

HONEYBEE FORAGES OF ETHIOPIA



The National Herbarium

HONEYBEE FORAGES OF ETHIOPIA

Admasu Adi, Kibebew Wakjira, Ensermu Kelbessa and Amssalu Bezabeh



Holeta Bee Research Centre

This book is the result of the cooperation between Holeta Bee Research Centre (HBRC) and the Netherlands Development Organization (SNV-Ethiopia)

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Bidens pachyloma on the cover page is an endemic species restricted to the highlands of Ethiopia. The flowering of this and other species of *Bidens* at the end of the main rainy season (in September), is coincidental with the beginning of New Year in Ethiopia during which the followers of Christian Orthodox religion celebrate the finding of "True Cross", and also the Oromo celebrate "Irreechaa". Bunch of this species is often presented to families or friends as best gifts wishing bright hope for the upcoming New Year and/or new season.

Forward

Ethiopia is endowed with an immense diversity of about 6000 species of vascular plants of which the majority are honeybee flora. These comprise wild plants, weeds, forage plants, horticultural crops, pulses and oil crops. These resources coupled with variable climate, edaphic factors, huge water resources and other favorable ecological factors enable the country to sustain about ten million bee colonies.

Ethiopia is in the pace of agricultural growth and transformation and the contribution of apiculture has enormous value for the agricultural sector. In this regard, beekeeping fits well in many other livelihood endeavors and it plays an important role in income generation. As per the report from different sources, the annual honey and beeswax production of the country is estimated at 54,000 and 5,000 tons respectively, and valued at 0.1 to 0.3 billion US dollars. This makes the country one of the largest honey and beeswax producers worldwide.

The Government of Ethiopia has recently elaborated a number of agricultural policies and strategies aimed at reducing poverty and enhancing sustainable environmental conservation. In this context, the Government believes that the development of the apiculture sub-sector will serve as a catalyst for economic growth and transformation and therefore would contribute significantly to achieving food security, and creating employment. The timely publication of this book will contribute for the development of apiculture industry which in turn would help in sustainable biodiversity conservation and combating climate change.

The book describes and illustrates 371 important honeybee forages (the majority of which are indigenous) and is believed to be a valuable reference to all interested individuals and groups involved in beekeeping. I believe, this book would lay down ground for a better appreciation and understanding of our plant biodiversity as well as the conservation of forest resource for sustainable honey production. I hereby express recognition to all involved in the preparation and publication of this highly prized book with a special appreciation of its contribution to the green development in Ethiopia.



Aliye Hussen

Director General, Oromia Agricultural Research Institute

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HONEYBEE FORAGES OF ETHIOPIA

INTRODUCTION

Physiography

Ethiopia occupies the major part of the Horn of Africa. The country covers approximately 1.11 million square kilometers and shares boundary with Eritrea, Sudan, Kenya, Somalia and Djibouti. It is located between 3° and 15°N latitudes and 33° and 48° E longitudes. The altitude ranges from the depressions in the Afar (126 m below sea level) to the spectacular mountain tops of Ras Dasha in the north with an altitude of 4620 m a.s.l. and Tullu Dimtu of Bale Mountains in the southeast with an elevation of 4377 m a.s.l. The major physiographic features of the country are a massive highland complex of mountains and plateaus divided by the Great Rift Valley and surrounded by lowlands along the periphery. It is a country of great geographical and climatic diversity, with varied ecological conditions.

Climate

In Ethiopia, altitude-induced climatic conditions form the basis for three climatic regions, which are traditionally known as "DEGA", "WEINA DEGA", and "KOLLA". The "DEGA" zone consists of areas generally above 2400 meters in elevation; with average daily high temperature of near freezing to 16°C, with March, April and May being the warmest months. Lower areas of the plateau, between 1500 and 2400 meters in elevation, constitute the "WEINA DEGA". In this climatic region the daily temperature ranges from 16 to 30°C. The "KOLLA" zone consists of areas where the elevation is lower than 1500 meters. The "KOLLA" encompasses the eastern Ogaden, south-eastern lowland and Afar plains, most parts of the rift valley, the deep valleys associated with the Blue Nile, Ghibe-Omo and Tekeze rivers and the peripheral areas along the Sudanese and Kenyan borders.

Variations in precipitation throughout the country are governed by differences in elevation and seasonal changes in the atmospheric pressure systems that control



the prevailing winds. Winds that originate over the Atlantic Ocean and blow across Equatorial Africa have a marked seasonal effect on much of Ethiopia's rainfall. The resulting weather pattern provides the highlands with most of its rainfall during a period that generally lasts from mid-June to mid-September. The second main rainy season is usually preceded in April and May by converging northeast and southeast winds that produce a brief period of light rains known as "BELG". In the southwest, precipitation is high and evenly distributed and the central highlands receive sufficient amount and gradually decreases towards northern and eastern parts of the country. The amount of rainfall is much lower in the Afar and the Ogaden.

Vegetation of Ethiopia

Ethiopia is one of the countries in the world endowed with rich biodiversity. One of these resources is the natural vegetation. The vegetation is an assemblage of plants growing together in a particular location and it is characterized either by its component species or by the combination of structural and functional characters that determine the appearance, or physiognomy of vegetation. The vegetation types in Ethiopia are divided into about eight to nine and are being sometimes considered ecosystems but there are disagreements among the vegetation ecologists on few of the vegetation types. Nevertheless, here we recognize ten vegetation types in Ethiopia, namely: i) Desert Vegetation, ii) Semi-Desert Scrub, iii) *Acacia-Commiphora* Bushland and Thicket, iv) Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest, v) Dry Evergreen Montane Forest, vi) Afroalpine and Sub-Afroalpine Vegetation, vii) Moist Evergreen Montane Forest, viii) Broad-leaved (*Combretum-Terminalia*) Deciduous Woodland and Forest, ix) Lowland Semi-evergreen Forest, and x) Wetland (swamps, lakes, rivers and riparian) Vegetation.

i) Desert Vegetation. Strict desert occurs in Ethiopia only in a narrow belt extending from Dalol Depression along the Eritrean border, which is characterized by highly drought tolerant species. The altitudes of this desert landscape range from 126 m below sea level to 100 m above sea level. The desert landscape is characterized by rocks and/or salt pans and lakes. The very sparse vegetation is composed of drought and

salt tolerant species like *Hyphaene thebaica*, *Salsola spinescens*, *Saueda monoica*, *Aerva javanica*, *Trianthera cystallina*, *Tamarix aphylla* and *Sporobolus spicatus*. *Hyphaene thebaica* that grows in the desert also extends up to 1000 m a.s.l. into the Semi-desert Scrub and *Acacia-Commiphora* Bushland and Thicket vegetation types. It is almost impossible to exercise apiculture in this desert area.



Figure 1 Desert Vegetation in Afar Region

ii) **Semi-desert Scrub Vegetation.** The Semi-desert Scrub Vegetation is covered with semi-desert grasses and dwarf shrubs and occurs at altitudes between 100 and 300 m a.s.l. It is found in north-eastern part of the country in Afar Floristic Region, bordering the Desert and also bordering Djibouti and Somalia, stretching into the *Acacia-Commiphora* Bushland and Thicket on both sides of the Wabe Shebelle River in Bale and Harerge floristic regions, extending eastwards along the Somali border. The Semi-desert Scrub Vegetation also extends westwards from Wabe Shebelle along the border with Somalia stretching into Ethiopia along Genale River in a narrow strip in Sidamo and Bale floristic regions. The Semi-desert Scrub Vegetation is interrupted by the highlands that extend from Yaballo along Mega Plateau and Tuka ridge culminating at the border town of Moyale. The interrupted Semi-desert Scrub

starts beyond the Ethio-Kenyan border ridge of Forrole with its widest area coverage around El Hobok, extending towards Chew Bahir and culminating in the lower portion of the Omo River Valley.

The vegetation is mainly dominated by shrubs not usually exceeding two metres in height and interspersed (or dominated in some places) with grasslands (as open-wooded grassland), or more or less covered by ephemeral grass vegetation as it is the case on the Bale Floristic Region side of Genale River and around Chew Bahir and low-ermost portion of the Omo River Valley. Characteristic species of this vegetation type include grasses like *Aristida adscensionis*, *A. faniculata* and *A. somalensis* and shrubs including *Acacia paolii*, *Acacia oliveri*, *Anisotes trisulcus*, *Anisotes tanensis*, *Barleria pseudopronitis*, *Cadaba barbiger*, *Cordia monoica*, *Fadenia zygophylloides*, *Maerua candida* and *Neuracanthus polyacanthus*.

It is not possible to run economic beekeeping in this drought prone vegetation type.



Figure 2 Semi-desert Scrub Vegetation, near Gode, Harerge Floristic Region, Somali Region



iii) *Acacia-Commiphora* Bushland and Thicket. This vegetation type, which should be recognised as a separate vegetation type, or may be included in the Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest (as “Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest and Bushland and Thicket”), is a major vegetation type occupying large areas between the proper Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest and Semi-desert Scrub vegetation types. The *Acacia-Commiphora* Bushland and Thicket Vegetation covers large areas in the Afar, Harerge, Bale, Sidamo and Gamo Gofa floristic regions (in Afar, Somali, Oromia and SNNP regional states) extending from northern Afar to northeastern part of the Somali Region but interrupted where the Ethiopian Highland elements extend into Somaliland (North Somalia) and covering a wide area, particularly in flat and rocky low ridges in Harerge, southern Bale and Sidamo floristic regions and also in Oromia Regional State around Wachile and running parallel but below the ridge from Yaballo via Mega and Tuka and reaching the Kenya border from northwest of Forrole to south of Tuka ridge. The Woito River Valley in SNNP Region is characterized by this vegetation type, which also extends north as a narrow and interrupted vegetation strip along the inner edges of the Rift Valley, e.g. along the western escarpment, west of Lake Chamo northwards to close to Humbo village via Arba Minch.

The altitudes of *Acacia-Commiphora* Bushland and Thicket range between 300 and 1000 m (in some areas extending up to 1100 m), occurring between Semi-desert Scrub and Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest. This vegetation type occupies large areas in Wachile and Triangulo areas in Sidamo Floristic Region (in Oromia and Somali regional states).

Characteristic species of the vegetation type include *Acacia edgeworthii*, *A. mellifera*, *A. oerfota*, *A. senegal*, *A. stuhlmannii*, *A. bussei*, *Senna ruspolii*, *Boswellia rivaie*, *Commiphora boiviniana*, *C. corrugata*, *C. erlangeriana*, *C. guidottii*, *C. incisa*, *C. longipedicellata*, *C. kua*, *C. myrrha*, *C. uniloba*, *Ziziphus hamur*, *Cadaba farinosa*, *C. glandulosa*, *Maerua macrantha* and *Barleria hochstetteri*.

In this type of vegetation it is possible to exercise beekeeping for income generation and conservation of the existing resources.

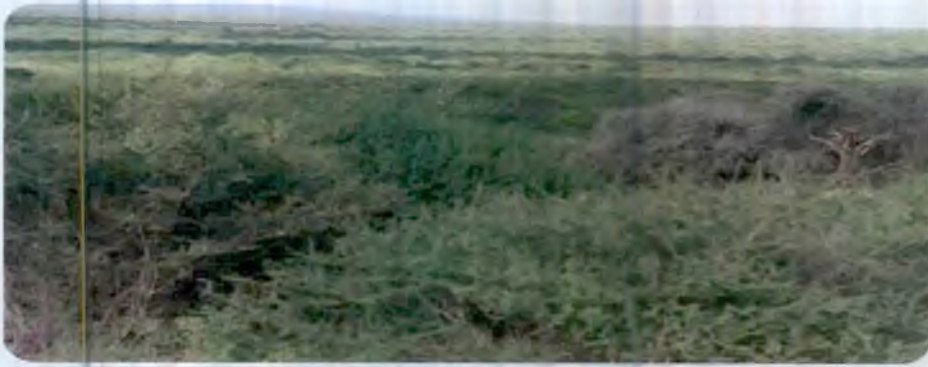


Figure 3 *Acacia-Commiphora* Bushland and Thicket, near Triangulo, NW of Boko Mayo in Liban Zone of Somali Region

iv) *Narrow-leaved (Acacia-Commiphora) Deciduous Woodland and Forest.*

This vegetation type occurs in the northern, eastern, central and southern parts of the country, mainly in northeastern and eastern Tigray Floristic Region, the escarpment of the Afar Floristic Region, Harerge Floristic Region in Somali, Oromia and Harari regional states, and in Bale and Sidamo floristic regions of Somali and Oromia regional states as well as in Sidamo and Gamo Gofa floristic regions of Southern Nations, Nationalities and Peoples Region. The Rift Valley in Afar, Oromia, and SNNP Regions are characterised by this vegetation type, although the parts of the Rift valley north of Lake Abaya is dominated by various species of *Acacia* and the contribution of the genus *Commiphora* is mostly negligible. In the Central Rift Valley, *Balanites aegyptiaca* and *Ziziphus abyssinica* are more dominant than the *Commiphora* species. The vegetation type is found at altitudes between 1000 and 1800 m. The lower portion intergrades with *Acacia-Commiphora* Bushland and Thicket while the upper part forms a forest (with the trees being taller than five metres) and found sometimes mixed with the elements of the Broad-leaved (*Combretum-Terminalia*) Deciduous Woodland and Forest. The former vegetation occurs in various parts along the Malka Guba Wachile Road and also along Filtu-Bokol Mayo Road and in southern Bale in various places, while the latter can be observed in various places including the escarpment below Chencha, along the Roads from Woito Valley to Jinka, from Bule Hora (Agere Mariam) towards Yabello, and extending towards the east from Bule Hora area via

lower part of Shakisso, Wadera and Dalo Mana extending into Harerge Floristic Region, reaching Babile area and beyond. The vegetation of the Gibe River valley (both in Shewa and Kefa floristic regions) is also the mixed type of woodland and forest.

The characteristic species of the Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest are *Acacia tortilis*, *A. senegal*, *A. seyal*, *A. bussei*, *A. albida*, *Ziziphus abyssinica*, *Balanites aegyptiaca*, *Boswellia neglecta*, *B. macrophylla*, *Commiphora erythraea*, *C. myrrha*, *C. obovata*, *C. serrulata*, *C. sphaerocarpa*, *C. terebinthina*, etc.

In this vegetation type, beekeeping is a profitable business to exercise as sideline activity for income generation, or as a full time business enterprise provided that the vegetation would not be disturbed. The major bee forage species in this vegetation type are *Hypoestes forskalii*, *Aloe* spp., *Acacia tortilis*, *Acacia senegal*, *Acacia brevispica* and *Terminalia brownii*, which are known for honey production.



Figure 4 Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest, Sof Omar Area in Bale Zone, Oromia Region

v) **Dry Evergreen Montane Forest.** This vegetation type covers much of the highland areas and mountainous chains of Ethiopia in Oromia Region (Shewa, Arsi, Sidamo, Bale and Harerge floristic regions), Amhara Region (Gonder, Welo, Gojam and Shewa floristic regions), Tigray Region and SNNP Region (Sidamo and Gamo Gofa floristic regions). The Dry Evergreen Afromontane Forest has canopies usually dominated by

Juniperus procera or *Podocarpus falcatus* as dominant species, followed by *Olea europaea* subsp. *cuspidata* and *Hagenia abyssinica* (in some areas). Other characteristic species include *Buddleja polystachya*, *Erica arborea*, *Hagenia abyssinica*, *Hypericum revolutum*, *Galiniera saxifraga*, *Nuxia congesta*, *Pittosporum viridiflorum* and *Prunus africana*. In this forest type, beekeeping is a profitable business to exercise as sideline activity for income generation, or as a full time business enterprise provided that the forest resource is properly managed and conserved. The major bee forages in this vegetation include *Hagenia abyssinica*, *Olea europaea* subsp. *cuspidata* (including *Eucalyptus globulus* plantations), various species of *Trifolium*, *Hypericum revolutum*, *Mikaniopsis clematoides*, etc. The honey from *Hypericum revolutum* and *Eucalyptus* species is commonly produced in this vegetation in Bale and central highlands, respectively.



Figure 5 Dry Evergreen Montane Forest, Chilimo Forest in West Shewa Zone of Oromia Region

vi) **Afroalpine and Sub-Afroalpine Vegetation.** The sub-afroalpine vegetation occurs between 3200 and 3500 m, while the Afroalpine areas are found above 3500 m a.s.l. The vegetation is characterized by the most conspicuous giant *Lobelia* (*Lobelia rhynchopetalum*) and evergreen shrubs including *Erica arborea*, *E. trimera*, *Helichrysum horridum* and perennial shrubby herbs such as *H. citrispinum*, *H. splendidum*, *H. gofense*, etc.

This vegetation is composed of the most important bee forages, which include *Erica arborea*, *E. trimera*, *Helichrysum citrispinum*, *Lobelia rhynchopetalum* and *Trifolium* spp. (e.g. *T. acaule*, *T. cryptopodium*, *T. multinerve*, *T. semipilosum*, *T. simense*). Honey from *Erica arborea* is known from this vegetation type and harvested in Gondar, Bale and West Shewa (Wonchi) floristic regions and it is a source of income for the community dwelling in this vegetation.



Figure 6 *Erica arborea* forest in Debark area, North Gonder Zone of Amhara Region

vii) **Moist Evergreen Montane Forest Vegetation.** This vegetation type is traditionally referred to as the Afromontane rainforest. The Afromontane rainforests occur in the southwestern part of the Ethiopian Highlands, at altitudes between (1200-)1500 and 2600 m and the Harenna-Mana Angetu and Jamjam (Bore-Anferara National Forest Priority Area) forests on the southern slopes of the Bale Mountains and eastern Sidamo floristic regions respectively, in Oromia.

The forests characteristically contain a mixture of *Podocarpus falcatus* and broad-leaved species as emergent trees in the canopy including *Pouteria altissima* (lower portion of SW forests only), *P. adolfi-friederici* and *Olea welwitschii*. Other characteristic species include *Albizia grandibracteata*, *A. gummifera*, *A. schimperiana*, *Celtis africana*, *C. gomphophylla*, *C. philippensis*, *Chionanthus mildbraedii*, *Ficus mucosa*, *F. sur*, *F. umbellata*, *Morus mesozygia*, *Psychotria orophila*, *Trichilia dregeana*, *Trilepsium madagascariense* and *Vepris dainellii*.

The major honey producing species in this vegetation include *Croton macrostachyus*, *Schefflera abyssinica*, *Polyscias fulva*, *Coffea arabica*, *Vernonia amygdalina*, *Crassocephalum macropappum*, *Asystasia gangetica* and *Justicia bizuneshiae*. The honey harvested from the above-mentioned species (first five) fetches higher price both in local and international markets.



Figure 7 Moist Montane Forest, Sheka Forest, SNNPR

viii) **Broad-leaved (Combretum-Terminalia) Deciduous Woodland and Forest.**

This vegetation is characterized by small-to moderate-sized trees with fairly large deciduous leaves. The vegetation type occurs along the western lowlands and the escarpment of the Ethiopian Plateau and the major river valleys that drain the Blue Nile and Omo rivers, between altitudes ranging from 500 to 1900 m. Characteristic species of the vegetation include *Combretum molle*, *Terminalia brownii*, *Ziziphus abyssinica*, *Anogeissus leiocarpa*, *Ficus dicranostyla*, *Securidaca longepedunculata*, *Ozoroa insignis* and *Grewia bicolor*. The commonly known bee forage plant species in this vegetation include *Ozoroa insignis*, *Securidaca longepedunculata*, *Terminalia brownii*, *Combretum molle*, *Grewia mollis*, *G. villosa*, *Piliostigma thonningii*, *Acacia tortilis*, *Acacia sieberiana* and *Borassus aethiopum*.



Figure 8 Broad-leaved (*Combretum-Terminalia*) Deciduous Woodland and Forest, Baro River Area, Gambella Region

ix) **Lowland, Semi-evergreen Forest.** This vegetation encompasses forests that are restricted to the lowlands of eastern Gambella Region in Abobo and Gog districts. The altitudes of the Forest range from about 450 to 650 m and the dominant tree species include *Baphia abyssinica*, *Celtis zenkeri*, *Milicia excelsa*, *Alstonia boonei*, *Antiaris toxicaria* and *Trichilia prieuriana*.

The major bee plants in this vegetation include *Acacia pentagona*, *Hypoestes forskoolii* and *Ziziphus pubescens*.



Figure 9 Lowland Semi-evergreen Forest, Gog Forest in Gambella Region

x) **Wetland (swamps, lakes, rivers and riparian) Vegetation.** Wetland vegetation type includes the vegetation growing in various types of wetlands including, but not restricted to, lake shores, riverine vegetation, swamps and edaphic grasslands. Wetlands have often been described as being ecotones, i.e., they act as transitional zones between upland areas such as forests and farmlands and deepwater aquatic ecosystems such as river, lakes and estuaries. Lake shore and swamp wetland vegetation is, characteristically, composed of various species of sedges, grasses and other species like *Aeschynomene elaphroxylon*, *Crassocephalum montuosum*, *Spilanthes costata*, *Mimusops kummel*, *Typha latifolia*, etc., while riverine vegetation is characterised by having species that include *Berchemia discolor*, *Celtis toka*, *Ficus capreaefolia*, *F. sycomorus*, *F. thonningii*, *F. vallis-choudae*, *Mimusops kummel*, *Pouteria alnifolia*, *Psychotria capensis*, *Trichilia emetica*, *T. retusa*, *Tamarix aphylla* and *T. nilotica*.

Although the floristic composition of the riverine vegetation varies, depending on altitude and geographical location, the most distinctive riverine forest is found in Narrow-leaved (*Acacia-Commiphora*) Deciduous Woodland and Forest (including

Bushland and Thicket and Desert and Semi-desert Scrub Vegetation types, e.g. along Awash and lower parts of Wabi-Shebelle and Genale rivers.

The major bee forages in this vegetation type include *Celtis africana*, *C. toka*, *Mimusops laurifolia*, *M. kummel*, *Tamarindus indica*, *Ficus sur*, *Berchemia discolor* and *Phoenix reclinata*.

Beekeeping in Ethiopia

The practice of beekeeping seems very old and no one knows exactly when and where it was started. However, it is believed that primitive man, may be even Adam and Eve, harvested honey from bee nests in hollow trees and rock crevices and is portrayed in many rock paintings in Africa and Europe. Beekeeping, as we think of today, commenced when man learned to safeguard the feature of swarms, established colonies from them and even built some type of doweling from them, perhaps and pottery vessels as shown in a wall painting about 1500 B.C., which shows smoke being used to harvest honey. Honeybees were confined to the old world until the 16 century. However, they are now spread throughout all the habitable parts of the world, perhaps more than any other single branch of agriculture. The change in honeybee distribution over centuries has followed man's colonization of new regions and changes in agricultural practices.

In Ethiopia, there is no well-documented evidence that indicates when and where honey hunting and beekeeping practice started. Today, beekeeping is widely exercised in most parts of Ethiopia. However, honey hunting is mostly exercised in south-eastern, south and southwestern parts of the country along with beekeeping. For example, beekeeping and honey hunting are major livelihood options for the Mejenger ethnic group in Gambella Region of Ethiopia. Honey hunters use bee flight direction; nest guiding birds and their own experiences in search of caves, stone crevices and tree trunks in which the feral colonies are expected to harbour.

Apicultural Resource base of the Country

Ethiopia has suitable environmental conditions for the existence of diversified natural resource that is suitable for beekeeping. There are abundant flowering plants, most of which are honeybee flora. These coupled with variable climate, edaphic factor, huge wa-

ter resources and other favorable ecological factors have enabled the country to sustain large number of honeybee colonies. As per the different reports, the annual honey and beeswax production of the country is estimated at 54,000 and 5,000 tons respectively. This makes Ethiopia one of the largest honey and beeswax producer worldwide.

Biology of Ethiopian Honeybees

The country is not only agro-climatically diverse but also a centre for diversified species of plants and animal resources, including honeybee races. The geographic races of honeybees found in the country have been studied by various scientists and the existence of different races of honeybees was reported. The first honeybee race reported to occur in the Ethiopian plateau was *Apis mellifera monticola* by Smith in 1961. Later on, the existence of large and black monticola bees in high mountainous areas of Ethiopia was reported in 1988 by Ruttner. However, none of these reports indicated the localities and the distribution of these bees.

In 1998, Hepburn and Radolff confirmed the existence of *A. mellifera jemenitica* and a different race *A. mellifera bandasii* and they stated that the Horn of Africa, particularly the highlands of Ethiopia, are physiographically and climatologically complex and the populations of the honeybees of the area are also interesting and complex.

To refine the understanding of honeybee populations of the country, a more detailed study was conducted by Amssalu Bezabeh and others in 2004, using a multivariate morphometric analysis. The result indicated the occurrence of five statistically separable morphometric clusters occupying different ecological areas: *A. mellifera monticola* in northern mountainous highlands, *A. mellifera jemenitica*, in eastern, north-eastern and north-western arid and semi-arid lowlands, *A. mellifera bandasii* in central moist highlands, *A. mellifera scutellata* in western, southern and south-western humid midlands (rainforests) and *A. mellifera woyi-gambella* in south-western semi-arid to sub-humid lowlands, which is more aggressive compared to all other Ethiopian honeybee races. The ecological distributions of Ethiopian honeybee races are indicated in Figure 10.

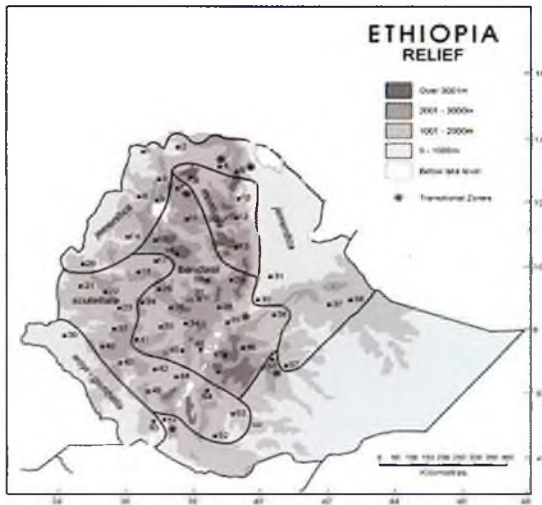


Figure 10 Map of Ethiopia showing the distribution of honeybee races

Relative Advantage of Beekeeping

Beekeeping has many relative advantages over other agricultural activities, to mention a few: i) it doesn't compete for resources with other agricultural activities, ii) bee husbandry does not disturb ecological balance, iii) the investment and running costs are relatively low with minimum risks, iv) beekeeping can be run as part time, side line or off time activity, v) it can be done irrespective of sex and working age, vi) most bee products are not easily perishable, and vii) beekeeping helps rural communities for self-reliance.

Socio-economic and Environmental Value of Beekeeping

Beekeeping has diverse values both for human beings and the environment. The indirect contribution of bees to the environment is much more than the monetary value of bee products. Some of the values of bees and beekeeping are summarized below.

As income source. Beekeeping is one of the agricultural sectors that make a substantial contribution to rural household food security and risk management through providing income. Beekeeping in Ethiopia plays an important role in income generation for beekeeper farmers. An average of 0.1-0.3 billion USD can be obtained from honey sales alone per year and it is expected to increase every year.



As 95% of the produce comes to the markets for sale of honey, collecting and selling honey create profits for collectors and traders. Beeswax is also one of the bee products collected and sold to generate cash income to the producers, collectors, processors and exporters. In bee colony shortage areas, the selling of bee colonies has become a new business venture to generate additional income to the beekeepers. The income from bee product sales would enable the beekeeper to purchase food grains, clothes and to pay off labour and government tax. Moreover, the income from beekeeping is extending benefits to the beekeepers to reinvest on other income generating activities such as the purchase of farm animals and construction of a better house.

Food security and poverty alleviation. Food security is not only a matter of producing grains but also the financial power to pay for the purchase of grains. Since products obtained from honeybees are of high value products, the income generated through selling of honey and beeswax is very significant for purchase of grains for family consumption. It was noticed that during falling coffee prices in predominantly coffee-growing areas and Tsetse fly problems in lowlands, only beekeepers were able to purchase grain to feed their families and withstand such a hard period, through the sale of honey.

Job opportunities. Many people are engaged in trading of honey and beeswax at different levels and in production and selling of honey mead (TEJ). Based on the season of honey production, high number of TEJ breweries are operating in different parts of the country, creating job opportunities for large number of Ethiopians. Apart from this, there are also a number of honey collectors, traders and transporters who earn their livelihoods from these activities.

Environment Contribution of Beekeeping

Pollination service. Pollination is an essential ecosystem service that enables plant reproduction. This important step depends, to a large extent, on the mutualistic relation between species of the plant to be pollinated and the pollinator. The reduction or loss of either will affect the survival of both. Pollinators contribute to the maintenance of biodiversity and ensure survival of plant species including plants

that provide food security to innumerable rural households. It is reported that more than half of the world's diet of fats and oils comes from oilseeds: coconuts, cotton, oil palm, olives, peanuts, rape, soybeans and sunflower that are dependent upon or benefited by insect pollinators. The most important pollinating insects are bumblebees, solitary bees, stingless bees and honeybees. It is interesting to note that the value of honeybees as pollinators from the data obtained from the agricultural economy of the United States of America in 1987 was estimated to be about US\$ 9.3 billion. But this very important benefit of honeybees is often poorly understood or totally unknown to most people in Ethiopia.

The hill tracks and forests of Ethiopia host a large number of honeybee (*A. mellifera*) colonies. Hence, beekeeping has a great potential in raising the productivity of cross-pollinated as well as other crops that need insects for their pollination. Some of the major crops investigated that need honeybee pollination in the country are niger seed, onion, apple, coffee and beans.

Niger seed (NOUG). Niger seed (*Guizotia abyssinica*), locally known as NOUG, is cultivated as an oil seed crop and used for edible oil, as animal feed and an illuminant. Niger seed is self-sterile and requires bees for cross-pollination. Honeybee pollination can increase the seed yield of niger seed by 43% and this in turn also would increase the oil content of the seed. In the country, 150,000-170,000 hectares of land are annually covered with this crop and annually 50,000 to 79,000 quintals of niger seed are produced. Thus, the monetary value that can be obtained from niger seed pollination service of bees is estimated to be Birr 60,000,000 to 94,800,000. Niger seed is one of the major bee plants in the country and honey from this crop is highly demanded for making honey mead (TEJ).

Onion. Onion (*Allium cepa*) is an important condiment and vegetable in Ethiopia and it is a cash crop for generating income and spice for flavouring local dishes. Onion is produced for both domestic consumption and export. The intensity of the cross-pollination in onion varies between 30 to 94% depending on availability of pollinators. Pollination experiments carried out by Admassu Addi and others indicated that honeybee pollination increases the seed yield by 84%.

Apple. Apple (*Malus sylvestris*) is another important cash crop. Limited production



and more demand of the apple make it a high value cash crop all over the highlands of the country. Most varieties of apple needs cross-pollination. In apple, early pollination soon after the flowers open is desirable for good fruit set. Honeybees constitute about 75% of the insects visiting apple and there tends to be a decrease in honeybee activity and fruit set with increasing distance (from 25 to 100 m) from the hives. An experience from Tseday Horticultural Development Enterprise in Ethiopia also showed that fruit yield of apple reduced due to lack of sufficient honeybee population in the area of cultivation. Honey from apple can be harvested in large quantity depending upon the availability and abundance of apple orchards.

The Role of Beekeeping in Natural Resource Conservation

Apiculture and forest management practices are deep rooted in Ethiopian rural life. Beekeeping is an environmentally friendly activity and beekeepers are more aware about the importance of conservation of natural resource than any ordinary farmers. Beekeepers know very well that if there are no trees there will be no bees, and if there are no bees there will be no honey and money. In this regard, experiences have shown that beekeepers not only try to maintain the natural vegetation in their surroundings but also plant trees in their homegardens and farmlands. For instance, the traditional beekeepers in southwest Ethiopia have long established traditional forest management practices for beekeeping, which are locally called "KOBO". KOBO is a block of forestland bounded and demarcated by big trees and/or physical features like rivers and streams, and exclusively used for the purpose of traditional beekeeping and hunting. In "KOBO" system, nobody is allowed to cut a single stick or hang hives in the forest which does not belong to him or her. Realizing the value of beekeeping for forest conservation and poverty alleviation, integration of beekeeping with area enclosures and rehabilitation of degraded lands is needed. Conservation of natural resources is widely practiced by giving such areas for organized jobless youth in many parts of northern Ethiopia (Amhara & Tigray regions). For instance, Farm Africa, GIZ and other relevant organizations are supporting farmers living near-by forest to practice beekeeping for honey production to generate income and to protect the forests.

Beekeeping Practices in Ethiopia

In Ethiopia, beekeeping is practiced extensively in all areas where human beings have settled. However, the levels of beekeeping practices vary from place to place.

Traditional beekeeping. In the country, traditional beekeeping can be categorized as forest and backyard traditional beekeeping. Traditional beekeeping is practiced using traditional hives made with different locally available materials. The average annual yield of colonies in traditional hives is 5-10 kg/colony/annum.

Traditional forest beekeeping. Forest beekeeping is widely practiced using traditional beehives in the western, southwestern and southern parts of the country, where natural vegetation and the honeybee populations are relatively more available. Forest beekeeping is carried out by hanging the traditional beehives on trees far away from the homestead in the forest (see Figure 11). Honey harvesting is usually made by checking the hive weight for honey speculated within the traditionally honey harvesting periods. While bringing down the beehives from long trees for honey harvest, complete or partial destruction can take place on the bee colonies and their nests. After the honey harvest, the bees are shaken out of the hives and the hives are brought home and kept to be hung back on the trees for the next season, and such a practice has contributed to thousands of honeybee colonies loss or migration, thus affecting honey production of the country. Forest beekeeping practices are very risky for those climbing tall trees to hang and bring down beehives during harvesting. It was reported that many people die annually during honey harvesting times. However, forest beekeeping has opportunities in exploiting resources and it helps harvest organic honey.



Figure 11 Traditional forest beekeeping in Borena Zone of Oromia Region

Traditional backyard beekeeping. Backyard beekeeping is widespread in northern, central and eastern parts of the country. In these areas, beekeeping is mostly done at backyard, very close to humans and animals in which beehives are sheltered from the sun, rain and wind. Bees get immediate supervision for feeding during dearth periods and protection from enemies and pests. The beekeepers have a better chance of close contact with their bee colonies; this enables them gain well established indigenous knowledge of managing their colonies, resulting in a better quantity and quality honey harvest without affecting the bee colony. Natural vegetation cover is relatively low in these areas, making natural swarm catching somewhat difficult. Therefore, beekeepers pay high attention to their bee colonies and induce bee colonies to create swarm either to increase their bee colony stock or to sell extra colonies.



Figure 12 Apiary showing large stock traditional beehives, Wagmira Zone, Amhara Region

Intermediate beekeeping. Along with traditional beekeeping, intermediate beekeeping is also widely practiced in the country, using a Kenyan top bar prototype made of different cheap and non-timber, locally available materials. Top bar hives have been considered intermediate between the traditional and frame beehives. This type of hive is long and trough-shaped with sloping sidewalls covered with top bars of a specified width. This hive can be made from timber or from any other locally available materials, which is then internally plastered with mud and cow dung. The bars are moveable allowing internal inspection with little disturbances to the bees and the constructed combs. The average yield of intermediate hives is 20-40 kg/hive/year.



Figure 13 Apiary showing beehives made from wood

Moveable frame hive beekeeping. Globally, significant change in the beekeeping industry and honey yield production was made through the adoption of frame beehives and certain production-enhancing equipment. Moveable frame beehives allow common bee management practices such as migratory beekeeping, supers adding or reducing, regular inspection, quality honey harvest, swarm control, feeding during dearth periods, stimulating early colony growth and pest and disease control. A frame beehive allows for honey to be extracted from the combs without breaking the combs, and bees require less time to refill the combs.

Local condition observations showed that frame beehive beekeeping method provides better productivity as compared to other beehive types (40-60 kg/hive/year). Honey production varies from place to place, mainly, because of the availability of bee forage and the level of management inputs.



Figure 14 Apiary with improved beehives

Constraints of Beekeeping

Despite the country's great potentials and opportunities for beekeeping, there are many constraints that affect the production and productivity of beekeeping. Some of the major constraints are briefly described below.

Scarcity of bee forage. Much of Ethiopia's land mass was once covered with a variety of natural forests. In these forests, there were many plants that were serving as a source of nectar and pollen to honeybees, food for human, forage for wildlives and domestic animals. However, today, some of these important resources like bee forage trees, are declining rapidly due to the expansion of subsistence agriculture and small to large scale commercial farming. As a result of these threats, the honeybee populations are declining from time to time eventhought honey production is increasing because of technological interventions For instance, in the past two decades it was a matter of an hour for the traditional hives to be occupied by bee swarms. But nowadays, during flowering periods of the plants, it is hard to get a bee swarm to start beekeeping, and the price of a colony ranges from 400-1500 Birr.

Honeybee diseases and pests. There are enormous factors that are endangering the life of honeybees, affecting bee products. These factors include bee diseases and enemies (pest and predators) since honeybees are a colonial insect so that pathogenic organisms spread with great ease and can easily affect their health

status. In Ethiopia, like in any other tropical countries, honeybee pests and predators are more serious than honeybee diseases. In the country, ants, wax moth, small hive beetle and bee eater birds are some of the major problems of bees and beekeeping. **Chemical poisoning.** The effect of agricultural chemicals on honeybees has been regularly reported by beekeepers. Application of chemicals may lead to a large scale death of worker bees that affects colony strength and may sometimes lead to a total death of the whole colony. In addition to the direct effect of chemicals on bees, herbicides may create a shortage of bee forages by eradicating some of the important bee forage weeds. Weeds like *Guizotia scabra* and *Bidens* species are among the most important honeybee forages and are sources of honey in the country. Moreover, chemicals may contaminate the bee products and can affect the health of consumers and export market of bee products. Control measures like using less toxic insecticides to bees, adjusting of timing of the sprays, early warning practices, creation of awareness, etc. are not given much attention. In this regard, policy which regulates the importation of hazardous pesticides that affect non-target animals and safe application of less hazardous pesticides should be applied to avoid the indiscriminate killing of the bees and contamination of their products.

The aim of this Book

The major aim of the book was to inventorise and document the major bee forage sources of the country. The information is believed to increase the awareness of users on planting and conserving important honeybee plants of the country. The book would contribute to enhance the conservation of the natural resources in general and the development efforts of beekeeping of the country in particular. The book may stimulate scholars and students to contribute to the documentation and characterization of the honeybee forage sources of the country.

Whom the Book may Serve the best

This honeybee forage book has aimed to provide information on plants (trees, shrubs and herbs) visited by honeybees, which are found in different agro-ecologies of the country. The book is intended to serve people involved in different sectors, at all



levels, like beekeeping development and environmental education, in the formal education system both in the specialised training of botanists and agriculturalists.

Why it was Important to Prepare this Book

In the field of apiculture, identification and documentation of nectar and pollen source plants are the most limiting factors for honey production. Knowledge of nectar and pollen source plants is important to assist beekeepers in site selection, determination of carrying capacity and to establish an appropriate colony management calendar. The integration of beekeeping with natural resource conservation needs also the knowledge of bee forage plants, and their agro-ecological distribution. Therefore, the publication of this book is extremely important because currently NGOs, private investors and research and higher learning institutions are involved in beekeeping development and research interventions and they are seeking information on honeybee forages, both for conservation and propagation purposes. To accomplish these activities, the availability of this reference book on honeybee forages to stakeholders is very important both to increase honey production and conservation of bee forage. The reference book can also be used for plant identification purpose, and it would also be essential to identify pollen spectrum of honey from which exporters would be able to precisely label the botanical and geographical origin of their honey.

This honeybee forage book of Ethiopia comprises important honeybee trees, shrubs and herbs, which commonly grow in Ethiopia and for most of them, the colour photo of each tree including flowers, fruits and/or bark are depicted. This publication is also meant to meet the needs of both individual farmer beekeepers and people involved in environmental conservation, by showing important bee plants that provide pollen and nectar for the honeybees. The book also includes very valuable plants not only as bee forage but also other usages for local people such as soil conservation, medicinal value and culturally important products. There are also some neglected plants which are considered to be notorious weeds in the country such as *Guizotia scabra*, *G. schimperi* (MECH), *Lantana camara*, *Parthenium hysterophorus* and *Prosopis juliflora*. The above mentioned plants contribute much for honey production and the beekeepers would be getting higher additional income from honey sales. On the other

hand, trees like *Schefflera abyssinica* and *S. volkensii* do not much timber value for the local communities but they are the major sources of white or creamy honey which has good aroma and flavour, and highly demanded in local and international markets.

How to use this Book

This honeybee forage book can be used in a number of ways. It can be used as field guide for honeybee forage identifications and search for information on various other plant uses. It is essential that the development agents are able to identify the honeybee forages and give advice on their propagation and management, for improving honey production and environmental conservation.

The phrase “major bee plant” means a plant frequently visited by honeybees for nectar and pollen and it is widely distributed in the country. Thus, it contributes either for the production of mono- or multi-floral honey. While “minor bee plant” means a plant visited by honeybees less frequently or in extraordinary time, but it also contributes for the production of honey in association with the major bee plants. A plant considered a major nectar source in one area may be only a minor source in other areas. Seasonal variations may also cause minor honey plants to occasionally yield heavily or major bee plants to yield poorly.

In this book, bee forage plants are arranged alphabetically by family names, and genera and species are also arranged alphabetically within each family, and for each plant species vernacular names, a standard botanical description, ecological distribution, uses and methods of propagation of the plant are presented.

Vernacular Names

The English or scientific names for plants are not appropriate for farmer beekeepers and development agents in Ethiopia. Even though Amharic, Afan Oromo, Tigringa, etc. are widely spoken languages in Ethiopia, there is still no one common language that all the people of Ethiopia speak. Even within one language, vernacular names can be varied. Therefore, it has become important to include the vernacular names of the plant species in some of the most important local languages. The following abbrevia-

tions of local languages have been used in the book (following Flora of Ethiopia and Eritrea, with some modifications): Afaringa (Afa), Afan Oromo (Oro), Agewinga (Age), Amharinga (Amh), Ahinashagna (Ahi), Alabagna (Ala), Anuwakinya (Anu), Arboregna (Arb), Arigna (Ari), Bertigna (Ber), Bodigna (Bod), Dasenechigna (Das), (English (Eng), Gamogna (Gam), Gedeogina (Ged), Ge'ezigna (Ge'e), German (Ger), Ghebigna (Ghe), Gimiringa (Gir), Gofagna (Gof), Gumuzigna (Gum), Guraginga (Gur), Hadiyigna (Had), Kafigna (Kaf), Kambatigna (Kam), Koenguigna (Koe), Konsinga (Kon), Kunamigna (Kun), Mejengerinya (Mej), Maoigna (Mao), Me'enigna (Me'e), Mesengogna (Mes), Mursigna (Mur), Nuwerigna (Nuw), Sahogna (Sah), Shekogna (She), Shankligna (Sha), Sidamogna (Sid), Somaligna (Som), Tigrigna (Tig), Tsamakogna (Tsa), Tsemayigna (Tse), Wolaitinga (Wol), Yemigna (Yem), Zaysingna (Zay).

Plant Description

The descriptions of plant families, species (and subspecies) in this book focus on the general features of the taxa - the habits/growthform, stems, leaves, flowers, fruits, the habitats and distribution of the plants with simple botanical terminologies. The description of each species (and subspecies) is followed by a photo of the plant to match with and also for easy identification of the plant, except in few cases.

Propagation

Whenever information on suitable propagation methods is available, it has been included. "Seedling" indicates that a relevant propagation method is raising seedlings in some sort of nursery.

Uses

In this section, more emphasis is given to apicultural use of the plants and other uses such as food source, flowering period and honey physical properties (colour, aroma and flavour), have been provided in detail, when available. In addition, other use values of the plants are described. Some definitions of common botanical terminologies that have been used in the text are also given in a separate section.

DESCRIPTIONS OF HONEYBEE FORAGE PLANT TAXA

ACANTHACEAE

Members of this family include herbs, shrubs and very rarely trees, with erect, ascending, prostrate, straggling or climbing stems. Leaves simple, decussate opposite, or very rarely alternate, or crowded at stem tip and apparently whorled; blades entire, rarely crenate or spine-toothed. Inflorescences of various types: cymes, racemes, spikes, panicles, or rarely dichasia, or flower solitary. Flowers irregular to sub-regular or apparently regular, hypogynous and bisexual. Fruit a capsule or rarely a berry, usually four or six to many-seeded, rarely 1-2-seeded.

This family comprises about 230 genera and 3,500 species, with major centres of distribution in tropical Africa, also in South Africa and Madagascar, tropical Asia and tropical America. The family is represented by 41 genera and 212 species (including subspecies) in Ethiopia.

Many species are very attractive to honeybees. The pollen production is moderate, whereas their nectar yield is substantial, under favorable environmental conditions. Some species of the Acanthaceae are very important honey plants, for example *Acanthus sennii*, *Asystasia gangetica* subsp. *micrantha*, *Barleria grandis*, *Hypoestes forskoolii* and *Justicia schimperiana*.

Acanthus eminens C.B. Clarke

KOSHISHILA (Amh); pigs wood (Eng); CHOCHA (Kam); BALA-URENTE, KORATI-BOYE, SOKORO, SUGURU (Oro).

A woody herb or shrub up to 4 m high. Leaves deeply pinnatifid with spines along the margins. Flowers deep blue-violet and arranged in one-sided racemes. Fruit a 25-26 mm long sessile and glabrous capsule.

Growing in moist montane forest under partial shade of trees, evergreen forest, stream banks and along grassland margins, at altitudes between 1500 and 2500 m in Welega, Ilubabor, Kefa, Sidamo, Bale and Harerge floristic regions, and also in Sudan, Uganda and Kenya.

Flowering almost all year round, alternatively visited by carpenter bees and honeybees when other major sources of nectar and pollen are scarce.



Figure 5 *Acanthus eminens*

***Acanthus pubescens* (Oliv.) Engl.**

KOSHISHILA (Amh); GOGODU, HERAYA, KOSSORU (Oro).

A shrub 1.5-3 m high with much branched, glabrous to densely pubescent stems covered with short non-glandular hairs. Leaves pinnatifid, oblong-ovate to oblong-elliptic and cordate at the base. Flowers purplish-pink or rarely white and arranged in terminal, decussate spikes.

Growing in deciduous woodland, wooded grassland and roadsides, at altitudes between 1300 and 2400 m, in Kefa, Gamo Gofa and Sidamo floristic regions, and also in Uganda, Kenya, Tanzania, Dem. Rep. Congo and Burundi.

The shrub is a major honey source in some parts of the country, and honeybees collect pollen and nectar from the flowers. A spoon full of nectar was collected from a single flower of this species while honeybees were collecting nectar and pollen from the flowers. The flowers are also pollinated by birds, since the flowers produce copious nectar.



Figure 16 *Acanthus pubescens*

Acanthus sennii Chiov.

KOSHESHLA (Amh); KOSORU, OKHA, QORE, SOKORU (Oro); OKOLE (Sid).

An erect, very prickly subshrub or shrub growing up to 2 m high. Leaves simple, but deeply lobed with marginal spines, dry and stiff. Flowers red and very showy, borne in terminal racemes with unilateral flowers that are produced in leaf-axils and clustered at the end of the stem.

The species is endemic to the highlands of Ethiopia (except Tigray) growing in *Juniperus-Olea* forest, *Podocarpus* forest, secondary scrub, thicket, roadsides, montane grassland and wooded grassland, usually in rocky places, at altitudes between 1700 and 3200 m.

The plant is a major honey source in the highlands of the country and honeybees collect pollen and nectar from the flowers. A spoon full of nectar was collected from a single flower while honeybees were collecting nectar and pollen from the flowers. The flowers are also pollinated by birds.



Figure 17 *Acanthus sennii*

Asystasia gangetica (L.) T. Anders. subsp. ***micrantha*** (Nees) Ensermu
TELENJE (Amh); MELLA (Anu); SENKE (Mej).

A suffrutescent herb; stems creeping-ascending, or rarely erect and 0.25 to 1 m high, sparsely to densely pubescent. Leaves ovate, with cordate to truncate or rarely rounded base. Flowers white but flushed and with lower mid-lobe violet or purple marked and borne in terminal, one sided racemes.

Growing in forest margin, coffee and other plantations, woodland, wooded grassland, road and gully sides and ditches, at altitudes between 200 and 2100 m, in nearly all floristic regions, and also in upland Eritrea, throughout tropical Africa, westwards to Senegal, from Somalia and Sudan southwards to Angola, Namibia, Swaziland and South Africa and also in Madagascar and other Mascarene Islands, tropical Arabia and introduced into Malaysia, Australia, etc.

The herb flowers from July to March and honeybees forage for pollen and nectar all day round. The herb is a very important honey source in south-western Ethiopia.



Figure 18 *Asystasia gangetica* subsp. *micrantha*

Barleria eranthemoides R. Br. ex C.B. Clarke

YESETAF (Amh); SHISHI (Oro); QODAXTOOL (Som).

A subshrub up to 0.5-1.2 m high; stems woody, covered with dense cystoliths, but glabrous. Leaves oblong to oblong-elliptic, attenuate at the base and mucronate at the apex. Flowers yellow-orange, borne in terminal (rarely sub-terminal) spikes with opposite flowers, or rarely solitary.

Growing in *Acacia* woodland and scrub, *Acacia-Commiphora* woodland, *Acacia-Balanites* and *Acacia-Dicrostachys* woodland, at altitudes between 500 and 1900 m, in nearly all floristic regions, and also in Eritrea, Sudan, Somalia, East Africa, Nigeria and Cameroon.

Flowering in September and October, the flowers are nectar and pollen sources for honeybees.



Figure 19 *Barleria eranthemoides*

Barleria grandis Hochst. ex Nees

A shrub or woody herb growing up to 1 m high; stems pubescent with subsessile glandular and sometimes with non-glandular hairs. Leaves narrowly elliptic to sub-ovate. Flowers cream to creamy-white and arranged in racemes in leaf axils and at the end of branches.

Growing in broad-leaved deciduous woodland and river valleys at altitudes between 900 and 1800 m, in Tigray, Gondar, Shewa, Welega and Kefa floristic regions of Ethiopia, and in lowland and upland Eritrea, being endemic to the two countries.

Flowering in October and November, honeybees forage on nectar and pollen. It is a potential honey source plant in deciduous woodlands of the country, confined mainly to the Tekeze-Gibe-Abbay river systems in Ethiopia.



Figure 20 *Barleria grandis*

Baleria submollis Lindau

A scrambling sub-shrub to 0.4-2.5 m high with stems straggling, densely pubescent with spreading glandular and spreading-descending non-glandular hairs. Leaves ovate, truncate or rounded to acute at base, margins entire and obtuse to acute at the apex. Flowers white.

Growing in *Acacia-Commiphora-Kirkia-Lannea* woodland, riverine forest, grassland and roadside, at altitudes between 500 and 1900 m in Kefa, Gamo Gofa, Sidamo and Bale floristic regions, and also in East Africa.

Flowering from September to October, the herb is a potential source of nectar for honeybees.



Figure 21 *Barleria submollis*

Blepharis edulis (Forssk.) Pers.

YAYIT ESHOH (Amh); CARAACAR, CARRAACAR, YAMAARUG (Som).

An annual or a perennial herb 10-50 cm high; stems erect or sometimes creeping, glabrous to pubescent with spreading non-glandular hairs. Leaves linear to narrowly elliptic, margin with 3-16 spreading, large or small pairs of spines. Flowers pale to bright blue or purple and borne in an erect spike, which is solitary or congested towards the base of stems.

Growing in open Broad-leaved (*Combretum-Terminalia*) woodland, and Forest mixed broadleaved woodland dominated by *Anogeissus*, narrow-leaved *Acacia-Commiphora* woodland, *A. mellifera* and *A. drepanolobium* thicket, semidesert bushland, on rocky slopes, lava outcrops, alluvial plains often on alkaline or saline soils at altitudes between 300 and 1600 m, in nearly all floristic regions, and also in Eritrea, Sudan, Djibouti, Somalia, E Africa, Egypt, Chad, Mali, Niger, Mauritania, Saudi Arabia, Yemen, Qatar, Oman and Iran.

Flowering from September to November, this plant is a nectar and pollen source for honeybees. The flowers are also visited by carpenter bees.

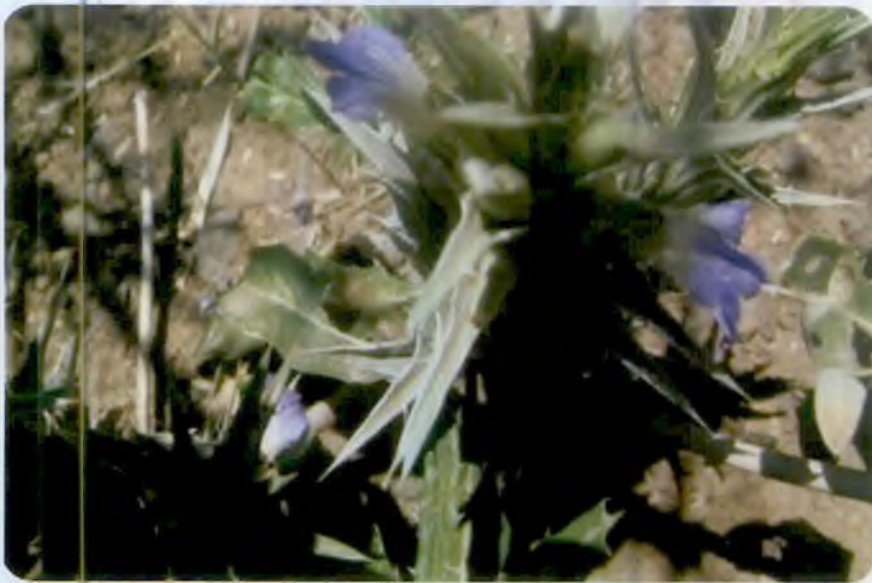


Figure 22 *Blepharis edulis*

Hgyrophila schulli (Hamilt.) M.R. & S.M.Almeida

AMEKELA, KORJEJOT, KURMBA, KURUMBEYE (Amh); UTIWAELLO (Anu); SIYAL, TILL (Nuw); QORRATI-SAREE (Oro); E'SHOCH-GUASSN (Tig); T'UT'UWA (Wol).

A small branched herb up to 80 cm tall, armed with six axillary, straight or curved spines at each node. Leaves lanceolate or oblong-lanceolate, sessile. Flowers purple, or sometimes whitish and borne in whorls in leaf axils.

Growing in moist depressions, grassland, along roadside ditches and creeks, swampy places and waterlogged areas at altitudes between 500 and 2600 m in most floristic regions, and also in Eritrea, throughout tropical Africa, Namibia, Swaziland, South Africa (Natal and Transvaal), India and Sri Lanka.

Flowering from August to March honeybees collect nectar and pollen from the flowers. The herb is browsed by livestock.



Figure 23 *Hygrophila schulli*

Hypoestes forskalii (Vahl) R. Br.

DARGU (Oro); FAARAXOOD (Som); GERBEIA (Tig).

A perennial herb or subwoody herb growing up to 1 m high. Leaves dark green above, paler beneath, ovate to lanceolate with entire margins. Flowers white, with purple nectar guides, arranged in erect racemes.

Growing in shade of *Podocarpus-Juniperus* and riverine forests, evergreen scrub, rocky slopes in open woodland, *Combretum-Terminalia* deciduous woodland, *Anogeissus-Combretum-Acacia* mixed woodland, *Acacia-Commiphora- Boswellia* woodland, *Acacia-Balanites* woodland, *Acacia mellifera* thicket, wooded grassland and *Eucalyptus* plantation, at altitudes between 400 and 2900 m, in all floristic regions of Ethiopia and also widespread in tropical and southern Africa and in tropical Arabia.

Flowering almost throughout the year, with a peak flowering period ranging from September to November, honeybees forage for the abundant pollen and nectar. Honey from this plant is creamy white and easily granulated. The honey is commonly harvested from Tigray and the rift valley areas of Ethiopia and the honey fetches higher price both in local and international markets because of its attractive colour and being light to eat.



Figure 24 *Hypoestes forskaolii*

***Hypoestes triflora* (Forssk.) Roem. & Schult.**

TIQUR-TELENG (Amh); DARGU (Oro).

An annual herb, variable in size, but often growing to a height of 50 cm. Leaves opposite, elliptic. Flowers pink or white.

Growing in moist montane forest, *Juniperus* forest, riverine forest in *Combretum-Terminalia* deciduous woodland, *Eucalyptus* plantation, roadside, weed in gardens and usually in shade, at altitudes between 1200 and 3200 m, in almost all floristic regions and also in Eritrea, throughout tropical Africa, Yemen, China, Nepal, India and Thailand.

Flowering from July to February, the plant is a minor honeybee forage throughout the highlands and provides pollen and nectar for honeybees. It also contributes for brood rearing during early nectar flow period. In traditional medicine, the herb is used for wound dressing.



Figure 25 *Hypoestes triflora*

Isoglossa somalensis Lindau

DARGU (Oro).

A scrambling or clambering woody herb 0.5-3 m high; stems dark green and usually purple tinged in longitudinal stripes. Leaves elliptic to narrowly ovate-elliptic, attenuate at the base and entire at the margins. Flowers white, tinged brown/pink and provided with pink/brown spots on the lower lip and borne in thyrse.

Growing as undergrowth in forests of various types, natural *Podocarpus-Juniperus* evergreen montane forest, edge of *Hagenia -Schefflera-Allophylus* montane forest, in scrub, plantations and disturbed parts of forests, usually in deep shade at altitudes between 1600 and 2900 m, in Shewa, Arsi, Ilubabor, Kefa, Gamo Gofa, Sidamo and Bale floristic regions of Ethiopia, and also in South Sudan. A near endemic species

(restricted to Ethiopia and South Sudan) with a specific epithet 'somalensis', for species that does not occur in Somalia.

Flowering in September and October, the herb is a nectar and pollen source plant for honeybees.



Figure 26 *Isoglossa somalensis*

Justicia bizuneshiae Ensermu

A robust straggling shrub, or a semiscandent perennial herb with creeping stems upto 4 m long, which is pubescent with descending nongrandular hairs. Leaves narrowly ovate but broadest near the base. Flowers pale purple or lilac-blue with darker veins in the throat and borne in compound terminal spikes.

An endemic species growing along margins of primary and secondary forests, riverine forest, in valley bottom, wooded grassland, broad-leaved deciduous woodland, at edge of cultivation and in coffee plantations, at altitudes between 1200 and 2100 m in Welega, Ilubabor, Kefa, Gamo Gofa, Sidamo and Bale floristic regions only.

Mostly flowering in September and October and honeybees collect pollen and nectar vigorously from the flowers.



Figure 27 *Justicia bizuneshiae*

Justicia heterocarpa T.Anders. subsp. *vallicola* Hedrén

NAGAADH (Som).

A perennial, or rarely an annual erect, ascending or straggling herb, growing to 1 m high; stems pubescent with descending non-glandular hairs and sometimes also with spreading glandular hairs. Leaves narrowly-elliptic to narrowly ovate or linear-lanceolate. Flowers lilac, pink or rarely white, borne few to several together in leaf axils.

An endemic subspecies growing in narrow-leaved *Acacia* deciduous woodland, *Acacia-Balanites-Euphorbia-Croton* woodland, broad-leaved *Combretum-Terminalia-(Ozoroa-Lannea)* deciduous woodland, evergreen and mixed scrub, *Acacia drepanolobium* wooded grassland and degraded *Juniperus-Olea* dry evergreen forest, at altitudes between 1100 and 1900 m, in Shewa, Gamo Gofa and Sidamo floristic regions only.

Flowering all year round but more profusely after the big rains up to January, honeybees visit the flowers for pollen and nectar. It is a minor honey source plant for colony maintenance during dearth period.



Figure 28 *Justicia heterocapa* subsp. *vallicola*

Justicia schimperiana (Hochst. ex Nees) T. Anders.

SENSEL, SIMIZA (Amh); WACHAKEM (Mej); GULBANA (Kam); DHUMUGA, TEMUGA (Oro); DHAMUUG, DHARNUUG (Som); SHINFAI, SUDA (Tig).

A shrub with much branched 2-3 m high stems, with slightly unpleasant smell; stem brittle and breaks easily at nodes. Leaves simple, opposite, long oval. Flowers white or yellow, tubular, inconspicuous and borne in terminal racemes on long stalk.

Growing in moist montane forest usually near streams, evergreen scrub on hill slopes, forest clearing, coffee plantation, riverine forest, waste ground in villages and house hedges and hedge rows, at altitudes between 1300 and 2700 m, in almost all floristic regions, and also in upland Eritrea, Somalia and Kenya.

The shrub flowers from November to January and the honey from this plant is poisonous to humans, causing vomiting and dysentery. It was also reported that when children sip the nectar from the flowers, they become unconscious. Beekeepers usually mix the honey with honey from other plant flowers for consumption.



Figure 29 *Justicia schimperiana*

***Peristrophe paniculata* (Forssk.) Brummitt**

ANDOLIVA (Afa); XUBNAALE (Som).

An annual herb; stems erect, 0.7-1.5 m high; unbranched at the base, much branched above, with very narrow whitish ridges and broad green channels, provided with bristly hairs. Leaves ovate to lanceolate mostly shed during flowering and fruiting. Flowers pink-lilac purple, borne in paniculate much branched, upto 30 cm long inflorescences.

Growing along roadside, edge of forest, in woodland and as weed of cultivation, at altitudes between 400 and 2200 m, almost in all floristic regions, and also in Eritrea, from Egypt and Sudan to Senegal in the west and to Namibia and Mozambique in the south, the Arabian Peninsula, India and Thailand.

Flowering from September to November, the flowers are frequently visited by honeybees for pollen and nectar.



Figure 30 *Peristrophe paniculata*

AGAVACEAE

The family is composed of shrubs and trees, which are usually stout, simple or sparingly branched, often arborescent shrubs, or even trees. Leaves alternate, narrowly ovate, usually acuminate and are crowded at the base of stem. Inflorescences long panicles bearing flowers with slender yellow tepals. Stamens six, emerging well above the perianth. Capsule oblong with a short beak, bearing curved and shiny black seeds. The Agavaceae is a small family and they come originally from drier and warmer parts of the American continent and western Pacific region, but several species are now found throughout drier areas of the world. There are two species of *Agave* widely distributed in Ethiopia and an unidentified species of *Cordyline* has been recorded cultivated in some gardens in Addis Ababa.

The *Agave* species are valuable bee plants because of their long lasting flowering periods and where the plants are plentiful honey can be harvested from the flowers..

Agave sisalana Perr. ex Engl.

YAA (Afa); QACHA, YEQUUNCHA TEKEL (Amh); sisal, sisal hemp (Eng); ALGHEE, QACHAA (Oro); IQA TLYAN (Tig); KACHIYA (Wol).

A robust perennial herb, with a rosette of thick fleshy leaves, up to 2 m high (reaching 5-8 m when flowering). Leaves with thick tips and margins, each leaf bearing a sharp terminal spine. Flowers yellowish- green and borne on many branched, 5-6 m long panicles.

It is widely planted as a hedge plant around homegardens, growing also in fields, roadsides and tracks and on terraces, particularly in drier areas, from sea level to 2450 m throughout Ethiopia, but as a large-scale farm crop near Hawassa only. It can be propagated from seeds and cuttings.

It is a major source of pollen and nectar for honeybees, especially in mid altitude areas of the country. Beekeepers plant this robust herb as a hedge around apiary for pollen supplement during dry periods. It is widely cultivated for fiber production, as a hedge around homestead, boundary markings and as a terrace to stabilize soil. The species is an important source of fibre, which is called KACHA/QACHA in many parts of the country, but mainly in the rift valley.



Figure 3 | *Agave sisalana*

ALLIACEAE

The members of the family include herbs with bulbs and bulb-like corms, covered with membranous or fibrous scales, or a rhizome, or both; many produce a strong or weak smell of garlic or onion when crushed. Leaves in a basal rosette or two ranks, partly forming the bulb, base sheathing, rarely with a false petiole at the base of the blade. Inflorescence a false umbel or globose head of short or long-stalked flowers. Flowers are mostly regular, white, pink, blue, violet, or purple, sometimes yellow.

There are about 30 genera with a total of over 700 species, the majority of which belong to the genus *Allium* which is widely distributed. Two genera and six species have so far been recorded for Ethiopia, four of which are widely cultivated.

Allium cepa is one of the important honey source plants in this family. Honeybees also contribute for the pollination of the crop for a better seed set.

Allium cepa L.

ASA BESEL (Afa); QEYSHINKURT (Amh); bulb onion, shallot, sweet onion (Eng); zwiebel (Ger); BSHA SHINKURT (Gur); KESHERTUNA (Had); TUKISHO (Kaf); SUNKUTA (Kam); BESEL MIDAR (Nuw); QULLUBBII DIIMAA (Oro); QEYH SHGURTI (Tig); FARANJA TUMWA, TUMWA (Wol).

A biennial herb which produces a bulb in the first season and flowers in the second. Leaves linear, ^{hal}scented of onion when crushed. Flowers white with green veins and borne in terminal umbels.

It is cultivated on large farms and by vegetable growers' cooperatives with irrigation facilities all over the country, at altitudes between 500 and 2500 m. A very important vegetable used in making BERBERE and cooking in all types of WOT (local sauces), particularly chicken stew. Onions were cultivated by the earliest known civilization in Egypt and China with a centre of genetic diversity in South East Asia.

Flowering all year round, the herb is a potential source of nectar. It is reported that honey from onion flowers has a taste of onion. Honeybees contribute for seed production through pollination and 84% seed yield increment has been reported with local honeybees.



Figure 32 *Allium cepa*

ALOACEAE

The family is composed of succulent perennials, varying from small herbs to large woody trees. Leaves usually spiral, rarely distichous, mostly crowded, and often with marginal teeth. Inflorescence an axillary pedunculate raceme, often branched bearing small and scarious bracts, but lowermost rarely leafy. Flowers 3-merous, bisexual and usually united into tube, mostly pink, red, orange or yellow, usually very slightly zygomorphic. Fruit a loculicidal capsule that is many-seeded.

The family is composed of about seven genera and 650 species, mostly restricted to southern Africa with only the genus *Aloe* extending into tropical Africa and Arabia, as well as Madagascar and Mascarenes. The genus *Aloe*, with 46 species (including subspecies) occurs in Ethiopia, several of which are endemic. Many species are now very widely grown as ornamentals in drier and frost-free parts of the world.

Several African *Aloe* species are reported to be important bee plants. In Ethiopia, *A. debrana* is the major bee plant and provides abundant pollen for brood rearing.

Aloe debrana Christian (syn. *A. berthana* Reynolds)

IRET, MERARIE (Ahm); ARGEESAA, HARGESA, HEEJERSAA (Oro); IRET (Tig).

An annual herb up to 1-2 m high, with a thick prostrate stem when old. Leaves arranged in very dense rosette, spreading and recurved with toothed margins. Flowers

red, arranged in branched racemes.

An endemic species growing in grassland on thin soil overlying basalt, often on gentle slopes, at altitudes between 1800 and 2800 m, + in Welo and Shewa floristic regions. Flowering from November to March, honeybees collect pollen and nectar from the flowers. Pollen collected by honeybees is used for mass production of brood which leads to colony swarming. The honey contains 36.3% fructose and 3.5% glucose and it is light and almost colourless and granulation is rapid. The vegetative parts of the plant are mostly used to treat burns, wounds, skin irritations and constipation.



Figure 13 *Aloe debrana*

AMARANTHACEAE

The family is mostly composed of annual or perennial herbs, shrubs or small trees, which are sometimes climbing. Leaves simple, alternate or opposite. Inflorescence a dense head, loose thyrses, spike, raceme or panicle, basically cymose; bracts membranous and hyaline to white coloured. Flowers bisexual, or unisexual and usually regular. An almost entirely tropical or subtropical family of about 70 genera and over 1,000 species. Twenty genera and 57 species (including subspecies) have been recognized in Ethiopia.

This family has considerable economic importance with species of *Amaranthus* being important as food crops for both grain and foliage in peasant farmer economies. Several species are aggressive weeds while some of them and others have been developed as ornamentals. In Ethiopia, *Achyranthes aspera* and *Celosia argentea* are very common bee plants occurring in nearly all floristic regions.

***Achyranthes aspera* L.**

YEMOBN FIKIR, TELENJ (Amh); devil's horsewhip (Eng); KACHABA (Had); MATANE (Oro); MUTCHELO ROUT, DOOET (Tig).

A scrambling annual, or perennial herb growing to 3 m high. Leaves opposite, simple. Flowers pale pink, green, reddish or whitish, borne in terminal spikes.

Growing in hedges, thickets and shaded habitats, bushland and riverine forest, throughout the country, at altitudes between 700 and 3100 m, in nearly all floristic regions of Ethiopia, and also throughout tropical and warm temperate regions of the world. Flowering all year round, honeybees collect pollen and nectar from the flowers frequently. The long flowering period makes this species very valuable for honeybee colony maintenance. The plant also contributes for honey production in association with other species. In traditional medicine, the fresh flowers and leaves of this plant are crushed, homogenized in water and drunk to treat abdominal distention.



Figure 34 *Achyranthes aspera*

***Amaranthus hybridus* L.**

AJOFTU (Oro).

An erect, less commonly ascending, annual herb, up to 3 m tall in cultivated forms, but usually with much shorter stems in the wild; stems simple to much-branched, glabrous or with long multicellular hairs in upper parts. Leaves broadly lanceolate to rhomboid or ovate. Flowers in axillary and terminal spikes of cymose clusters that

are densely crowded in upper parts; the terminal inflorescences are varying from a single spike to a broad, much branched panicle.

A widespread weed growing in open disturbed ground, occasionally in marshy areas on red or dark brown clay, at altitudes between 1500 and 2400 m, in most floristic regions, and also throughout the tropics and subtropics, and as a casual weed in temperate regions but native in the New World.

Flowering from September to November, the flowers are potential pollen source for honeybees. The flowers have unpleasant smell, which deters ants.



Figure 35 *Amaranthus hybridus*

***Celosia argentea* L.**

BEIBEITO (Amh).

An erect annual herb 0.4-2 m high; stem and branches glabrous. Leaves lanceolate-oblong to narrowly linear with acute or obtuse apex. Flowers silvery-white or pink and borne in spikes arranged in long peduncles.

Growing as a common weed of irrigated crops, fallowland, disturbed habitats, dry river beds, open grassland and *Acacia* scrub, at altitudes between 500 and 1900 m, in nearly all floristic regions. It is also widespread and almost pantropical in the Old World.

Flowering in late September and October, the plant is a potential pollen source for brood rearing.



Figure 36 *Celosia argentea*

***Celosia polystachia* (Forssk.) C.C.Townsend**

A perennial herb often woody at the base, bushy or scrambling to 4 m; branches and inflorescence axes glabrous or with scattered multicellular hairs. Leaves narrowly ovate to subcordate-ovate and acute or shortly acuminate at the apex. Inflorescences terminal and axillary, spike-like with scattered or more rarely dense cymes.

Growing in *Acacia* woodland, gallery and riverine forests, grassy depression on limestone and on rocky slopes, at altitudes between 300 and 1300 m in almost all floristic regions, and also in Sudan, Somalia, Kenya and Yemen.

Flowering in August and September, the herb is a major pollen source.



Figure 37 *Celosia polystachya*

Chionothrix latifolia Rendle

SHELEL (Amh); HAMBOY (Gam); GARRI (Oro); TETERA, ZANZA (Tig).

A shrub or small tree, 1-4.5 m tall with star shaped hairs. Leaves opposite, narrowly elliptic to broadly ovate. Flowers white or silvery white hairy, borne in spikes, which are few to many.

An endemic species growing in rocky hillsides with open scrub, open dry grassland, broken limestone slopes and in *Acacia-Commiphora* bushland and woodland, at altitudes between 700 and 1750 m, confined to Sidamo, Bale and Harerge floristic regions.

Flowering in December and January, it is a potential pollen source for honeybees.



Figure 38 *Chionothrix latifolia*

Cyathula uncinulata (Schrad.) Schinz

BEGD ZEMEDIE, CHOGOGIT, YEKALM QIM, YEMOGNFKR (Amh); DARGUU, KADERA DHALTU (Oro); AKRA, SEGOGO, TENEG GIHE (Tig).

A scrambling perennial with herbaceous stems, sometimes erect and bushy, up to 3 m tall; young stems densely hairy with yellow hairs or felt-like and 4-angled with swollen nodes. Leaves broadly ovate to elliptic-oblong, shortly acuminate and densely hairy to velvety on the lower surface. Flowers greenish and arranged in dense globose heads of closely packed compound cymes, which are borne on a short axis and covered with matted white hairs.

Growing in various types of habitats, from *Podocarpus* forests to weedy situations, in hedges around compounds, also in shade in valley bottoms near springs, on dry stony

slopes and usually scrambling over other vegetation, at altitudes between 1300 and 2500 m in most floristic regions of Ethiopia, and also in upland Eritrea, widespread in Africa from Cameroon and Sudan southward to South Africa (Cape Province) and Madagascar. The seeds are easily attached to animal hairs and human clothing and dispersed.

Flowering in September and October, honeybees collect pollen from the flowers.



Figure 39 *Cyathula uncinulata*

ANACARDIACEAE

The family is composed of trees, shrubs and woody vines producing gums, resins or latex, often sweetly aromatic when cut. Leaves mostly alternate, occasionally opposite or whorled; stipules absent or very obscure. Inflorescences essentially racemose, often much branched, sometimes spicate. Flowers often in clusters, dioecious, monoecious or polygamous, bearing usually free, imbricate petals. Stamens as many or twice as many as petals. Fruit a drupe with fleshy mesocarp, often 1-seeded by abortion, which is strongly compressed.

The family is composed of about 60 genera and some 600 species, mostly in the tropics but also extending into the Mediterranean, East Asia and the USA. Seven genera and 29 species (including subspecies) are found in Ethiopia. Many species have edible fruits, some of which are economically important while others are exploited for their gums, and the strong phloem fibres of some wild species are often used as tying materials.

The indigenous species of *Rhus* are very common in many climatic zones of Ethiopia and are, including *Schinus molle*, important pollen suppliers and less important in nectar production, whereas *Mangifera indica* with rich nectaries and also with the juicy fruits is one of the most important representatives of this family in terms of honey production.

***Mangifera indica* L.**

Mango (Eng); MANGUS (Tig).

An evergreen tree usually up to 10-15 m high; bark dark brown and cracking with age. Leaves dark green, simple, alternate, variable in size and crowded at the ends of the branches. Flowers pale green to pink or red, borne in terminal panicles that are broadly conical and can be up to 60 cm long.

It is widely cultivated in warmer lowland areas for valuable fruit production, as a garden and shade tree, at altitudes between 500 and 1800 m, and also throughout the tropical and subtropical world for commercial fruit but originally from Asia.

Flowering in September and October, the tree is a good source of pollen and nectar. The pollination of the flowers by honeybees has also been reported to increase fruit yield. The honeybees are reported to forage on leaves either for honeydew or extrafloral nectar. Juice from damaged fruits may also be collected by honeybees.



Figure 40 *Mangifera indica*

***Ozaroa insignis* Del.**

SHELEL (Amh); HAMBOY (Gam); COBWE (Mur); GARRI (Oro); WGR-ADAD (Som); TETERA, ZNZA (Tig).

A tree, or shrub 3-9 m high; bark fissured; shoots densely pale puberulous to yellowish villous; stem dark grey. Leaves usually \pm whorled, oblong lanceolate to oblong elliptic, base rounded. Flowers grey, borne in spike and scented.

Growing in broad-leaved deciduous woodland, often with *Terminalia*, on well drained rocky slopes, sometimes in *Acacia* woodland overlying limestone, at altitudes between 1350 and 2000 m, in Tigray, Gondar, Shewa, Gamo Gofa, Sidamao, Bale and Harerge floristic regions, and also in upland Eritrea and west to Senegal, east to Somalia and Yemen.

Flowering in December and January, honeybees collect nectar and pollen. Ants were also observed collecting nectar from the flowers.



Figure 41 *Ozoroa insignis*

***Rhus natalensis* Krauss**

FATUQA, FRTATA (Agew); MST-AYBELASH, TAQUMA (Amh); KECAC (Bod); ON-GAPRIE (Gam & Wol); KABUDEYDA (Kon); KEAY (Mur); CHAQEMA, DABOBECHA, DABOBESA, TATESSA (Oro); TETA'LO (Sah); DABOBIS (Som); ATAME, TETA'LO (Tig).

A densely branched shrub, or small tree up to 8 m high. Leaves compound, trifoliolate, middle leaflet usually oblanceolate to obovate or elliptic. Flowers greenish-yellow and borne in loose panicles. Fruit oblong to bean-shaped, smooth, red with thin flesh and a waxy covering.

Growing in deciduous bushland with *Acacia* and/or *Combretum*, evergreen bushland

with *Euclea*, *Dodonea* etc., usually on well drained slopes and less often along water courses, at altitudes between (700-) 1200 and 2000(-2500) m, in most floristic regions, and also from Eritrea and Somalia west to Guinea and south to Natal and also in tropical Arabia.

Flowering in September and October, the plant is one of the major pollen source plants for brood rearing. Other uses of the plant are firewood, charcoal, farm tools, food, medicine and tooth brush.



Figure 42 *Rhus natalensis*

***Schinus molle* L.**

TIQUR-BERBERIE (Amh); pepper tree (Eng); pfefferbaum (Ger); BERBERE-TSELLIM, TQUR-BERBERE (Tig).

A small evergreen tree growing up to 8 m high; bark brown, rather scaly and fissured and often marked with drops of a strong-smelling gum. Leaves compound, to 30 cm long, with many narrow leaflets to 7 cm and strongly smelling of black pepper. Flowers small, creamy white and borne in conspicuous hanging clusters. It is propagated by seeds and growing fast.

Planted throughout the country from Afar lowlands to 2400 m. A heat and drought-resistant tree that is widely planted in all but the coldest and wettest areas and sometimes regenerating naturally at altitudes from near sea level to 2400 m, but native of Brazil through to N Argentina.

Flowering all year round and profusely after rains, and the flowers provide some

amount of nectar and heavy yields of pollen, especially in the mornings. Honeybees collect nectar and pollen frequently and the tree is indirectly very important for honey production by strengthening colonies and stimulating brood rearing in low altitudes, and it is highly recommended for planting to increase honey production. It is cultivated for shade and amenity, its wood is termite resistant and generally suitable for firewood and charcoal. The leaves are used as insect repellent. It is recommended as a windbreak, particularly in semi-arid areas.



Figure 43 *Schinus molle*

APIACEAE

Members of this family are aromatic, often herbs and rarely shrubs or small trees with often hollow or pithy stems. Leaves alternate or rarely opposite; blade usually pinnately divided, compound, or dissected often sheathing at the base. Inflorescence usually a compound umbel, or sometimes flowers in simple umbels or heads. Flowers small, epigynous, regular or zygomorphic with enlarged outer petals, normally bisexual or unisexual: sometimes some or all of the flowers unisexual by reduction. Fruit dry (a schizocarp), very variable in appearance, formed by two mericarps.

The family is composed of about 450 genera and 3,550 species, cosmopolitan in distribution, though chiefly in the north temperate region. There are 32 genera and 55 species in Ethiopia. Several species are important spices or root crops and are cultivated, often escaped, while others are used in traditional medicine.

The nectaries of the Apiaceae are exposed and are therefore acceptable for all bees

and flies. They provide, in general, a good nectar production and are also valuable pollen sources. The honey is a little bit pungent. *Foeniculum* honey is produced in Mediterranean countries.

In Ethiopia, huge areas are covered with *Foeniculum vulgare* at medium elevations and *Ferula communis* at higher altitudes, and these plants provide a good honey source for the beekeepers in the surroundings. In addition, in some parts of the country, cultivated *Corriandrum sativum* provides some surplus honey.

***Anethum graveolens* L.**

INSLAL (Amh); dill (Eng); KAMUUNII (Oro); SANDAN SHEWA, SHILAN BAITA (Tig).

An erect annual herb with a strong characteristic smell, growing up to 150 cm, with finely grooved stems and finely divided leaves. Flowers yellowish, arranged in numerous compound umbels. Frutits only slightly laterally compressed.

Growing in cultivated land as a weed and on degraded mountain slopes, at altitudes between 1500 and 2800 m, in Welo, Shewa and Sidamo floristic regions, and also grown in the east Mediterranean countries for its aromatic fruits, which are used for flavourings.

Flowering from September to November, the herb is a major source of pollen for brood rearing, and growing it around homegardens is highly recommended. The leaves and stems are used for flavouring locally distilled alcoholic drink (AREKE).



Figure 44 *Anethum graveolens*

***Coriandrum sativum* L.**

DEMBLAL (Amh); coriander (Eng); WERDIMAMA (Had); DEBO (Kaf); DEBO, DIMBLAALA, SHUCAR (Oro); TSEGHA, ZAGDA (Tig); DABUWA (Wol).

A cultivated annual herb growing up to 20 to 70 cm high from fleshy taproot. Leaves pinnately divided into many leaflets. Flowers white to pale, arranged in compound umbel.

Growing in ruderal ground, escaped from cultivation and also widely cultivated in fields and homegardens, at altitudes between 1700 and 2400 m, occurring in Gogjam, Welo, Shewa, Welega, Kefa and Harerge floristic regions, and also widespread throughout the world as a result of cultivation but possibly native to North Africa and West Asia.

Flowering almost all year round, the herb is a potential source of nectar and pollen for honeybees. The nectar secretion rate is 0.05 mg/flower with 35.2% glucose and 48.1% fructose. Honey from the plant is dark in colour. The fruit is used for the preparation of BERBERE (hot red pepper flour) as flavouring agent.



Figure 45 *Coriandrum sativum*

Peucedanum mattirolii Chiov.

SRE-BIZU (Amh).

A perennial herb 1-2 m high; stems covered sometimes with scattered short hairs; branches usually arising singly. Leaves 2-3-pinnate, with few divisions, lanceolate to ovate. Flowers yellowish to white, regular, with a central marking.

An endemic species growing in stream banks and sometimes in juniper forest, at altitudes between 2600 and 3100 m, in Shewa, Arsi and Sidamo floristic regions only. Flowering in September and October, the plant is a major source of pollen for honeybees.



Figure 46 *Peucedanum mattirolii*

APOCYNACEAE

Members of the family are trees, shrubs, climbers or sometimes herbs, mostly with white latex. Leaves usually opposite, less often in whorls of three or alternate, simple, pinnately veined. Flowers bisexual, 5-merous and mostly actinomorphic, bearing mostly coloured fused petals and variously shaped corolla. Fruit a berry or a capsule, syn- or apo-carpous.

The Apocynaceae is a large family with about 165 genera and 1,900 species, mainly tropical, but a few taxa are temperate. Fifteen genera with one species each are found in Ethiopia.

Adenium obesum is reported in the lowlands as an important honey plant.

Adenium obesum (Forssk.) Roem. & Schult.

Desert rose (Eng); ORKETA (Gam); wüstenrose (Ger); XINQISIIS (Oro); ABEI, HABEJ, HOMBI, OMBI (Som).

A thick-stemmed succulent shrub, or tree attaining a height of 5 m, producing a massive stem when growing older with much swollen base; bark grey-green and smooth. Leaves thick, fleshy, bluish-green, narrowly elliptic and crowded at the ends of branches. Flowers funnel-shaped, about 5 cm across, bright pink to deep red. All parts have conspicuous watery sap.

Growing in semi-desert and dry bushland and on sandy and rocky soils, at altitudes between 300 and 1400 m in Kefa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also in Somalia, Tanzania, Senegal and Saudi Arabia. It is propagated from seeds and cuttings.

Flowering in December and January, honeybees forage for nectar and pollen in the very early morning. This plant is useful in the semi-arid areas to ensure the survival of honeybees. It is also grown as a useful ornamental even on poor soils. It is browsed by game and livestock but the sap is poisonous to humans.



Figure 47 *Adenium obesum*

Cryptostegia grandiflora Roxb. ex R. Br.

MARORA-GEL (Som).

A liana or scrambling subshrub to several metres long, with white latex. Leaves opposite, petiolate and elliptic with acute apex. Flowers pink or purplish with funnel-shaped corolla tube and ovate-lanceolate lobes, borne in terminal clusters of 1-4 flowers.

Naturalised and growing in riverine forest along the Awash River, at altitudes between 700 and 1200 m, in Shewa and Afar floristic regions, and also frequently introduced and naturalised elsewhere but native to Madagascar.

Flowering throughout the year, the flowers are good sources of nectar and honeybees easily access the nectar from elongated nectary. The latex is poisonous to livestock and humans.



Figure 48 *Cryptostegia grandiflora*

***Nerium oleander* L.**

Oleander (Eng); MACHALLOW (Oro).

A shrub growing upto 2 m high. Leaves lanceolate with pointed tip. Flowers variable in colour, rose or white.

The shrub is widely cultivated as an ornamental in public gardens and along streets, at altitudes between 200 and 2500 m, in many floristic regions, and also cultivated as ornamental throughout the world but indigenous in the Mediterranean area and the Middle East to China. The flowers are rarely visited by honeybees when there is no alternative forage source, providing honeybees with nectar and pollen all year round. The plant is deadly poisonous.



Figure 49 *Nerium oleander*

AQUIFOLIACEAE

The family is composed of trees and shrubs, mostly evergreen, usually glabrous. Leaves alternate or rarely subopposite, simple; stipules minute or absent. Flowers regular, bisexual or sexes separate and borne in cymes or fascicles, or rarely solitary. Corolla rotate with petals free or joined at the base. Fruit a drupe with (1-)2-6 (-many)-seeded pyrenes.

In Ethiopia, *Ilex mitis*, which is the only member of the family, is the major honey source plant in moist Afromontane forests of Ethiopia.

Ilex mitis (L.) Radlk.

MISIR GEMFO (Amh); African holly (Eng); KETTO (Kaf); HANSIKA, KETTO, MIESA, TILTO, WOLKITE GAADHII (Oro); MIKICHIO (Sid); MISIRA SHENDIRA (Wol).

An evergreen shrub, or more usually tree, 4–24 m, very variable; bark pale grey-brown, smooth; branchlets purple coloured. Leaves alternate elliptic, or rarely almost round. Flowers small, white fragrant and arranged in cymes.

Growing in moist montane forests, in hillside thickets or scrub along stream valleys, associated with *Arundinaria alpina*, *Croton macrostachyus*, *Erica arborea*, *Hagenia abyssinica*, *Juniperus procera*, *Maesa lanceolata*, *Myrsine africana*, *Nuxia conjesta*, *Olea europaea*, *Olinia rochetiana*, *Schefflera abyssinica*, *Podocarpus falcatus* and *Prunus africana*, at altitudes between 1575 and 3000 m, in Welega, Shewa, Ilubabor, Kefa, Arsi, Sidamo, Bale and Harege floristic regions, and also in E Africa south to Cape in South Africa and

west to Sierra Leone and Fernando Po, also Madagascar.

The plant is a potential pollen source for honeybees and beekeepers reported that pollen is used for strengthening honeybee colonies in early nectar flow. Honey from this tree is greenish yellow and usually harvested in December and January. The tree is used for firewood, charcoal, timber (local construction), tool handles, farm tools and medicine (bark).



Figure 50 *Ilex mitis*

ARACEAE

The family is represented with herbs, bearing larger or smaller aerial stems, tubers or rhizomes, climbers or floating water plants, often with milky or sticky and sharp-smelling juice; adventitious roots are formed in many species, usually aboveground, most often in climbers. Leaves simple, or palmately or pinnately divided, often with holes appearing naturally in the blade, some leaves reduced to scales; petiole usually with a distinct sheath. Inflorescence pedunculate, monoecious or dioecious, with small bisexual or unisexual flowers, usually arranged very densely along a cylindrical fleshy axis forming a spadix, where flowers are unisexual, the females are found at the base of the spadix and the male above them; spadix enclosed by the leaf- or petal-like spathe.

The Araceae is a large family with 1,800 species distributed in 110 genera, widely distributed but mostly in tropical and subtropical regions. In Ethiopia, the family is represented by 12 genera and 21 species. *Zantedeschia aethiopica* is an important honey source plant in Ethiopia.

Zantedeschia aethiopica (L.) K.P.J. Spreng.

MILAS GOLGUL, YEMUSHRA ABEBA, YETRUMBA ABEBA (Amh); arum lily, calla lily, lily of the Nile (Eng); .

A perennial rhizomatous herb growing to 80 cm high. Leaves cordate-sagittate to sagittate with cuspidate base and obtuse to acuminate apex. The big white long-stalked flower is funnel shaped and consists of a yellow spike-like clasp by a white petal-like sheath called spathe.

Cultivated garden plant and also growing in roadside ditches as an escape, at altitudes between 1900 and 2400 m, in Shewa and Harerge floristic regions, and also cultivated and as an escape growing in moist, shady places especially at higher altitudes in many parts of tropical East and Northeast Africa, and as far north as Spain but native of South Africa, where it occurs widely from the Cape to Natal.

Flowering throughout the year, honeybees collect yellow pollen loads from the flowers.



Figure 51 *Zantedeschia aethiopica*



ARALIACEAE

The family is represented by trees, shrubs, climbers, or sometimes perennial herbs. Leaves palmately or pinnately compound, or simple and often the leaf-stalk is clasping the stem at its base. The flowers are bisexual or sometimes unisexual, regular and often arranged in umbels, or condensed into heads or spikes. The stamens are as many as the petals and alternating with them.

The family is composed of about 70 genera and 800 species which are widespread in tropical and subtropical regions, and with some in temperate regions. There are five genera and 10 species in Ethiopia; three genera and eight species are indigenous. The Araliaceae are very attractive to honeybees providing the bees with abundant pollen and nectar. In Ethiopia, *Schefflera abyssinica* is one of the most important and valuable honey sources. White honey is harvested from the flowers, which is highly priced.

Polyscias fulva (Hiern) Harms

YEZNJERO WONBER (Amh); parsol tree (Eng); KARASHO (Kaf); ABERRA, ADA-LO, ADOJE, ANKISSA, ANTALLO, GUDUBA, HUDHA, KARASHO, KORIBA, TALAO (Oro); KERBONI (Sid).

A deciduous tree up to 12-25 m high, with umbrella-shaped crown and branched from the same point; bark grey and smooth. Leaves compound, very long, reaching to 1 m, with 5-15 pairs of ovate to oblong and leathery leaflets. Flowers greenish-yellow with panicles of small racemes up to 60 cm long and honey-scented.

Growing in upland and lowland rainforest, mainly secondary, at altitudes up to 2500 m in Shewa, Iluababor, Kefa, Arsi and Sidamo floristic regions, and also westwards to Guinea and southwards to Mozambique and Angola. It is propagated from seedlings and wildlings.

Flowering from November to April, the flowers are good sources of nectar and pollen. Honey is harvested from the plant in association with *Coffea arabica*, *Albizia* species and *Allophylus abyssinicus*, since its phenology overlaps with the above-mentioned species. The wood is soft, very light, white and odourless and useful for making food containers and inner layers of plywood. It is fast growing and potentially useful in agro-forestry for shade.



Figure 52 *Polyscias fulva*

Schefflera abyssinica (Hochst. ex A. Rich.) Harms

GETEME, GUSTYA (Amh); GABTZE (Gam); GETEM (Had); BUTTO, WITTO (Kaf); ARFATTU, GATAMA, HARFATU, MARFATU (Oro); GETEM, ORONCE (Sid); BOB-OLUHU (Som); GET'EM (Tig).

A tree up to 30 m high, with spreading crown and rarely an epiphyte; bark greyish-black and corky. Leaves digitately compound with leaflets 4-6, obovate, oblanceolate or elliptic and clustered at the ends of branches, stiff or leathery. Flowers creamy-yellow, fragrant and borne in heads, the sessile flowers grouped into panicles. Fruit ellipsoid or obovoid and deeply ribbed. It is propagated from seeds and the germination percentage is nearly 50% but slow growing, taking almost one year in nursery condition.

Growing in upland forest, secondary forest, woodland, wet montane forest, often along streams and in riverine forests with *Celtis africana*, *Polyscias fulva*, *Podocarpus fal-catus*, *Syzygium guineense*, *Olea capensis* subsp. *macrocarpa*, *Mimusops kummel*, *Albizia schimperiana* and *Apodytes dimidiata*, at altitudes between 1400 and 2800 m, in most floristic regions, and also in Cameroun, Sudan, Uganda, Burundi, Tanzania, Zambia and Malawi.

Flowering from March to May, *Schefflera abyssinica* is one of the most important honey producing trees in the southern and southwestern parts of the country. It has ample nectar but little pollen and it yields large quantities of light and pure white honey which fetches the best prices in local and international markets. The granulation of honey is very fine and recommended to plant around apiary for honey production. The soft and light wood provides valuable timber for furniture and boxes as well as for farm tools.



Figure 53 *Schefflera abyssinica*

ARECACEAE

The family is composed of trees, shrubs, or sometimes climbers. Members of the family usually have a single unbranched stem or trunk. The family is very distinctive and recognized by its often tree-like habit and stem that usually does not grow in thickness and the usually large palmately or pinnately divided evergreen leaves that are crowded at top of the stem. The generally large inflorescences are most commonly axillary, or sometimes terminally arranged. The numerous flowers are usually individually small, sometimes large and showy, bisexual or unisexual. The tepals are leathery and fleshy, variously coloured, white, green, yellow, orange or red.

The Arecaceae is a large family with about 3,000 species distributed in 200 genera, widespread in tropical and warm temperate regions. The family is represented by four genera and eight species in Ethiopia.

Several palm species are cultivated and the indigenous *Phoenix reclinata* is a valuable source for pollen and honey.

***Borassus aethiopum* Mart.**

ZEMBABA (Amh & Gur); UDUWA (Anu); African fan palm, ago beam, borassus palm, fan palm, palmirah palm (Eng).

An unbranched, usually erect palm with 2-3 m high trunk, which is sometimes swollen above the middle. Leaves rounded head of palmate grey-green leaves to 2 m with stiff tips. Flowers whitish-green, borne in dense spikes. Fruit black when ripe with orange flesh. It is propagated from seeds and seedlings.

Growing at the edge of semi-deciduous lowland forest, in depressions in *Terminalia* woodland, along streams, also left as isolated trees in fields and widely cultivated as ornamental and shade tree on roadside and in parks, at altitudes between 900 and 1000 m in Gojam and Illubabor floristic regions, and also widespread but patchy in the moister areas of tropical Africa.

Flowering in September and October, the flowers are frequently visited by honeybees for nectar and pollen. Honeybees have been observed collecting copious nectar from the flowers in late afternoon and pollen loads early in the morning for brood rearing. The hard and moderately heavy wood is very resistant to insects, termites and fungi. Seedlings and cabbage-like shoots of immature palms are edible. The fleshy part of the fruit and the coconut-like jelly from immature fruit are widely eaten. Unexpanded leaves are used for making mats, baskets and other household items. The leaf midrib is used to make fish trap nets and fibres of leaf stalks are suitable for making brushes.



Figure 54 *Borassus aethiopicum*

***Phoenix reclinata* Jacq.**

HOSA'NA, SELLEN HOSANA, ZEMBABA (Amh); TUOH (Anu); wild date palm (Eng); ZEMBABA (Gur); YEBO (Kaf); BODE (Mes); MEEXII (Oro); BADAYE (She); AWSH'NA (Tig).

Tree up to 15 m high with a wide cylindrical stem, encircled by leafscars. Leaves very strong, upto 3 m long; leaflets narrow, linear-lanceolate, stiff and sharply pointed, up to 35 cm. Flowers creamy white, arranged in a close panicle of wavy spikes. Male and Female flowers are on different trees. Fruit edible, yellow-brown, oblong-ellipsoid.

Growing in open forest beside streams and rivers, particularly in steep-sided valleys and ravines, sometimes forming groves, woodland and wooded grassland where-ground water is available and widely grown as an ornamental in public and private gardens at altitudes between (500-)1200 and 2400 m in most floristic regions, and also throughout tropical Africa south of the Sahara to South Africa.

Honeybees collect much pollen and nectar from the flowers. The tree is known as a good source of nectar and pollen and the juice of damaged fruits is also sucked by bees. When the tree is found in dense stands, it contributes significant feed for

strengthening bee colonies. The leaves are used for making basket and mats and the roots for dye. It gives a valuable timber commonly used for local doors, roofing and windows. It is grown as an ornamental and for soil conservation. The sap is very sweet and used for making palm wine in other countries. In traditional medicine, the fruit and roots are used against haemorrhoid.



Figure 55 *Phoenix reclinata*

ASCLEPIADACEAE

The family is represented by herbs, shrubs or climbers with white, yellow or clear latex, mostly perennial, rarely annual. Stems strongly succulent to herbaceous or woody. Leaves simple, usually opposite but occasionally in whorls of four; stipules absent or reduced to an annular fringe or ridge. Flowers borne in terminal, axillary or extra-axillary cymose inflorescences; flowers frequently with fused petals, lobes valvate or imbricate in bud; stamens usually inserted at the base of the corolla tube; filaments free or fused into a tube surrounding the ovaries. Fruit of two unilocular follicles, but frequently only one developing.

A diverse family with approximately 240 genera and 3,400 species widely distributed throughout the world but centered in the tropics and subtropics. The family is most diverse in eastern and southern Africa while there are 161 species (including subspecies) belonging to 45 genera in Ethiopia.

In Ethiopia, the climbing members of this family are mainly valuable nectar and pollen sources for honeybees. *Gymnema sylvestre* and *Sarcostemma viminale* are important honeybee forages.

***Calotropis procera* (Ait.) Ait.f.**

GINDA, QIMBA, TOBIYA, YAHARA-ZAF (Amh); GELEHATOO (Afa); Dead Sea fruit, gun powder bush (Eng); AKALO (Kaf); ADAL, FOLFOL, KIMBO, USHEES (Oro); BO, BOAH, BOAH-AD, HOE, BOH, BOHE, BUA, BOA-BOA (Som); GINDA (Tig).

A shrub or small tree growing up to 4 m high, with thick, corky and yellowish-brown bark and soft wood. Leaves pale-green. Flowers White, or grey to pink with purple tips and the clusters of flowers arising from leaf axils.

Growing in dry river beds, disturbed areas and along roadsides, at altitudes from sea level to 2300 m, in most floristic regions and also in Eritrea, drier parts of tropical Africa, Arabia and India and it is naturalised elsewhere in the tropics.

Flowering in September and October, the plant is a potential pollen and nectar source for lowland races of honeybees. The plant is also used to maintain the quality of camel milk.



Figure 56 *Calotropis procera*

Gymnema sylvestre (Retz.) R. Br. ex Schult.

HAREG (Amh); QOMBO (Kaf); SHANQUQH (Tig).

A woody, softly hairy climber with stems growing to 4-15 m long. Leaves ovate-oblong, light green and softly hairy. Flowers pale yellow, borne in axillary umbels.

Growing on sandy to loamy soil, often also at the edges of river beds at altitudes from sea level to 1600 m, in Tigray, Gondar, Ilubabor and Gamo Gofa floristic regions, and also widely distributed in tropical Africa, Madagascar and the dry areas of India.

Flowering from November to August, the flowers are sweetly scented and honeybees very frequently forage for the néctar and pollen.



Figure 57 *Gymnema sylvestre*

Periploca linearifolia Quart.-Dill. & A. Rich.

MOYDER (Amh); ADITETI (Anu); ANANNOO, BORIINOO (Oro); DEMAYITO, MODER (Tig); DOMAYITO (Wol).

A liana up to 20 m long, or more with glabrous, greyish-brown stems. Leaves persistent, glabrous, shortly petiolate, leathery and linear-lanceolate to very narrowly ovate. Flowers white or light-green, usually borne in many-flowered, open and compound cymes. The whole plant produces a milky latex.

Commonly growing in dry savannah to moist forestland and bushland, at altitudes between 600 and 2900 m, in most floristic regions and also in East and Northeast Africa from Ethiopia to Malawi.

It is pollen and nectar source plant for honeybees and the tough phloem fibers of the bark is used for making ropes.



Figure 58 *Periploca linearifolia*

***Sarcostemma viminale* (L.) R. Br.**

MAIDU (Afa); YEMEDER-QENCHIB (Amh); HANGEYU, MALAKSO, XANGEY (Som); HALENGI KEWHI (Tig); GOJJO (Tse).

An erect perennial herb, scrambling or twining up to 5 m high, with or without corky main stem; shoots succulent, glabrous or pubescent when young. Leaves triangular to deltoid. Flowers cream to yellow, at least faintly scented, sessile or on short lateral shoots, arranged in 2-30-flowered conical or depressed-conical inflorescence.

Growing in dry rocky places, at altitudes between 200 and 2000 m, in Sidamo, Bale and Harerge floristic regions, and also in lowland Eritrea, Sudan, Somalia, Kenya, Tanzania, South Africa, Saudi Arabia and Yemen.

Flowering in December and January, the herb is a pollen and nectar source plant for honeybees.



Figure 59 *Sarcostemma viminale*

ASPARGACEACE

A family composed of perennial climbing, or erect shrubs and subshrubs. Rhizomes sympodial from where the branches are growing. Leaves normally reduced and scale-like, the assimilating function taken over by modified green branches (cladodes). In some genera, the branches are transformed into leaf-like cladodes (phylloclades). Inflorescence axillary or terminal, solitary, fascicled or assembled in racemes. Flowers unisexual or bisexual, regular and small. Perianth with six tepals in two whorls, all similar in shape, free or fused at the base, white, yellow or green. Fruit a globose berry bearing 1-2(-3) black seeds.

Members of the family are widely distributed in the Old World with most species confined to arid tropical regions and the Mediterranean climates. The family is represented by the genus *Asparagus* with 12 species in Ethiopia, and *Asparagus africanus* is an important nectar and pollen source plant for honeybees.

Asparagus africanus Lam.

KESTEENICHA, YESET QEST (Amh); ANTE (Arb); HIDDII SAAREE, SARITI (Oro); MULU (Shi); ARGHEG, BAKAR (Som); OOAINI DMU, QASTA ANISITEE (Tig).

A perennial or woody climber, growing up to 3-10 m high with attractive blue-green foliage and the stems are covered with hooked spines. Leaves needle-like. Flowers white and numerous, aggregated at each node.

Growing in secondary forest and *Acacia* woodland and forest margins and hedgerows at altitudes between 700 and 2900 m, in almost all floristic regions, and also in Eritrea, Sudan, Somalia, Uganda, Kenya, Tanzania to South Africa and Arabia to India.

Flowering in September and October, the plant is an important honey source throughout its distribution area. The attractive and scented flowers provide abundant nectar and pollen for honeybees. Honey from this plant is not reported yet in the country but some beekeepers reported that its honey is mixed with other plant flowers during October and November honey flow period. The roots are edible and medicinal for various diseases.



Figure 60 *Asparagus africanus*

ASPHODELACEAE

A family of rhizomatous perennial herbs, generally producing anthraquinones which make the rhizome yellow inside, sometimes with thickened storage roots, but without distinct tubers. Leaves in basal rosette, rarely on a short woody stem. Inflorescences simple rarely branched; bracts one per flower. Flowers bisexual, hypogynous, regular with tepals free or fused, white, green or pale yellow, pink, yellow or red; stamens six, free or slightly fused with the perianth. Seeds enveloped with an aril, making them dull brown or grey to black, sometimes glutinous.

A family with eight genera and about 250 species distributed in the Old World, mainly from western Mediterranean to central Asia and Africa, particularly South Africa. It is represented by four genera and 11 species in Ethiopia. *Kniphofia foliosa* is a well known pollen source plant in higher mountains.

Kniphofia foliosa Hochst.

ABELBILA, AMELMIELA, ASHENDA, SHEMETMETIE, YEJIB SHNKURT, YEZJERO AGEDA (Amh); red-hot poker, torch lily (Eng); HURGUUFOO, LELADA, SHEEMEXIIMEX, SHUSHUBBEE, SIISIIYEE, WALEEBOO (Oro); GALADWESSA (Sid); AMBALA ARMI, AMELMIELA, ASHENDA (Tig).

A robust perennial herb to 1.5 m high. Leaves linear, continuing to grow after the flowers have died. Flowers yellow, red or orange, borne in dense terminal spikes.

It is an endemic herb growing on roadsides, in overgrazed areas with scattered trees, hillsides with rocky outcrops and tops of mountains, at altitudes between 2500 and 4000 m, in Tigray, Gondar, Gojam, Welo, Shewa, Arsi, Bale and Harerge floristic regions only.

The plant is a potential source of pollen for honeybees. In local medicine, it is used for the treatment of abdominal cramp.



Figure 61 *Kniphofia foliosa*

ASTERACEAE

The family is composed of herbs or shrubs, less commonly trees or climbers; sometimes with milky latex. Leaves alternate, sometimes opposite, or whorled, basal or simple to compound. Flowers small, sessile, 1-many on a common receptacle, sometimes individually subtended by a scarious bract and almost always collectively subtended by an involucre of 1-many seriate, overlapping bracts forming a head (capitulum). Capitulum solitary, or, more often, several to numerous, arranged in various types of simple or branched corymbs or cymes. Individual flowers are small, bisexual, unisexual or sterile, bearing united and regular or irregular corolla; stamens alternate with the corolla lobes, and the filaments loosely attached to the corolla tube and the anthers united into a tube. Ovary inferior, bicarpellate but unilocular; ovule solitary and basal.

The Asteraceae is one of the largest families of vascular plants with about 1535 genera and about 23,000 species. It is represented by 130 genera and about 459 species

(including subspecies) in Ethiopia.

Many of the Asteraceae are excellent pollen and nectar suppliers for honeybees and some of them are known throughout the world as important honey sources, for example sunflower (*Helianthus annuus*) and thistles (*Cirsium* spp.). In Ethiopia, species belonging to *Echinops*, *Bidens*, *Guizotia* and *Vernonia* are important bee plants because of their wide distribution and abundant pollen.

***Ageratum houstonianum* Mill.**

Blue mink (Eng).

An erect or decumbent annual herb, 0.3-1m high, robust, densely pilose with branchlets and peduncles covered with stipitate glands; stems equipped with hairs. Leaves simple: opposite, thin, ovate, hairy and with unpleasant smell. Flowers white to blue, arranged in terminal corymbs.

Growing widely as a weed in cultivated fields, margins of forest and under shade of the trees but usually cultivated, at altitudes between 1800 and 2000 m, in Shewa, Kefa and Harerge floristic regions, and currently widespread in warm tropical countries throughout the world and it is probably a native of southeastern Mexico.

Flowering from September to March, honeybees collect pollen and nectar from the flowers.



Figure 62 *Ageratum houstonianum*

Anthemis tigreensis A.Rich.

SHUKINDO (Kaf); EMBAHA (Tig).

A prostrate, or sometimes erect annual herb growing up to 30 cm high. Leaves grey-green, alternate and divided into rounded segments. Flowers white, attractive and borne on long stalks in heads.

Growing in Afromontane and afroalpine grassland, commonly found with *Senecio*, *Helichrysum*, *Artemisia*, *Ursinia*, etc., in *Erica arborea* bushland at altitudes between (1800-)2300 and 4620 m, in the Ethiopian Highlands (Ethiopia and Eritrea), and also in East Africa.

Flowering throughout the year but especially in mass after the start of rains. Honeybees collect nectar and pollen from the flowers. In local medicine, the roots are used against wet eczema.



Figure 63 *Anthemis tigreensis*

Aspilia africana (Pers.) Adams

ARIBI (Ari).

An erect perennial, many-branched herb, or bushy subshrub up to 1 m high; stem sparsely branched toward the apex. Leaves broadly to narrowly ovate. Flowers bright yellow, solitary or a few arranged in terminal corymbs.

Growing in swampy places, grassland with scattered thickets on steep or gentle slopes and highland forest margins, at altitudes between 900 and 2200 m, in Tigray, Gojam, Welega, Kefa, Gemo Gofa and Sidamo floristic regions, and also in Sudan,

Uganda and Angola.

Flowering from September to November, honeybees collect abundant pollen and nectar from the flowers frequently.



Figure 64 *Aspilia africana*

***Bartlettina sordida* (Less.) R.M. King & H. Rob.**

A shrub or woody perennial herb 80 cm high; stems brownish to reddish-brown tomentose. Leaves simple, ovate or ovate-oblong. Flowers with white tube and purplish lobes, arranged in heads or capitula.

It is an ornamental cultivated at the main Holetta Bee Research Centre at an altitude of about 2400 m. A widely cultivated plant originating in Mexico and better known by its other name, *Eupatorium sordidum* Less.

The purple or violet colour of the inflorescence is derived from the elongate style branches that attract honeybees. It is a major pollen source plant for honeybees.



Figure 65 *Bartlettina sordida*

***Berkheya spekeana* Oliv.**

AISHIKOM (Ari).

An erect perennial herb, reaching up to 2 m high with woody rhizome. Leaves alternate, simple, sessile, narrowly elliptic to lanceolate and highly dissected with spines on the margins. Flowers yellow, borne in heads at ends of branches.

Growing in hilly grassland with scattered trees and shrubs, roadside slopes, evergreen bushland and margins of forest, at altitudes between 1400 and 2800 m, in Gogjam, Shewa, Arsi, Welega, Illubabor, Kefa, Gamo Gofa and Sidamo floristic regions, and also in Sudan, E Africa, Rwanda and Nigeria.

Flowering from October to February, honeybees collect abundant pollen from the flowers frequently.



Figure 66 *Berkheya spekeana*

Bidens macroptera (Sch.Bip. ex Chiov.) Mesfin

ADEY ABEBA, MESKEL ABEBA (Amh); ADELA (Kam); KELLO (Oro); GHEL-GHELE-MESCHEL, TSSELIM-TENEG (Tig).

A perennial herb up to 60 cm high; stems several arising from a woody rootstock, prostrate to suberect and rooting at lower nodes. Leaves broadly ovate, pinnate or rarely lobed. Flowers yellow, arranged in heads that are clustered in erect panicles.

The species is endemic to the Ethiopian Highlands (Ethiopia and Eritrea) growing in rocky or stony places in mountain slopes and grassland, forest margins and open places in ericaceous scrub, rarely also along roadsides, at altitudes between 2000 and 3700 m.

Flowering from September to December, honeybees collect light orange pollen loads for brood rearing and for strengthening colony during dry periods.



Figure 67 *Bidens macroptera*

***Bidens pachyloma* (Oliv. & Hiern) Cufod.**

ADEY ABEBA, MESKEL ABEBA (Amh); ADELA (Kam); KELLO (Oro).

An erect annual herb growing up to 0.5-2 m high; stems with ascending branches from the base, or with angular branches from the upper half, glabrous to sparsely pubescent and rooting at the lower nodes. Leaves simple to tripinnatisect, upto 20 cm long, with linear oblong segments. Flowers bright yellow, borne in heads bearing 8-10 ray florets.

An endemic species growing in short grassland, gentle mountain slopes, river banks and extending to margins of arable land and roadsides, at altitudes between 2200 and 3300 m, in Gondar, Gojam, Welo, Shewa, Arsi and Gamo Gofa floristic regions.

Flowering during the Ethiopian meskel celebrations in late September, the herb is one of the major honey sources in the highlands and provides honeybees with abundant pollen in September and initiates brood rearing since honeybees collect large quantities of pollen from the flowers.



Figure 68 *Bidens pachyloma*

***Bidens pilosa* L.**

CHEGOGIT, YEQURA WOSFEI, YESETAN MERFE (Amh); K'ECH'EBA, MUTE (Had); , JUGOGID, MAXXANNEE, SAMIE ABABRE (Oro); DAJIBADI (Som); CGWAGUHOT, HELGHELE-MESCHEL, ZAGOGO QATTATO (Tig); SET'IK'OP'IYA (Wol).

An erect annual, or perennial herb, growing up to 1.5 m high; stem simple or branched. Leaves deeply divided into three toothed lobes. Flowers yellow (when ray florets are absent, which are mostly white if present).

A noxious weed of cultivated fields, roadsides, pastures, plantations and wastelands, distributed throughout the country, growing at altitudes between 700 and 2400 m. It is a widespread species occurring in most tropical and subtropical regions of the world and also extending into some temperate areas.

Flowering profusely in September and October, honeybees collect nectar and pollen from the flowers and it is an important honey source plant throughout the country. It has medicinal properties and has been reported to control bleeding.



Figure 69 *Bidens pilosa*

Bidens prestinaria (Sch.-Bip.) Cufod.

ADEY ABEBA, MESKEL ABEBA (Amh); ADELA (Kam); KELLO (Kaf & Oro); GHEL-GHELEMESCHEL, TSELIM-TENEG (Tig).

An erect annual herb, growing up to 0.5-2 m high; stems with ascending branches from near the base, or with angular branches from the upper half, which are rooting at the lower nodes. Leaves simple, ovate with linear-oblong segments. Flowers yellow, borne in heads and clustered in showy panicles at the end of branches.

Growing commonly in gentle mountain slopes, river and stream banks, short grassland, margin of arable land and on roadsides, at altitudes between 900 and 2900 m, in nearly all floristic regions, and also in Eritrea and Sudan.

Flowering from early September to end of October, honeybees collect nectar and pollen from the flowers. The pollen pellet is yellow and abundantly collected during September for brood rearing and it contributes for honey production in central and northern parts of the highlands of the country. The honey from this plant is yellow and bitter in taste because of its high proportion of pollen grains and mostly used for the preparation of TEJ.



Figure 70 *Bidens prestinaria*

***Bothriocline schimperi* Oliv. & Hiern ex Benth.**

SHITTO (Kaf).

A much-branched perennial herb, growing up to 2 m high with a woody base. Leaves lanceolate and toothed along margins, dull dark green above but paler beneath. Flowers pale to dark lilac, borne in heads that are arranged in terminal panicles.

Growing in moist montane forest margins, damp depressions in *Combretum-Terminalia* wooded grassland, grassy roadside thickets, along stream banks and in dry woodlands, at altitudes between 1300 and 2800 m, in Gondar, Gojam, Shewa, Arsi, Welega, Ilubabor, Kefa, Gamo Gofa, Sidamo and Bale floristic regions, and it is endemic to Ethiopia.

The plant provides flowers almost all year round from September to May and honeybees forage for the abundant nectar and pollen from the flowers. This species is a very important honey source plant during the November honey flow season in south and southwest Ethiopia. No data on the physical and chemical composition of honey but it is believed to contribute for mixed honey production in association with other plants. Pulverized leaves and the flowers are said to be dangerous for the eyes.



Figure 71 *Bothriocline schimperi*

Carduus nyassanus (S. Moore) R.E. Fries

KOSHESHILA (Amh); thistle (Eng); BALA-WORANTI (Oro); DENDER (Tig).

An erect perennial herb, reaching up to 2 m; stem green with white stripes. Basal leaves narrowly oblanceolate, highly dissected with spines on the margins. Flowers red to pale violet, borne in spiny heads which are arranged in clusters at ends of branches.

Growing in highland bamboo ticket, along streams and ravines in *Juniperus* forest and open *Hagenia-Hypericum* forest, at altitudes between 2300 and 3400 m, in Tigray, Gondar, Shewa, Arsi, Welega, Gamo Gofa, Sidamo and Bale floristic regions, and also in Sudan, East Africa, Cameroon, Nigeria, Rwanda, Burundi, Malawi and Zambia.

Flowering from September to December, the plant is a good source of pollen and nectar. The flowers are vigorously foraged by honeybees during dry season.



Figure 72 *Carduus nyassanus*

***Carduus pycnocephalus* L.**

KOSHOSHILA (Amh); QOREE-HARREE (Oro).

An erect annual herb about 75 cm high; stem slender, solitary, paniculately branched above and narrowly winged with triangular, spinose or spinulose lobes. Leaves grey-green especially on lower side. Flowers tubular, slightly exserted with lilac-red lobes and whitish-yellow tube arranged in heads that are solitary or 2-5 clustered together at apices of branches.

Growing as roadside weed, at altitudes between 1700 and 2100 m, in Shewa Floristic Region but native of West Europe, Mediterranean region, North and West Africa, South west and Central Asia to Afghanistan and Pakistan.

Flowering in August and September, the plant yields large quantity of pollen for brood rearing.



Figure 73 *Carduus pycnocephalus*

***Carduus schimperi* Sch. Bip. ex A. Rich.**

QOREE-HARREE (Oro).

A stemless spiny perennial herb with a long, white or brown taproot. Leaves flat on the ground or slightly raised from half-way up, 3-20 cm long, elliptic or oblanceolate. Flowers white to pale-lilac, sweet-scented and arranged in heads.

Growing in montane grassland, ericaceous bushland, secondary scrub, open *Juniperus* forest and in heavily grazed area, at altitudes between 2000 and 4600 m, in most floristic regions, and also in Sudan and East Africa.

Flowering from October to December, honeybees collect creamy pollen loads from the flowers for brood rearing. The plant is used to make rig for soil conservation on degraded hilly lands.



Figure 74 *Carduus schimperi*

***Carthamus lanatus* L.**

YEAHIYA SUF (Amh); bastard saffron, rouge, rouge plant, safflower, wars saffron (Eng); SEKENDER, AFA`NSTI, DANDER- BELTA (Tig).

An annual herb growing up to 1m high with an erect stem, which is grey-green to straw coloured. Leaves ovate lanceolate with spines on the margins. Flowers lemon-yellow, borne in solitary heads with spiny bracts and tubular corolla.

Growing in fallowland, as a weed of *Eragrostis tef* and other crops and along roadsides, at altitudes between 1000 and 2500 m, in Tigray, Gondar, Gojam, Shewa, Arsi and Harerge floristic regions, and also in upland Eritrea, North Africa, Europe, Russia, Iraq, Iran and extending to China.

Flowering from November to January, the plant provides pollen and some amount of nectar for honeybees.



Figure 75 *Carthamus lanatus*

***Carthamus tinctorius* L.**

SUFF (Amh); safflower (Eng); SUF (Gur & Tig); BORDA, SUFII, SUUFI, SUUFIBORDA (Oro); SUPIYA (Wol).

An erect stiff annual herb up to 75 cm high; stem much branched, glabrous, smooth and white. Leaves ovate to linear with finely spine-toothed margins. Flowers yellow to orange, or reddish-orange and arranged in large terminal heads.

It is widely cultivated for its edible oil-producing fruit and sometimes growing in wasteland, at altitudes between 1000 and 2400 m, in most floristic regions, and also widely cultivated in the East, Mediterranean area, Afghanistan, India and California (U.S.A.) for its oil bearing fruits and sometimes also cultivated as an ornamental, but unknown in the wild state.

Flowering from November to February, the plant is a major source of pollen and widely planted around apiary for brood rearing and maintenance of bee colonies during dearth period. Lightly roasted and crushed seeds are mixed with water to produce a milky fasting drink or made into "FITFIT" with "INJERA". Elsewhere, it is reported that the flowers are used in cosmetics for making a rouge.



Figure 76 *Carthamus tinctorius*

***Chrysanthemum coronarium* L.**

An erect stiff annual herb 50-75 cm high. Leaves 2-3-pinnatisect, obovate in outline, not succulent, with broader and sharper toothed segments more closely placed. Ray florets yellow cream or yellowish-white and disc florets bisexual, yellow.

Cultivated for ornament in towns, at altitudes between 2100 and 2500 m.

Honeybees frequently collect pollen from the flowers.



Figure 77 *Chrysanthemum coronarium*

Cineraria abyssinica Sch.Bip. ex A.Rich.

IT'SEMEFRIHI, T 'SEYFAT (Ge'e); NOPPHOO (Kaf).

An erect or a scrambling, annual or perennial herb, 20-100 cm high; stems repeatedly branched with straggly branches, slightly woody at base. Leaves alternate, simple, glabrous to covered with loose floccose tomentum especially on petioles and veins of developing leaves, margins serrate. Flowers in heads or capitula, which are radiate, campanulate and aggregated into dense corymbose cymes, with bright yellow ray and disc florets.

An endemic species growing in evergreen bushland with *Rumex*, etc., *Eucalyptus* plantations, montane grassland and *Erica arborea* bushland, at altitudes between 2300 and 4200 m, restricted to Tigray, Gondar, Welo, Shewa, Arsi, Sidamo and Bale floristic regions.

Flowering in September and October, the herb is a potential pollen source plant for honeybees.



Figure 78 *Cineraria abyssinica*

Cirsium vulgare (Savi) Ten.

QORIE HARREE (Oro); DENDER (Tig).

An erect perennial herb 75-125 cm high; stem densely branched below, winged,

arachnoid to spreading hirsute. Leaves oblong-lanceolate, pinnatisect, decumbent, segments triangular, spinescent at margins with spines up to 2 cm long. Flowers pink or purple, tubular and arranged in erect, solitary or weakly corymbose or paniculate inflorescences.

Growing on roadsides and in fallowland, at altitudes between 1900 and 3000 m, in Gondar, Welo, Gojam, Shewa, Welega, Ilubabor, Bale and Harerge floristic regions, but native of Europe, South west Asia, North Africa and Siberia, and introduced elsewhere.

Flowering in September and October, the herb is a potential pollen source plant for honeybees.



Figure 79 *Cirsium vulgare*

Crassocephalum macropappum (Sch.Bip. ex A. Rich.) S. Moore
LET'I-MAREFIYA (Amh); MANDALLO (Kaf).

A weak straggling herb growing to 1.5 m high; stem slender, often growing through herb or shrub clump. Leaves ovate, simple, pale green above and grey-green beneath. Flowers yellow, borne in solitary heads.

An endemic species growing in moist places along margins of evergreen forest, dry evergreen woodland and bushland, wasteland and along roadsides, at altitudes between 1000 and 3200 m, throughout the highlands of Ethiopia.

The nodding flower heads can be seen throughout the year, but more profusely

flowering after the rains. Honeybees collect pollen and nectar from the flowers frequently and the long flowering period is very helpful for strengthening bee colonies. In local medicine, the flower is used for wound dressing, eye treatment, lactation stimulant and to treat venereal diseases.



Figure 80 *Crassocephalum macropappum*

***Dahlia pinnata* Cay.**

Dahlia (Eng).

An erect, perennial herb, 1.8 m high; stems unbranched. Leaves simple, ovate-elliptic. Flowers purple with yellowish or rosy spot at the base and borne in erect heads.

It is cultivated in private gardens, at altitudes between 1500 and 2500 m, in Shewa Flosritic Region, and also introduced elsewhere but native of Mexico and Guatemala.

Flowering almost throughout the year, the herb is a pollen source for honeybees.



Figure 81 *Dahlia pinnata*

***Dicrocephala chrysanthemifolia* (Bl.) DC.**

MARE (Mej); HADAA, NUUGA, TABBAGIDII (Oro); NUGGHIO (Kaf); HARAMO (Som); NIHUG (Tya).

A erect stiff, widely branching annual, or short-lived perennial herb 30-75 cm high; stem solitary or several from the base. Leaves pale yellowish green, glandular-viscid, alternate, oblong to oblanceolate. Flowers greenish-yellow, white or dark red-purple and arranged in heads.

Growing in damp places in grassland, forests, amongst grasses along streams and river banks, occasionally a weed of cultivated and fallow fields and waste ground, at altitudes between 1800 and 3800 m, in most floristic regions, and also in upland Eritrea, west to Guinea and South to Malawi, and also in Saudi Arabia and India.

Flowering in September and October, the herb is a potential pollen source for honeybees.



Figure 32 *Dicrocephala chrysanthemifolia*

***Echinops macrochaetus* Fresen.**

KOSHISHLA (Amh); QOREE-HARREE (Oro); GADH-CEESAAN, QOBOROSH (Som).

An erect, densely branched, bushy, perennial herb up to 1 m high; stems much branched with woody rootstock. Leaves elliptic to oblanceolate. Flowers white or pale blue and arranged in ball-like conspicuous heads arising above the leaves and bearing pungent spines.

Growing in dry sandy places, river banks, disturbed open ground on rocky slopes, often along roadsides and in graveyards, at altitudes between 1300-3000 m, in most floristic regions, and also in upland Eritrea and Sudan.

Flowering from December to March, the herb provides surplus pollen from the flowers. It was recorded that a strong colony can collect about 100 gm of pollen from the flowers of this species in a day.



Figure 83 *Echinops macrochaetus*

***Ethula gracilis* Del.**

ASHMUCH, AWUNDA (Amh); ABUWA, APUDE (Anu).

An erect annual herb growing up to 1 m high. Leaves narrowly lanceolate to elliptic. Flowers white to pink or lilac to mauve.

Growing at disturbed river banks, margins of pools, weed in crop fields and wet roadside ditches, at altitudes between 300 and 2200 m, in Tigray, Gondar, Gojam, Shewa, Illubabor, Sidamo and Bale floristic regions, and also in upland Eritrea, Sudan, Uganda, Chad, Central African Republic and Cameroon.

Flowering in September and October, the herb is a major pollen source for honeybees.



Figure 84 *Ethula gracilis*

***Flaveria trinervia* (Spreng.) C. Mohr**

GOROSEZA (Oro); HADE, HARAMOBAQLEED, HARAMO-SHAWAAD (Som);
D'KA-NEKEL (Tig).

An erect annual herb to 50 cm high: stems often purplish and much branched. Leaves lanceolate, or oblanceolate. Flowers yellow, borne in dense axillary heads.

Growing in wet or damp road side ditches, waste places, cultivated fields and river and stream banks, at altitudes between 1000 and 2000 m, in most floristic regions, and also widespread in tropical Africa and Middle East but native of the tropical parts of North and South America, especially common in Mexico.

Flowering from October to January, the herb is a pollen and nectar source for honeybees.



Figure 85 *Flaveria trinervia*

***Galinsoga quadriradiata* Ruiz & Pavon**

ABA-DABO, AREMAMO NEGELEGN (Amh); LELIYA (Maji); ABBADEEBO, ABBA-GUYA RUFKEDDIE (Oro); HARRAME-BALSHE (Som).

An erect or spreading, annual herb, up to 60 cm high; stems and branches striate-sulcate, hispid-pubescent. Leaves simple, opposite, ovate with crenate-serrate margins and acute to obtuse apex, petiolate. Flowers in heads arranged in loose terminal cymes; ray florets white and disc florets yellow.

A common weed of cultivated and fallow land, usually found among grasses and other herbs, at altitudes between 1520 and 2600 m, in Tigray, Gondar, Shewa, Welega, Illubabor and Kefa floristic regions, and also in Cameroon, Nigeria, Rep. Dem. Congo, Zambia and South Africa.

Flowering all year round, honeybees collect pollen and nectar from the flowers. The herb is also used for wound dressing.



Figure 86 *Galinsoga quadriradiata*

***Guizotia scabra* (Vis.) Chiov.**

ADEY ABEBA, GAGIE, MECH (Amh); ARIBI (Ari); TUFFO (Kaf); ADELA, AWAAYYY-EE, HADAA, TUUFOO (Oro); MOCO (Sil); ADELA AWAAYYEE (Tig).

An erect or procumbent, densely branched perennial herb, growing up to 2 m high; stems reddish brown, or pale yellow. Leaves simple, sticky, narrowly lanceolate to broadly ovate, toothed or entire at the margins. Flowers yellow, borne in heads, which are arranged in several compound panicles.

Growing in short grassland, meadows, along forest margins, roadside ditches and waterways and in cultivated field, at altitudes between 1300 and 2900 m, in most floristic regions, and also in upland Eritrea, from Sudan west to Nigeria and from East Africa south to Zimbabwe and also in Yemen.

Flowering all year round, the herb provides a significant amount of pollen and nectar for honey production and strengthening honeybee colonies. The plant is one of the major honey source plants in mid-altitude areas of central and northern Ethiopia.

The honey from this plant is brown or yellow and bitter in taste and highly preferred for making TEJ. Farmers in the rift valley area of East Shewa Zone migrate honeybee colonies during peak flowering period of the plant for honey production.



Figure 87 *Guizotia scabra*

***Helianthus annuus* L.**

JABAR-SUF, YEFERENG SUF (Amh); SUF (Amh, Gur, Har & Tig); sunflower (Eng); DUBI SUFÍ-FERENGI, NUUGI ADI (Oro); YEFERENJ SUF (Sil); SHUFIYA (Wol).

An annual herb growing up to 3 m high, with unbranched to much-branched stems. Leaves alternate, ovate-lanceolate, with large blunt teeth. Flowers yellow, borne in very large heads, consisting of 1000-2000 florets.

It is cultivated in homegardens for food, fodder and oil, at altitudes between 1700 and 2500 m, in Shewa, Arsi and Bale floristic regions, and also in upland Eritrea, Tanzania, Zambia, South Africa and other parts of the world.

Honeybees collect nectar and pollen from the flowers and the plant is an important honey source world wide. The honey is golden yellow, with high proportion of glucose (34.72-42.33%). In Ethiopia, sunflower is largely produced in state farms and the honey is yellow or golden yellow and honeybees are also believed to increase the seed yield through pollination. Dried green stems and leaves are recommended to be used for smoker fuel.



Figure 88 *Helianthus annuus*

***Helichrysum citrispinum* Del.**

NECHILO, SETEGARDA (Amh); NACHILO, NATCHILO, TUKA (Oro).

A cushion-forming perennial herb, or shrub often 50-70 cm high; stem grey and spiny. Leaves linear-lanceolate or oblong, often crowded at the apex of the branches, densely white or grey hairy. Flowers whitish-pink or white, borne in heads.

Growing in rocky mountain slopes and meadows, Afroalpine communities with scattered *Erica* and *Senecio* and in open stony mountain slopes on light loamy soil derived from volcanic rock, at altitudes between 3000 and 4500 m, in Gondar, Gojam, Shewa, Arsi and Bale floristic regions, and also East Africa.

The herb is a potential pollen source plant for mountain bees (*Apis mellifera monticola*).



Figure 89 *Helichrysum citrispinum*

***Helichrysum formosissimum* (Sch.Bip.) A. Rich.**

Ever lasting flower (Eng).

An erect perennial herb, or weak shrub up to 0.5-1.5 m high. Leaves ovate-oblong with one prominent midvein and several longitudinal veins. Flowers red to pink or white, papery and shining, arranged in terminal corymbose heads.

Growing along streams and damp spots in *Erica arborea* bushland, in marshy ground, and in degraded woodland in upper alpine zones, at altitudes between 2600 and 4400 m, in most floristic regions, and also in Sudan, East Africa and Rwanda.

Flowering almost all year round but more abundantly from October to January, honeybees forage for pollen and a small amount of nectar. It is also used as an ornamental for decorating houses.



Figure 90 *Helichrysum formosissimum*

Helichrysum splendidum (Thunb.) Less.

NEWODE (Amh); everlasting flower, straw-flower (Eng).

A shrub or bushy perennial herb with woody base, growing to 50-75 cm high. Leaves alternate, linear-oblong or lanceolate, covered with white hairs. Flowers bright yellow, borne in heads, many of which are crowded together in terminal corymbs.

Growing in *Erica arborea* bushland and Afroalpine grassland, at altitudes between 2900 and 4300 m, in Tigray, Gondar, Welo, Shewa, Arsi, Bale and Harerge floristic regions, and also in Sudan, Tanzania, Malawi, Zimbabwe and South Africa.

Flowering all year round, honeybees collect pollen and nectar from the flowers. The plant also supplies abundant pollen for brood rearing during active period.



Figure 91 *Helichrysum splendidum*

Helichrysum stenopterum DC.

An erect or a straggling perennial herb, growing up to 1 m high; stems grey tomentose and glandular pubescent. Leaves simple, alternate, elliptic to ovate. Flowers yellow, borne in heads arranged in terminal corymbs.

Growing along margins of dry evergreen woodland and in cleared areas in juniper forests, at altitudes between 1800 and 3500 m, in almost all floristic region, and also in Sucas, E Africa, Zambia, Zimbabwe, Mozambique, Malawi, Swaziland, South Africa and Yemen.

Flowering in September and October, honeybees visit the flowers for pollen and nectar, which are also visited by various other insect species for pollen.



Figure 92 *Helichrysum stenopterum*

***Inula confertiflora* A. Rich.**

WONAGIFT (Amh); BULAANCHOO, HAXAWWII (Oro).

A much-branched shrub, 1.5- 2.5 m high. Leaves densely formed towards the apex of the branches, elongate-lanceolate, acute at the apex, narrowed at the base. Flowers yellow, arranged in large heads of flat-topped groups.

An endemic plant growing along margins of and in clearings of *Juniperus-Podocarpus* forest, *Erica arborea* scrub, along stream banks, in *Eucalyptus* plantations and montane grassland on slopes with scattered *Juniperus*, *Hagenia*, *Hypericum*, at altitudes between 2500 and 3800 m, in Welo, Shewa, Arsi, Bale and Harerge floristic regions.

Flowering from August to March, the shrub is a major honey source in high altitude areas of Ethiopia and honeybees collect pollen and nectar from the flowers. In rural areas, the roots of the plant are dried and smoked as a fumigant during child birth and a solution of pounded leaves in water is applied to diseased eyes of cattle. The roots are used against leprosy.



Figure 93 *Inula confertiflora*

Kleinia grantii (Oliv. & Hiern) Hook.f.

RAAFU-QAMALE, RAAFU, GAMALEE (Oro); GUSSDURUEI (Som).

An erect annual herb, growing up to 40-50 cm high, rhizomatous or tuberous, spreading beneath the soil surface and forming new shoots and short tuberous roots; stems covered with fine hairs. Leaves simple, fleshy, glaucous, glabrous, elliptic to oblanceolate, with entire or toothed margins. Flowers numerous, bright red, crimson, scarlet, or vermillion, with corolla tubular below and dull dark red, aggregated into terminal heads.

Usually found under shade in various types of *Acacia* woodland, *Acacia-Commiphora* bushland and sometimes in abandoned fields, at altitudes between 1200 and 2300 m, in Tigray, Welo, Gojam, Shewa, Sidamo and Harerge floristic regions, and upland Eritrea, Somalia, Kenya, Tanzania, Mali and Guinea.

Flowering in September and October, the herb is a major pollen source for honeybees.



Figure 94 *Kleinia grantii*

Kleinia squarrosa Cufod.

MARCU (Ben & Gum).

A shrub with up to 4 m long, with scandent, or sprawling branches, forming clumps or climbing-straggling perennial herb up to 5 m high; stem succulent, angular, streaked with red or green and longitudinally purple striate, with pungent smell when bruised or cut. Leaves simple, fleshy, obovate, and usually deciduous at anthesis. Flowers pale purple or pink.

Growing in *Acacia-Commiphora* and *Balanites* woodland and sometimes cultivated as a hedge plant, at altitudes between 900 and 1500 m, in Shewa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also in Somalia and East Africa.

Flowering in December and January, honeybees collect mass of yellow pollen loads from the flowers.



Figure 95 *Kleinia squarrosa*

Laggera crispata (Vahl) Hepper & Wood

GEMIE, QES BEDEJA, KESKESSIE (Amh); APUDA (ANU); HUPICHO (KAF); GULMEN (Mej); AJAYA, ASHKASHO (Oro); GUFUA (Sil); KANSKANSO (Tig).

An aromatic perennial herb, or shrub 2-4 m high, with stems narrowly winged with teeth or uninterrupted wings, and sticky due to glandular hairs. Leaves alternate, oblanceolate with serrate margins. Flowers white to pink and borne in hairy heads. Widely growing at margins of montane scrub, open woodland, grassland, river or stream banks and also as weed of cultivation and wasteland, at altitudes between 1400 and 2700 m, in Tigray, Gondar, Shewa, Arsi, Welega, Ilubabor, Kefa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also widespread in tropical Africa and Asia.

Flowering from June to October, honeybees collect abundant pollen and nectar from the flowers. The flowers are frequently foraged by honeybees during dry period for brood rearing. The whole plant is also used as a disinfectant whereas the roots are used for snake bite.



Figure 96 *Laggera crispata*

***Launaea intybacea* (Jacq.) Beauv.**

ECH MESKEL, MECHMESKEL (Amh); HOOLA -GABBISA, OLA-GABBIS (Oro); AY-BEGEDAMO (Sil); BURDEH (Som).

An erect annual, or short-lived perennial herb, growing up to 75 cm high, with a long slender taproot. Stem glabrous or subglabrous. Leaves, simple to pinnatifid, often runcinately-lobed with recurved lobes, margins serrated. Capitula few to several, in paniced racemose cymes. Flowers yellow with exposed anthers and with basal appendage.

It grows in grassland with scattered *Acacia* trees on calcareous soil, degraded *Acacia-Commiphora* bushland, weed in irrigated cultivations and sorghum fields, at altitudes between 180 and 2300 m, in nearly all florstic regions, and also a widespread pantropical weed reported so far from all the major continents except Australia.

It is flowering from October to December and the herb is a potential pollen source for honeybees.



Figure 97 *Launaea intybacea*

***Mikaniopsis clematoides* (Sch. Bip. ex A. Rich.) Milne-Redh.**

HADDI, KALALA, KARKORA, KATISA (Oro).

A perennial herb, or subshrub, scrambling, climbing or twining, up to 5 m long; stem profusely branched. Leaves alternate, ovate with cordate base, grey-green above, paler beneath and sometimes purple-tinged, usually glabrous or glabrescent. Flowers in heads, which are discoid or narrowly campanulate in shape, borne in leaf axils and in

terminal, rounded dense corymbs; ray florets yellow; disc florets bisexual or rarely functionally male, yellow.

An endemic climber growing at margins of moist *Schefflera-Hagenia* forest, steep mountain slopes in remnants of *Juniperus* forest and scrub of *Maesa lanceolata* and *Acacia*, at altitudes between 2000 and 3300 m, in Tigray, Gondar, Welo, Shewa, Kefa, Arsi, Bale and Harerge floristic regions.

It flowers from October to December and the flowers are sweet scented. The plant is one of the major honey sources in the highlands. The honeybees collect a large quantity of pollen loads from the flowers, which support the strengthening of brood rearing.



Figure 98 *Mikaniopsis clematoides*

***Parthenium hysterophorus* L.**

FARAMISSA (Oro); HARAMA DHIMBIL (Som).

An erect notorious perennial alien invasive weed up to 60 cm high with repeatedly branched, grey green stems. Leaves alternate, pinnate to bipinnate, linear or bilobed. Flowers white or yellow-green, numerous and arranged in heads or capitula.

Growing mainly along roadside ditches, in abandoned fields and along margins of farmlands, at altitudes between 700 and 1800 m, throughout the dry parts of the country, with high density in the Rift Valley. It is suspected that the seeds were brought into the country with imported or donated food grains and the herb was first encout-

nered in Dire Dawa area in the 1970s. The plant is grazed by livestock and suspected to affect the quality of milk. This alien invasive species has been collected from Afar, Welo, Shewa, Sidamo and Harerge floristic regions and it has recently been seen in Tigray, Welega, Kefa, Ilubabor, Arsi and Bale floristic regions. This noxious weed is native of the West Indies, North America and northern South America but introduced elsewhere including Eritrea, Djibouti, Somalia, Kenya, Uganda, Tanzania, Mozambique, Mauritius, Madagascar, South Africa, India and Australia.

Flowering throughout the year, the plant is potentially a pollen source but beekeepers are complaining about the honey from this plant for being bitter, affecting the taste and aroma of the honey.



Figure 99 *Parthenium hysterophorus*

***Plectocephalus varians* (A.Rich.) Jeffrey ex Cufod.**

African knapweed (Eng.); ESTSEYOHANNES (Ge'e); FUGAZERARO (Had).

A perennial herb with ascending, or prostrate branches, up to 20-100 cm high; stems usually several from a short rhizome. Leaves elliptic to oblanceolate with toothed margins, crowded at the base of the stem. Flowers white, or pale pink, sweet-scented, borne in heads produced at the end of erect stems.

A near endemic species growing in open *Juniperus* or *Juniperus-Podocarpus* forest, grassy slopes in *Erica arborea* bushland, seasonally flooded mountain meadows and

along perennial streams, at altitudes between 1900 and 3600 m, throughout the Ethiopian Highlands (Ethiopia and Eritrea).

Flowering at any time of the year but more profusely after the rains and honeybees collect pollen and nectar from the flowers. It is a minor honey plant throughout the highlands.



Figure 100 *Plectocephalus varians*

Senecio fresenii Sch.Bip ex Oliv. & Hiern
ANGAASUU (Oro).

An erect perennial herb, up to 75 cm high; stems simple, or densely branched and woody at base. Leaves simple, narrowly linear-lanceolate or elliptic, often bright green above and densely white tomentose beneath. Flowers lemon yellow.

An endemic species growing in *Juniperus* forest, *Erica arborea* bushland and in well drained grassy slopes in afro-montane meadows, at altitudes between 1500 and 4300 m, in Gondar, Gojam, Shewa, Arsi and Bale floristic regions only.

Flowering in September and October, it is a pollen source plant for honeybees.



Figure 101 *Senecio fresenii*

***Senecio hadiensis* Forssk.**

SUHUMATALI, TAIFARETH (TIG).

A shrubby liana, or scandent succulent perennial herb, or climber with stems up to 5 m high; stems softly woody to succulent, thick and branched above. Leaves simple, narrowly to broadly elliptic, abruptly narrowed at base, shiny glabrous, bright green but sometime variegated with yellow margins. Flowers yellow, borne in heads that are large in number and aggregated into dense corymbose, or rounded cymes.

Growing in forest margin, dry bushland and *Acacia-Commiphora* woodland, at altitudes between 1200 and 2400 m, and sometimes cultivated as ornamental (plants with variegated leaves are often selected for cultivation) at altitudes between 2000 and 2500 m in Shewa and Harerege.

Flowering from October to March, honeybees collect pollen and nectar from the flowers.



Figure 102 *Senecio hadiensis*

Senecio myriocephalus Sch. Bip. ex A. Rich.

SIMBITA (Gur); GAWEH, GAWE, INGESHU (Oro).

An erect shrub 1-3.5 m high. Stem densely branched. Leaves simple narrowly elliptic, sessile and toothed along the margins. Flowers in heads or radiate capitula, campanulate in dense and yellow, arranged in dense erect corymbs.

Growing along margins of *Hagenia-Schefflera* forest, *Podocarpus* forest, usually in forest clearings and in *Arundinana alpina* bamboo thicket and *Erica arborea* bushland, and sometimes also used as a hedge plant, at altitudes between 2250 and 3300 m. The species is endemic to the highlands of Ethiopia, widely growing in Tigray, Gondar, Welo, Shewa, Arsi, Kefa, Sidamo, Bale and Harerge floristic regions.

Flowering almost all year round, honeybees collect pollen from the flowers.



Figure 103 *Senecio myriocephalus*

Senecio ochrocarpus Oliv. & Hiern

QEBQEBO (Amh).

An erect perennial herb growing up to 1.7 m high; stem arising from a short rhizome and usually solitary but sometimes several stems developing together. Leaves simple, dark green and nearly glabrous above to densely tomentose to wooly beneath, or on both surfaces. Flowers yellow.

An endemic herb growing frequently in *Juniperus* forest, in moist or shaded situations, *Erica arborea* bushland below Afro-alpine meadow, sometimes along river banks and in open grassland on mountains, at altitudes between 2800 and 4300 m, in Gondar, Welo, Gojam, Shewa, Sidamo, Bale and Harege floristic regions only.

Flowering from September to November, the herb is a pollen and nectar source for honeybees.



Figure 104 *Senecio ochrocarpus*

Senecio schultzii Hochst. ex A. Rich.

GEDEET, QUEDEET (Amh).

Perennial herb without evident stems. Leaves arising from a woody rootstock, dark green above and white below, with waved or lobed margins. Flowers yellow, borne in solitary heads that are usually sessile in the centre of the leaf rosette.

Growing in Afro-alpine meadows and *Erica arborea* scrub, at altitudes between 3200 and 4400 m, in Gondar, Welo, Gojam, Shewa, Arsi and Bale floristic regions only.

Flowering from November to June, honeybees collect pollen and nectar from the flowers frequently. The long flowering period is very helpful for providing abundant pollen and nectar during the time when bee forage is scarce.



Figure 105 *Senecio schultzii*

***Silybum marianum* (L.) Gaertn.**

Blessed Mary's thistle, milk thistle (Eng).

An annual or a biennial herb up to 3 m high with prickles; stem hollowed, erect, glabrous, grey. Leaves grey with spines. Flowers pink or purple, tubular and borne in heads.

Growing in roadside ditches and wasteland, at altitudes between 2200 and 2600 m, in Tigray, Gondar, Gojam, Shewa, Arsi and Bale floristic regions, and also in upland Eritrea, Mediterranean region, Iraq, Iran, Afghanistan and naturalized in parts of Europe and Latin America.

It flowers from September to November and is a major pollen source plant for honeybees.



Figure 106 *Silybum marianum*

***Solanecio gigas* (Vatke) C. Jeffrey**

YESHKOKO-GOMEN (Amh); DOO'IROO, NOBE (Kaf); JILMMA JALDESSA, NOO-BE (Oro).

A shrub, or small tree growing up to 6 m high; stems and branches leafless below but with leafy crown near the apex. Leaves ovate-oblong, pinnatifid, membranous, with serrate margins and clear mid ribs. Flowers yellow, arranged in heads, or capitula and clustered in large terminal panicles, with unpleasant scent.

The species is endemic to Ethiopia, growing along stream banks, margins of forests,

in montane forest with *Juniperus procera*, *Hagenia abyssinica* and *Rhus glutinosa* and as hedge plant in both urban and rural areas, at altitudes between 1700 and 3400 m, throughout the highlands of Ethiopia.

The plant is a major pollen source during its flowering period of September to December, and it contributes for honey production and maintenance of honeybee colonies in most parts of the highland. It is also traditionally used in baking bread and the leaves are eaten by honey budgers and also used for soil fertility and as live fence.



Figure 107 *Solanecio gigas*

***Tagetes minuta* L.**

ELLCHIBO, GEMIE, GEMMA-HASHISH, YAHIYA ARITI, YAHIYA SHITO (Amh); ABA-BOO (Kaf); AJOFTU, HADDA (Oro); BANJAMA (Sid); HYBEGEDAMU (Sil); QA-DHMUUNE, SUN (Som).

An erect annual herb, densely branched, growing up to 2 m high; stem glabrous. Leaves lanceolate, margin serrate. Flowers whitish-yellow, arranged in erect clusters at the ends of the branches.

A weed of cultivated land, waste places and roadsides and also naturalized in *Acacia* woodland, at altitudes between 1300 and 2400 m, occurring in most floristic regions

of Ethiopia. It is native of west central South America, now introduced and naturalized in many tropical and warm-temperate countries.

The plant is a potential source of pollen and honeybees collect numerous light yellow pollen loads from the flowers. The roots are used in local medicine as ant repellent.



Figure 108 *Tagetes minuta*

***Verbesina encelioides* (Cav.) A. Gray**

An erect bushy annual herb, growing up to 10-40 cm high; stems with ascending branches arising from lower parts, with scattered white hairs. Leaves simple, light green and alternate. Flowers bright yellow, borne in heads or radiating capitula.

A recently introduced roadside weed, growing at altitudes between 1100 and 1450 m, in Harerge Floristic Region, and also introduced in many countries but native of SW United States and Mexico.

Flowering in September and October, the plant is a potential source of pollen for honeybees. It is recommended to put honeybee colonies nearby this plant for brood rearing and honey production.

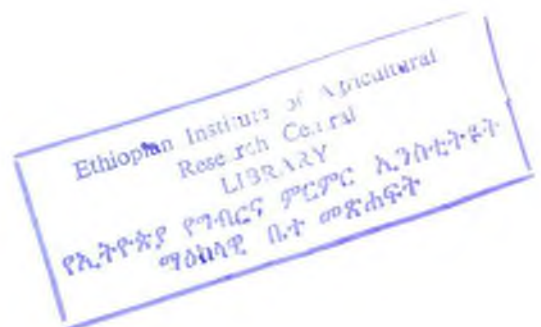




Figure 109 *Verbesina encelioides*

***Vernonia adoensis* Sch. Bip. ex Walp.**

FERES ZENG, TIKWA (Amh).

A densely branched subshrub, growing to 2.5 m high with light grey stems dotted with breathing pores. Leaves alternate, ovate-lanceolate to elliptic. Flowers whitish pink and arranged in terminal corymbose heads.

Growing along roadsides, in *Combretum-Terminalia* woodland, bushland, margins of cultivated fields, and short grassland often on black cotton soil and seasonal swamp dominated area, at altitudes between 500 and 2000 m, in Tigray, Gondar, Gojam, She-wa, Arsi, Welega and Kefa floristic regions, and also in upland Eritrea, widespread in tropical Africa.

Flowering after the rains from September to November, the shrub is a very valuable pollen and nectar source for honeybees during dry period and it is recommended to plant it around apiary for maintenance of bee colonies. The plant is also used for firewood, as live fence and for making torch for New Year celebrations.



Figure 110 *Verbesina encelioides*

***Vernonia amygdalina* Del.**

GRAWA (Amh & Tig); GERI (Anu); bitter leaf (Eng); HEBA (Had); GIRAWOO (Kaf); HEBA (Kam); EBICHA, GEEBICHA (Oro); BAKA (She); HEBA (Sil); HECHO (Som); GARA (Wol); IIBICHA (Zay).

A shrub, or small tree usually branched from near the base and growing up to 10 m high; bark rough, longitudinally fissured; young branches with numerous white breathing pores. Leaves alternate, elliptic-lanceolate or obolanceolate with regularly toothed margins. Flowers white, tinged purple or pink and sweetly scented particularly in the evening and arranged in numerous heads at the ends of the branches.

Growing in *Podocarpus* or *Pouteria* forest, usually in open spots near streams, or in fringe of glades, secondary forests, evergreen woodland and bushland, roadsides, wasteland and also grown in backyard gardens, at altitudes between (650-)1200 and 3000 m, in nearly all floristic regions, and also in upland Eritrea, Sudan, East Africa and Yemen.

Flowering trees can be found from December to May but the main flowering period is from January to February. It is a very valuable honey source in the country. Especially in warmer areas, the nectar secretion is abundant and bees produce a significant surplus of dark aromatic honey. Honeybees generally collect the nectar and whitish pollen throughout the day.

During flowering time honeybees develop very rapidly with a tendency to swarm easily. In some areas, honey is generally harvested after the flowering season of GRA-

WA. It is recommended for planting near apiary to increase honey production. GRA-WA is widely used as a hedge-forming shrub/tree and as a boundary marker. The wood is used for fuel and is also termite resistant. The leaves are used to scour pots used for making TELA, the local beer, and TEJ. The leaves and bark are bitter and in local medicine, they are used against menstruation pain, as a purgative and vermifuge, in wound dressing and against urinary inflammations. Together with roots the leaves are used against malaria. The leaves can also be browsed.



Figure 111 *Vernonia amygdalina*

***Vernonia auriculifera* Hiern**

A shrub, or small tree up to 6 m high; stems densely branched with striate branches, lenticellate, glabrous in lower parts and hairy-tomentose in upper parts. Leaves alternate, elliptic to oblanceolate, cuneate or narrowed at base and shortly decurrent on petiole, margins serrate with apiculate teeth, apex obtuse or acute with glabrous surfaces. Inflorescences with oblong-cylindric capitula, which are 1-2 (-3)-flowered, sessile and arranged in dense spreading terminal and axillary panicles, bearing pale pink, mauve, whitish or blue-violet florets. Fruit cypselas, greyish-brown, thinly hirsute with small brownish sessile glands.

Growing in forest margins and moist woodland or grassland, at altitudes between 1200 and 2200 m, in Welega, Ilubabor, Kefa, Sidamo and Bale floristic regions, and also in East Africa, Nigeria, Cameroon, Dem. Rep. Congo, Burundi and Angola.

Flowering after rainy season, the plant provides both nectar and pollen for honeybees.



Figure 112 *Vernonia auriculifera*

***Vernonia galamensis* (Cass.) Less.**

GEEDSALIID (Som).

An annual herb about 0.75-1.5 m high; stems striate, or narrowly ribbed. Leaves alternate, sessile, elliptic to lanceolate with serrate margins. Flowers with bright blue to almost white florets, which are sometimes flushed pale yellow or green, narrowly funnel-shaped and located at the end of the branches.

Growing in degraded *Commiphra-Lannea* scrub, *Acacia-Commiphora* woodland and bushland on rocky, granitic slopes with thin soil and *Acacia drepanolobium* woodland on black cotton soil, at altitudes between 700 and 2100 m, in Tigray, Shewa, Arsi, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also from Eritrea and Sudan west to Guinea and Senegal and south through East Africa to Zimbabwe.

Flowering in September and October, it is a pollen source for honeybees. The seeds are used for extraction of biofuel for aeroplane.



Figure 113 *Vernonia galamensis*

Vernonia hochstetteri Sch. Bip. ex Walp.

NEKHIELU (Amh); SEQELA-ANBESA (Tig).

A shrub growing up to 3 m high with purplish-brown stems. Leaves alternate, thin, ovate-lanceolate or lanceolate. Flowers purple with darker spots, borne in heads, which are campanulate and arranged in dense terminal corymbs.

Growing at the margins of *Juniperus-Podocarpus* forests, often in cleared parts, or along footpath in forests and in roadside thickets, at altitudes between 1200 and 2500 m, in nearly all floristic regions, and also in Sudan.

Flowering from June to October the shrub provides pollen and nectar for honeybees. The plant is also used for fire wood and making "CHIBBO" (torch) for New Year Celebrations.



Figure 114 *Vernonia hochstetteri*

Vernonia rueppellii Sch. Bip. ex Walp.

GUJO (Amh); DANGIRTTOO (Kaf); REDJII, REEJJII (Oro); BOOZWA (Wol).

A shrub or small tree, up to 6 m high; stem densely branched. Leaves alternate, elliptic to lanceolate, margins serrate and apex obtuse or acute. Flowers pale purple to white and borne in oblong-cylindric heads, which are arranged in dense spreading terminal and axillary corymbose panicles.

Growing in forest margins, grassland with evergreen scrub and *Croton-Calpurnea* woodland on montane slopes, at altitudes between 2100 and 3000 m, in the Ethiopia Highlands (Ethiopia and Eritrea, where it is endemic).

Flowering from November to May, honeybees forage for pollen and nectar. It is a major honey source plant and very good pollen supplier for strengthening honeybee colonies.



Figure 115 *Vernonia rueppellii*

***Xanthium spinosum* L.**

YESET MILAS (Amh); cocklebur (Eng); MLH'AS SEBETY (Tig).

A much branched annual herb, growing up to 0.75 m high, bearing spines in leaf axils, with yellow striate stems. Leaves borne on short shoots, subtended by one or two 3-branched yellow spines, with prominent venation. Flowers creamy-green, small and borne in heads in leaf axils. Fruit covered in hooked prickles.

Growing in irrigated fields of heavy clay soils, disturbed places and roadsides, at altitudes between 1700 and 2600 m, in Tigray, Welo, Gojam, Shewa, Arsi, Bale and Harerge floristic regions, and also in North Africa, Zimbabwe, Botswana and South Africa and Europe. It is regarded as an invasive alien species in Somaliland (northern Somalia).

It has a long flowering period but mainly flowering from September to May and provides abundant nectar and pollen for honeybees. The honey from this plant is dark and strongly flavoured.



Figure 116 *Xanthium spinosum*

***Xanthium strumarium* L.**

DEHA NIKEL (Amh); BANDA, BANDOO (Oro); ATTAMAKO (Sil); KARIS-BUDE-EXE (Som).

An erect annual, or short-lived perennial herb, 30-75 cm high; stems unarmed. Leaves long-petiolate, up to 15 cm long. Flowers whitish-green and fruiting; capitula scabrous to tomentose, green to brown, armed with straight or hooked spines.

Weed in farmland and along roadside ditches, stream and riverbanks, at altitudes between 900 and 2000 m, in nearly all floristic regions, and native of Central or South America but now almost cosmopolitan, occurring in Africa, known from West Africa (Nigeria), Sudan, Somalia and through East Africa to South Africa. The weed may turn out to be an invasive alien species in Ethiopia.

The herb is a potentail pollen source for honeybees for rearing brood during early nectar flow.



Figure 117 *Xanthium strumarium*

***Zinnia elegans* Jacq.**

An erect bushy herb up to 1 m high. Leaves broadly to narrowly ovate, sessile or subsessile, margins entire, base obtuse or subcordate, apex acute. Ray florets yellow, orange, pink, red, rarely lilac, purple or white.

A widely cultivated ornamental plant throughout the world. It has not yet become naturalized in Ethiopia and occurs only in gardens or rarely as an escape from gardens along roadside ditches, at altitudes between 1500 and 2400 m, in Shewa, Bale and Harerge floristic regions, and also in Kenya, Sierra Leone, Malawi, Zimbabwe and South Africa.

The plant flowers almost throughout the year when it gets frequent watering and provides honeybees with abundant pollen.



Figure 118 *Zinnia elegans*

BALANITACEAE

Members of this family are trees or shrubs, usually bearing conspicuous spines at a varying distance above the subtending leaves. Leaves alternate, 2-foliolate or some reduced to simple, minute, scale-leaves; leaflets entire; stipules triangular, usually falling early. Flowers regular, bisexual, 4- to 5-merous; sepals and petals free, imbricate, the sepals ovate, usually eventually falling off, silky-hairy at least within, the petals glabrous; stamens 8-10, free, glabrous. Fruit a 1-seeded drupe, indehiscent or splitting apically, with a leathery or crisp and brittle exocarp, fleshy or spongy mesocarp and hard, woody endocarp.

The family possesses a single genus *Balanites*, mostly confined to Africa and India. There are four species (including a subspecies) in Ethiopia.

Balanites aegyptiaca (L.) Del.

QUSSA, QUTTA (Agew); BEDDENNO, GUZA, JEMO, KUDKUDDA, QACONA (Amh); TOW (Anu); DAMOY, DOMAYE (Gam); JULI (Kun); BADDANNO, DOMOHO (Oro); GUT (Som); GWEZA, MEQI, NDRUR (Tig); BADENA (Wol).

A small evergreen tree, usually 5 to 7 m tall but occasionally reaching a height of about 10 m, with a dense rounded crown; young branches green, smooth and armed with straight, green, forward-directed spines up to 8 cm long. Leaves grey-green with distinctive pairs of ovate leaflets up to 5 cm long. Flowers fragrant, yellow-green, up to 1 cm across and arranged in loose or tight cymose fascicles on spineless stems.

Growing in dry woodland and bushland, at altitudes between 700 and 1800 m, with an annual rainfall from 200 to 800 mm, in Tigray, Welo, Shewa, Ilubabor, Arsi, Gamo Gofa, Sidamo, Bale and Harege floristic regions, and also from Senegal to Somalia and from Egypt south to Zimbabwe, also the Jordan Valley and western Arabian peninsula. It is widespread throughout the arid to subhumid tropical savannas of Africa, particularly throughout the Sahel, from the Atlantic coast to the Red Sea.

Flowering from January to March, the flowers are visited by honeybees for nectar only. It is a supplementary beeforage in times when other feed resources are scarce. This is an important multi-purpose tree with many uses and highly recommended in reforestation and agroforestry programmes. It is also very suitable for firewood

and charcoal making and cut branches make good fences. An emulsion made from the fruits is lethal to freshwater snails, including the intermediate hosts for bilharzia. It is also lethal to the water-flea which carries Guinea-worm disease. However, the fruits are non-toxic to human and domestic animals.



Figure 119 *Balanites aegyptiaca*

BALSAMINACEAE

The family consists of herbs, rarely small shrubs or epiphytes, usually growing in wet or moist habitats; stem often succulent. Leaves alternate or spiral, simple, fleshy or semi-succulent, glabrous to sparsely pubescent; stipules absent or represented by glands. Flowers showy, white, pink, orange, bisexual and arranged in simple or sub-umbellate racemes.

A family of two genera, *Hydrocera* and *Impatiens*. The genus *Hydrocera* has one species found in India and Southeast Asia while *Impatiens* has about 900 species most of which occur in tropical Asia and Africa, but some are also found in temperate regions.

In Ethiopia, there are four indigenous species of *Impatiens*, of which one species and a subspecies are endemic, and two widely cultivated ones of which one that has been accidentally introduced could become an aggressive weed; there is a single genus with eight species (including subspecies) in Ethiopia.

The *Impatiens* species supply honeybees mainly with nectar and only small amount of pollen. Their nectaries are found in the long cylindrical nectar tube called spur, and very often

the nectar fills up the whole tube and the wide opening enables the bees to suck nectar. In addition, the *Impatiens* species have extra-floral nectaries on the leaf petioles.

***Impatiens hochstetteri* Warb.**

EKEKO (Kaf).

An annual or a perennial succulent herb, with thin fibrous roots; stems erect, straggling or procumbent, 20-60 cm long and rooting at lower nodes. Leaves spirally arranged, ovate-lanceolate to broadly elliptic. Flowers white, pale pink or pale mauve, often with a pale yellow or white spot and solitary or borne in axillary racemes in fascicles of 2-3.

Growing in moist and shaded upland and lowland forests and forest fringes, usually by stream banks, in the spray zone of waterfalls, by irrigation ditches and in shaded coffee plantations, at altitudes between 1300 and 2800 m, in nearly all floristic regions, and also in upland Eritrea, South Sudan, Uganda, Kenya, Tanzania, Malawi, Angola, Swaziland and South Africa.

Flowering in September and October, the flowers are major nectar source for honeybees.



Figure 120 *Impatiens hochstetteri*

BASELLACEAE

Climbing herbs, glabrous, often with tuberous roots; stems slender, twining. Leaves often somewhat fleshy, alternate, entire, usually petiolate, rarely sessile. Inflorescence of spikes, racemes or panicles. Flowers regular, green or white or pink, bisexual or unisexual. Fruit indehiscent, surrounded by the persistent often fleshy perianth or winged bracteoles. Seeds solitary, almost spherical.

A small family of five genera and about 20 species, mostly found in tropical America. The genus *Basella* is represented by *B. alba* in Ethiopia.

Basella alba is one of the important honey source plants in the rift valley.

***Basella alba* L.**

NOPO (Kaf); LEEBOO (Oro).

A climbing glabrous herb, often with tuberous roots; stems slender, twining and much branched. Leaves often somewhat fleshy, alternate, entire, usually petiolate but rarely sessile. Flowers green, white or pink, borne in spikes, racemes or panicles.

Growing in evergreen montane forest particularly at margins, in clearings, usually in damp places, often near water, at altitudes between 1600 and 2350 m, in Gondar, Welega, Ilubabor, Kefa, Gamo Gofa, Sidamo and Bale floristic regions, and also in Sudan, E Africa and west to Cameroun, Dem. Rep. Congo, south to Mozambique and Angola (but rare in central Africa), Asia to China, Japan, Philippines, Borneo, Fiji and Hawaii, also in West Indies, Brazil and Guiana.

Flowering in September and October and it is visited by honeybees for pollen and nectar.



Figure 121 *Basella alba*

BIGNONIACEAE

Members of this family are trees, shrubs or woody climbers, rarely perennial or shrubby herbs. Leaves opposite, pinnate, bipinnate, digitately 2-3-foliolate, or simple, terminal leaflet sometimes replaced by a tendril. Flowers large and showy, bisexual and borne in several- to many-flowered terminal or axillary racemes or panicles, or in fascicles, or solitary on dwarf shoots. Fruit a capsule, dehiscing by two loculicidal or septicidal valves, which are perpendicular or parallel to the septum, or fleshy and indehiscent. Seeds numerous, compressed and winged in species with capsular fruits, wingless in species with indehiscent fruits.

The family is composed of about 110 genera and 900 species in all tropical regions but most numerous in Central and South America, with a few genera extending into subtropical and even temperate regions. There are nine genera and nine species (including a subspecies) in Ethiopia, of which only three genera and three species are indigenous.

Some members of the Bignoniaceae are cultivated as ornamentals and frequently visited by honeybees, mainly for nectar, like the American *Tecoma stans* and the South African *Tecomaria capensis*.

Tecomaria capensis (Thunb.) Lindl.

Cape honey suckle (Eng).

An evergreen many-stemmed shrub or climber, or a small tree growing up to 4 m high. Leaves opposite, pinnately compound; leaflets dark glossy green and up to 15 cm long. Flowers vermilion red, funnel shaped and arranged in showy panicles.

It is cultivated in gardens and parks, at altitudes between 1700 and 2400 m, in Shewa, Sidamo, Bale and Harerge floristic regions, but it is native in Mozambique, Swaziland, and South Africa and widely cultivated elsewhere.

Flowering all year round but mostly after rains and honeybees collect nectar and pollen from the flowers.



Figure 122 *Tecomaria capensis*

BOMBACACEAE

Members of the family are trees, often very large, covered with indumentum of small rough scales. Leaves alternate, simple or digitately divided; stipules present. Flowers regular, bisexual, large and showy, solitary or in cymes; stamens 15-many, free or filaments united near the base. Fruit often large, a woody capsule or indehiscent.

The family represented by about 30 genera and 250 species in all tropical regions but mostly in America. There are three genera and three species in Ethiopia.

In Ethiopia, both the indigenous and exotic species are valuable bee plants. *Chorisia speciosa* is widely cultivated in Adama and Addis Ababa while *Ceiba pentandra* is native in Gambela but cultivated elsewhere in Ethiopia. The flowers of both species have unpleasant smell but are very attractive to bees due to the abundance of nectar supply.

***Chorisia speciosa* St. Hil.**

A tree up to 10 m high with large spreading crown; stem with large knobs or spines. Leaves digitately 4-7-foliolate, glabrous; leaflets elliptic, dentate. Flowers white to pink, large and showy, arranged in clusters or solitary in leaf-axils or in well-developed axillary or terminal cymes. It is propagated from seedlings and cuttings.

An ornamental growing at altitudes between 1100 and 2400 m, in Tigray, Welo, Shewa and Harerge floristic regions, but originally from South America, now grown here and there throughout the tropics.

The nectar secretion is copious and tends to run out from the corolla and commonly visited during the night by fruit bats and honeybees begin foraging soon after dawn. The sugar concentration is medium. The honey is said to have a characteristic aroma and a light amber colour.

The leaves and shoots are used as fodder. Fibre is obtained from fruit capsules to make mattresses. It is commonly planted for shade and amenity. The fiber is water-repellent and lighter than cotton. The unripe fruit and seed oil are edible and important crops elsewhere.



Figure 123 *Chorisia speciosa*

BORAGINACEAE

The family is composed of annual or perennial herbs, often with woody rootstock, small to large shrubs, or trees, rarely climbers. Leaves alternate, or sometimes subopposite, simple with usually entire margins or sometimes dentate or crenate; stipules absent. Inflorescences axillary or terminal spike or raceme-like, or panicle. Flowers usually regular, parts in fives, mostly bisexual or, sometimes unisexual, bearing tubular, bell- or funnel-shaped, or flat corolla; stamens the same number and alternating with the corolla lobes. Fruit a drupe, or, more often, divided into four one-seeded fruit or nutlets.

A large family with more than 2000 species in 100 to 145 genera. There are 18 genera and 63 species (including subspecies) in Ethiopia. Several species of Boraginaceae are cultivated as ornamentals whereas others are cultivated as condiments or for bee feed. Many species of this family are known world-wide as major honey sources, like the species of *Borago*, *Echium*, *Cynoglossum* and *Cordia*. In tropical Central America the famous trees for honey production are *Cordia alba*, *C. alliodora* and *C. gerascanthus* while in Asia, *Ehretia acuminata* is recommended for planting to increase honey production.

In Ethiopia, *Cordia africana* and *Ehretia cymosa* are the most important honey sources and *C. africana* is considered one of the most important honey sources of the country.

Cordia africana Lam.

BUGITSI (Age); WANZA (Amh); UROGU (Anu); GIKU (Ben); USHOCH (Bod); Sudan teak (Eng); BANJA (Gum); ODESHA (Gur); WEDESA (Had); DIO (Kaf); WANJA (Kam); DARNPAEY (Mej); DAMPAEU, UROGU (Nur); ROKI (Nuw); ADA, DIHO, MAKOTA, WADICHO, WEDECHA, WODESSA (Oro); WEDICH (Sid); WADICHO (Som); AUHI, EKHI (Tig); MOKOTA (Wol).

A small to medium-sized tree, 4 to 15 m high. Leaves large, ovalte with rounded base and prominent veins beneath. Flowers white, showy, funnel-shaped, scented and attractive to bees. Fruit yellowish, about 1 cm in diameter and enclosed in hairy cups; flesh sticky and edible, each fruit containing 4–6 seeds. The tree can be propagated

from wildings, seedlings and through direct seeding.

Growing in open places in moist montane forest, forest edges, in forest remnants around churches and other traditionally protected areas, as isolated trees in grassland and cultivated fields, in villages and public gardens and also in plantations, at altitudes between 700 and 2600 m, in almost all floristic regions, and also widespread from Eritrea and Sudan in the north to South Africa and Angola in the south, also tropical Arabia, cultivated in India and elsewhere in tropical botanic gardens.

The plant provides abundant pollen and nectar for honeybees and is a major honey source plant in humid and semiarid parts of the country, contributing to mixed honey. The honey is very aromatic with slow granulation and it has light colour. The crushed seeds, dissolved in water can be used to feed honeybees during dearth period. The tree is also used for firewood, timber, medicine (juice from bark, roots), fodder (leaves), shade, ornamental, mulch and soil conservation. It provides a valuable timber for furniture as well as for farm tools. The flesh of the fruits is sticky and edible both in normal times and in famine period.



Figure 124 *Cordia africana*

***Cynoglossum coeruleum* Hochst. ex A. DC.**

CHIGOGOT, FERISH-TENU, SHINGUG (Amh); MATANE-CHATI (Oro).

Perennial herb or sometimes shrubby, 30-70 cm tall and bearing a taproot; stems simple or several from the base. Leaves soft and gray, linear to lanceolate with basal

ones borne in rosettes. Flowers small, bright deep blue. Fruits usually covered with short recurved spines.

Afroalpine grassland, rocky areas, field margins and fallow fields, open/degraded juniper forest and woodland, field banks, roadside, grasslands, *Acacia* woodland, in fallow land and as a weed, at altitudes between 1800 and 3400 m, in Tigray, Gondar, Gojam, Shewa, Ilubabor, Kefa, Sidamo and Bale floristic regions, and also in E Africa, Cameroon. Dem. Rep. Congo, Angola and Malawi.

The flower is attractive to honeybees and nectar and pollen source for bees.



Figure 125 *Cynoglossum coeruleum*

***Echium plantagineum* L.**

Payerson's curse (Eng); natternkopf (Ger).

An erect annual or biennial, rough to touch herb, growing to a height of 1 m. Basal leaves ovate and stalked and harsh with conspicuous lateral veins and upper leaves oblong to lanceolate and sessile. Flowers blue, funnel shaped and arranged in panicles. Growing among rocks, beside shallow water, in overgrazed grassland, at altitudes between 2200 and 2400 m, in Gondar and Shewa floristic regions, and also in upland Eritrea, naturalized in Kenya, Tanzania, Zimbabwe and Angola, and widespread throughout Europe, South Russia and the Caucasus but native of west Europe.

Flowering from November to March, the flowers are frequently visited for abundant nectar and numerous dark blue pollen loads and because of its long flowering period

the plant maintains the honeybee colonies during dry period. The plant is also used for improving soil fertility through its high dry matter content.



Figure 126 *Echium plantagineum*

***Ehretia cymosa* Thonn.**

GAME HULAGA, GAMMEH, GARMIE, KIRRAUKH, OULAGA, WULAGA (Amh); forest stamperwood (Eng); WAGAMO (Kaf); BORBORIS, DARGU (Kun); ATAATOY (Mej); GARMI, HULAGA, ODA, ULAGA, WAGI (Oro); URAGA (Sid); MARED-DAOL (Som); KIRWAH, KURRUAK (Tig); KITIRI WANGYA (Wol).

A deciduous shrub or tree 2–9 m high, often branching from the base; bark light to dark grey. Leave ovate to broadly-elliptic with entire margins and glabrous to sparsely hairy. Flowers sweetly-scented, white, small, sessile and arranged in loose, large terminal dense umbel with many one-sided banches, crowded often covering the tree in white bloom. It is propagated from seeds and seedlings.

Growing in montane and riverine forests, evergreen bushand, hedgerows around compounds and left standing in cultivated fields and sometimes also in plantations, at altitudes between 900 and 2400 m, in nearly all floristic regions, and also widespread from Eritrea and Sudan to West Africa.

Flowering almost all year round with a peak from September to December, honey-

bees collect pollen and abundant nectar from the flowers frequently throughout the day. It is a very valuable honeybee tree with a prolonged flowering period. In some areas, the tree is planted for honeybees around dwellings and recommended for planting to increase honey production and also to maintain honeybee colonies during dry period. The wood is used for firewood and provides valuable timber for furniture as well as for farm tools. The leaves are useful for browse. In traditional medicine, the bark and flowers are used against conjunctivitis. The juice from the leaves and roots are also used for healing wounds.



Figure 127 *Ehretia cymosa*

***Heliotropium cinerascens* DC. & A. DC.**

SHEKO (Amh); BAGANAPSI, DARRASA, SEBEKONE, SOKENE (Oro); AHOGADMA, AMMNGEMEL (Tig).

A shrubby or woody herb growing up to 50 cm high with grey stems covered with fine hairs. Leaves lanceolate, grey with entire margins. Flowers white, arranged in one sided inflorescence.

Growing along roadsides, in wasteland, as weed in cultivated fields, overgrazed woodland and grassland and in rocky places, at altitudes between 100 and 2400 m, in most floristic regions, and also in Eritrea, Sudan, Djibouti, Somalia, Kenya, Egypt and the Arabian Peninsula.

Flowering in September and October, the herb is an important source of pollen for strengthening honeybee colonies before honey flow period.



Figure 128 *Heliotropium cinerascens*

BRASSICACEAE

The family is composed of herbs, sometimes shrublets or shrubs. Leaves alternate, basal ones often in a rosette, with or without a petiole. Inflorescences terminal, but sometimes axillary racemes, mostly condensed in flower but elongating in fruit, mostly without bracts. Flowers hermaphrodite, regular but sometimes slightly irregular.

The family comprises about 370 genera and 3,500 species with greatest diversity in the Mediterranean area, west and central Asia and parts of North America. There are 60 species (including subspecies) in 22 genera in Ethiopia.

The family includes several important oil and vegetable crops belonging to the genera *Brassica*, *Crambe* and *Lepidium*, which are cultivated at higher altitudes in Ethiopia, as well as a large number of weeds, some ornamentals and plants of medicinal importance.

In general, the Brassicaceae are substantial nectar and pollen suppliers. In Ethiopia, several species are cultivated as important oil and vegetable crops (*Brassica* spp.,

Crambe hispanica, which is widely known as *C. abyssinica*, and *Lepidium sativum* and species of *Brassica* are known as being important for beekeepers, like for example, *B. nigra* and *B. carinata*.

***Allysum alyssoides* L.**

Baby's breath (Eng).

A small or short trailing perennial herb, much branched. Leaves sessile, reduced. Flowers white and borne in tight racemose cluster.

Grown as an ornamental herb in gardens in Addis Ababa and elsewhere.

It has a long flowering period depending on the availability of water. It is a potential pollen source plant for honeybees.



Figure 129 *Allysum alyssoides*

***Brassica carinata* A. Br.**

GOMEN ZER, SENAFC, YEGURAGIE GOMEN (Amh); Ethiopian kale (Eng); SHACHAFO (Kaf); EGEE RAAFUU, GOMANA, MIDAN-RAFU, SIANO, RAAFUU SIMBIRO (Oro); ADR, GRUMBA, HAML GUMBA, SENAFC (Tig); FOFA (Yem).

An erect herb 30-150 cm tall, glabrous or slightly covered with rough hairs at stem and petiole bases, somewhat blue-green, with long ascending branches in upper part. Leaves

obovate to oblanceolate with entire margins. Flowers bright to pale yellow and arranged in racemes forming a corymb and elongating up to 50 cm.

Widely cultivated at altitudes between 1350 and 3000 m, in Gondar, Shewa, Ilubabor, Sidamo and Harerge floristic regions. This species is grown for both its leaves and seeds. The leaves are eaten cooked as a vegetable while the seeds are used to oil the baking plate for making injera.

Flowering from September to November; honeybees collect nectar and pollen and the plant is an important honey source. Honeybees are the most important pollinators to increase seed set and oil yield. Honey from the plant is light in colour with high fructose content and crystallized easily while inside hive.



Figure 130 *Brassica carinata*

Erucastrum abyssinicum (A. Rich.) R.E. Fries

YEWOF GOMEN (Ahm); FESERIKA (Kam); GOMENZA (Oro); HIMFIDE AS (Som); HAML I GOMEN (Tig).

An annual herb growing up to 30 cm high. Leaves form rosette and are deeply lobbed.

Flowers white, borne in conspicuous racemes at the end of the main stem and branches.

Growing in wasteland and roadsides, often in dry and stony places, at altitudes between 1700 and 2600(-3200) m, in Tigray, Shewa, Kefa, Arsi, Bale and Harerge floristic regions, and also in upland Eritrea. The species is endemic to the Ethiopian Highlands (Ethiopia and Eritrea).

Flowering from September to November, honeybees were observed collecting abundant pollen and nectar from the flowers and the plant is one of the major honey sources.



Figure 131 *Erucastrum abyssinicum*

BURSERACEAE

Trees or shrubs, often spiny and often with latex, resins or oils which can be strongly aromatic. Leaves alternate, often in clusters, pinnate, 3- or 1-foliolate; stipules absent. Flowers in panicles, corymbs, racemes, cymes, fascicles or solitary; actinomorphic, unisexual or bisexual; stamens (3-)6-10(-12), filaments free or united at base. Fruit a drupe with 1 seed per locule. Seeds without endosperm, surrounded by a hardened endocarp.

The Burseraceae is a family with 17 genera and 500-600 species, which are widespread in all tropical regions and extending into the subtropics. The family is often a dominant constituent of the vegetation in dry lowland areas. In Ethiopia, two genera

and 62 species (including species) have been recorded, and several species provide resins which are of considerable commercial value as raw material of balm, myrrh, incense and frankincense.

Members of the Burseraceae are, in many cases, important bee plants of the vegetation in dry lowland areas. They are sometimes excellent pollen and nectar suppliers, for example, *Commiphora africana* and *Boswellia papyrifera*.

***Commiphora erythraea* (Ehrenb.) Engl.**

GAHADITA (Kon); HAGAR-AD, HAGAR-RNEDOW, HAGARSO, HAGARSU (Oro & Som).

Tree to 8 m high; bark whitish to yellowish or bluish grey, often with pink spots, smooth, peeling in large irregular papery flakes. Leaves 3-foliolate or a few pinnate with 5 leaflets, glabrous to subtomentose; petiole 0.5-6 cm; leaflets ovate or elliptic to orbicular, crenate to serrate, apex acute to retuse. Flowers in many flowered, pubescent, divaricately branched panicles. Fruit ovoid to subglobose.

Growing in *Acacia-Commiphora* woodland, wooded grassland, bushland, often on rocky slopes as well as basement, but also on red sandy soil and black cotton soil, at altitudes from near sea level to 1500 (-1900) m, in most floristic regions, and also in lowland Eritrea, Sudan, Kenya, Somalia, Tanzania and Arabia.

The red flowers attract honeybees for nectar and the species is one of the major honey sources in arid and semiarid agro-ecologies of northern Ethiopia. Roots of young plants are juicy with a mildly sweet taste and can be chewed. The leaves are browsed by livestock, especially camels and goats, at the end of the dry season when the tree comes into leaf. The wood is used for house building, headrests, stools, milk containers and wooden spoons. The fruits are chewed or pounded and used against toothache and diseases of the gum while the gum or resin extracted from the stem is used in making arrows. The resin is used as an insecticide (against cattle fleas) by the Borana Oromo.



Figure 132 *Commiphora erythraea*

CACTACEAE

The family comprises succulent perennials of diverse habit; roots fibrous or tuberous; stems cylindrical, globular, winged or flattened, often segmented, mostly leafless and variously spiny; buds concealed by a persistent cushion-like mass of short woolly hairs, referred to as an areole, from which new growth, spines and flowers emerge. Flowers solitary, rarely clustered, appearing sessile, nearly always bisexual, and usually regular; stamens often very numerous. Fruit juicy or dry, naked, scaly, hairy, bristly or spiny, indehiscent or variously dehiscent.

A large family of about 1,500 species, naturally restricted to N and S America, but various species of *Opuntia* are now naturalized in Africa and Australia. There are two genera and four species in Ethiopia, of which only one genus with one species is indigenous.

Many cacti are cultivated for living fences, erosion control and animal and human food. Spineless varieties of *Opuntia ficus-indica* are widespread and also called “living fodder banks” for livestock in arid and semi-arid climates.

***Opuntia ficus-indica* (L.) Miller**

YEBERHA QULQWAL (Amh); prickly pear, Indian fig (Eng); TINI (Oro).

A succulent, usually small tree or dense bush, attaining a height of 5 m; stem and branches are formed of large, elliptic to obovate flattened ear-like joints which are up to 40 cm long and covered with tufts of spiny brittle hairs. Normal leaves are only produced at the tops of very young shoots and soon fall off. Flowers yellow to orange, up to 8 cm in diameter and arranged in rows on the upper edges of young joints. Fruits pear-shaped, with sweet edible flesh after the spiny skin is removed.

Widely growing throughout the country in arid, semi-arid to humid zones up to 2400 m. It was introduced to Ethiopia by the Italians, particularly to stabilize hillsides when they were building roads and railways.

The fruits are important market items and eaten in many places as they come during the rainy season when other food stuffs are in short supply. After the spines are removed it is a very useful browse plant for livestock. In traditional medicine, the leaves are used against bloat and the sap against shin fungus.

The honeybees frequently forage the abundant pollen and nectar of the flowers. The honey potential is high, especially during partial drought and guaranteeing the survival of the bees. The species is an important honey source in the northern part of the country. The honey is aromatic and white with a slow, fine and creamy granulation.



Figure 133 *Opuntia ficus-indica*

CAMPANULACEAE

The family is composed of herbs or, sometimes climbers or epiphytes. Leaves alternate or rarely opposite; stipules absent. Inflorescences generally cymose, panicle-, raceme-, spike- or head-like, or flowers solitary. Flowers bisexual, usually with anthers maturing first, regular; stamens alternating with the corolla-lobes, free or rarely joined to the corolla. Fruit a capsule, variously dehiscent by apical or lateral valves or pores, or a berry.

The family comprises about 35 genera and 700 species, especially well represented in the Mediterranean region and South Africa, while three genera and 16 species (including subspecies) occur in Ethiopia. Members of the Campanulaceae are attractive to honeybees. *Canarina eminii* has been reported as an important plant for nectar and pollen source in Ethiopia.

Canarina eminii Schweinf.

TUTU (Amh); SHASHETAY, TUTO ROBBA (Oro).

An epiphytic plant with tuberous base, hanging from large trees in wetter forests and it is about 3-4 m long. Leaves opposite with serrate margins. Flowers pink and only appearing after rains in September and October.

Growing in upland riverine forests, as an epiphyte and also growing among rocks, at altitudes between 2100 and 3000 m, in Gojam, Shewa, Arsi, Welega, Gamo Gofa, Sidamo and Bale floristic regions, and also in eastern Africa south to Malawi.

Flowering after rains in September and October honeybees frequently collect nectar and pollen from the flowers.



Figure 134 *Canarina eminii*

CAPPARIDACEAE

Members of this family are herbs, shrubs or trees, sometimes scrambling or climbing with or without stipular thorns. Leaves evergreen or deciduous, petiolate. Inflorescences racemes, often corymbs, simple or compound, terminal or lateral, or flowers solitary or clustered in leaf axils. Flowers generally hermaphrodite, sometime dioecious, usually with a distinct bilateral symmetry or, sometimes regular; stamens few to many; filaments thin, free from base or borne close to the petal bases, or branching free at the top of the androgynophore.

A tropical and subtropical family with about 30 genera found in both hemispheres, well represented by woody species in Africa. In Ethiopia, there are seven genera and 62 species (including subspecies).

Many species are attractive to honeybees and the African *Boscia salicifolia* and *Cadaba farinosa* are very important for beekeeping.

***Boscia salicifolia* Oliv.**

ALUTTOO, LALATOO, QEYISA (Oro); ABO, KALKALCA (Tig); KADHII (Tsa); TAMBO (Wol); GACHUMA (Zay).

A large shrub or tree up to 10 m tall with a dense rounded crown; branchlets sometimes pendulous, bark dark and rough. Leaves always spaced out, narrowly elliptic or elliptic-lanceolate. Flowers creamy white, borne in axillary simple or terminal corymbose racemes.

Growing in grassland with scattered trees, deciduous bush and semi-desert scrub, in sandy soil or on rocky ground, rocky hills or mountains and sometimes in riparian formations, at altitudes between 500 and 2500 m, in Kefa, Gamo Gofa, Sidamo, Bale and Harerge and also in Sudan, Djibouti, Somalia, Kenya, Uganda and Tanzania. It can be propagated from seeds.

Flowering in December and January, honeybees collect nectar from the flowers. The honey from this plant is white and granulation is medium with mild aroma. The plant is also used for fuelwood and in traditional medicine (barks and leaves).



Figure 135 *Boscia salicifolia*

Cadaba farinosa Forssk.

DNGAY SEBER (Amh); ANAEDO (Anu); DAMBII (Oro); DITIB (Som); ANAMIES, TUM-CHENA (Tig).

A shrub 1-5 m tall, with dense or open stem, sometimes with slender arching or scrambling branches; young twigs generally covered with white scales, resembling flour; branches glabrous and dark brown. Leaves alternate on young stems but clustered on older ones, elliptic or oblong-obovate. Flowers cream or pale yellow and arranged in a few-flowered inflorescence.

Growing in grassland with scattered trees, deciduous bushland, semi-desert scrub and riverine formations, at altitudes from sea level to 2000 m, in all floristic regions, and also in Eritrea and from Angola and Tanzania north into Somalia, west to Senegal, also in Arabian Peninsula and Pakistan.

Flowering from September to November, honeybees collect reddish-brown pollen loads from the flowers.



Figure 136 *Cadaba farinosa*

***Cleome gynandra* L.**

AWQO BEQE (Amh); AKEYA, AKIYA (Anu); KIYAIYUCH, YEWOFE-GOMEN (Bod); gynandra, stinking miss, cat's whiskers (Eng); KATO (Gam); KOKOMEN (Mej); AIYA, AIYU GURI, DARJO, GOWLELLO, MUNGO MUNGO (Som); BOKBWA, GARGAMA (Tig).

An erect annual herb, up to 50 cm tall, pubescent or more rarely puberulous. Leaves with leaflets up obovate or elliptic, with acute apex and entire margins. Flowers white, sweetly-scented, borne in long and dense, many-flowered racemes.

Growing abundantly as a weed on overgrazed areas, disturbed or cultivated ground or on roadsides, possibly nitrophilous, at altitudes between 300 and 2200 m, in nearly all floristic regions, and also in Eritrea, and widespread in most of African countries except in the more humid regions, Madagascar and in tropical and subtropical Asia. Flowering in September and October, honeybees collect pollen and nectar from the flowers.

The fresh young capsules are sometimes eaten as a vegetable.



Figure 137 *Cleome gynandra*

***Maerua angolensis* DC.**

ASTAN (Afa); AGATCHLAL, FRTEA, TEMENIE (Amh); QENQELCHA (Oro); ALAKALA, CHISCHI, CBISCI, CIE, CIR, LAMELISE, LAMOGOYE, LMAGOYE, MEDOBE, SHISHIE (Som); GERIMO, KOMANTINO (Tig).

A medium-sized tree about 7-8 m high, with light grey stems. Leaves large, trifoliate and pale green. Flowers white, with elongated pistil, sweet scented. It is propagated from seeds.

Growing in montane *Acacia* woodland with tall grasses, shrubland and bushland, on rocky slopes, in soil derived from limestone, granite or volcanic rocks, at altitudes between (500-)1200 and 1900 m, in most floristic regions, and also in Eritrea, Somalia, west to Senegal, south and southwest to South Africa and Angola.

Flowering from October to March, it is a nectar and pollen source plant in most parts of the arid and semiarid agro-ecologies and honey from this plant alone is not yet reported but it contributes for honey production in association with other plants. The plant is also used for fencing, making farm tool, for firewood and as animal forage.



Figure 138 *Maerua angolensis*

***Maerua crassifolia* Forssk.**

KALKALCHA, QANQALCHA, DHUMISHO (Oro); ANOOLAHEJE, ANOMAHYE, ANOOLAHEJE, CANAMAHEYE, CHIRSEI, GIEH, MEDU, LAMALANSEY, MIGAG, MIRANE (Som); SHISHQAALLO (Zay).

A shrub or tree, 3-4 m high, usually with a flattened crown. Leaves simple, clustered on old wood, clearly spaced on young shoots, obovate or oblanceolate, rarely elliptic. Flowers white, borne in clusters, occasionally single in leaf axils of young shoots.

Growing in *Acacia-Combretum* and *Euphorbia tirucalli* woodland on sandy or loamy, sometimes salty soil, at altitudes between 400 and 1350 m, in Gojam, Gemo Gofa, Sidamo, Bale and Harerge floristic regions, and also in Somalia, from Sudan west to Senegal, South to Tanzania, Arabian Peninsula and Palestine east to Pakistan.

The plant is an excellent source of pollen and honeybees collect abundant pollen from the exposed anthers. It is a potential source of nectar and pollen in dry season in December and January.



Figure 139 *Maerua crassifolia*

Maerua oblongifolia (Forssk.) A. Rich.

WAWATIE (Amh); SAMZEL (Ben); KARICOC (Sid); ADAI, DAROMA, GERIMO (Tig); KALKALKOABIYA (Tse).

A scabrous scrambling shrub up to 3 m tall, or sometimes a dwarf shrub growing from a woody root-crown; young stems pale green or brown, sometimes wine-red; older stems finally dark red-brown or grey and glabrous. Leaves simple, very variable in shape and size, oblong, lanceolate or elliptic. Flowers occasionally solitary, generally in short dense, or loose few-flowered terminal or axillary racemes.

Growing in deciduous bushland with scattered trees, grassland and scrub, usually dry, stony or sandy places, at altitudes from sea level to 1800 m, in Gondar, Shewa, Illubabor, Kefa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also in Eritrea, Somalia, northern Kenya, Sudan west to Senegal, and also in Yemen.

Flowering in December and January, it is a major pollen source plant for honeybees. Honey from this plant is dark-brown and granulation is rapid.



Figure 140 *Maerua oblongifolia*

CAPRIFOLIACEAE

The family is composed of shrubs, herbs or lianas or, seldom small trees. Leaves simple or pinnately compound, opposite, or rarely alternate. Flowers in cymes, panicles, umbels or, rarely solitary and borne terminally or in the axils of leaves. Corolla often irregular and 2-lipped, or regular, with (3-)4-5 lobes. Fruits berries, drupes, achenes, or capsules, one- to many-seeded.

A family of about 13 genera and 300 species, occurring mainly in the temperate region of the northern hemisphere, with a few taxa in the tropics and the southern hemisphere. The family is represented by two genera and three exotic species in Ethiopia. *Sambucus canadensis* is widely cultivated in Addis Ababa and other towns for ornament and bee forage.

Sambucus canadensis L.

Sweet elder (Eng).

A shrub or tree, much branched; stems brownish. Leaves compound with leaflets narrowly elliptic, with toothed margins and pointed apex. Flowers creamy white and scented, borne in terminal compound umbels.

Growing as a hedge and an ornamental plant in homegardens, hotels and parks, at altitudes between 1000 and 2500 m, in Shewa, Arsi and Sidamo floristic regions, and also in upland Eritrea and many other tropical African and Asian, and subtropical countries but indigenous to North and Central America. The plant produces copious nectar for honeybees.



Figure 141 *Sambucus canadensis*

CARICACEAE

The family is composed of small trees or shrubs, rarely herbs with smooth or spiny stems and milky latex. Leaves simple, alternate, long-petiolate, deeply palmately lobed, spirally arranged on stem and usually clustered at branch tips; stipules absent. Inflorescence axillary or sometimes cauliflorous. Flowers unisexual or sometimes bisexual, regular, 5-merous; sepals fused for most part, 5-lobed. Fruit a large fleshy berry with numerous seeds.

The Caricaceae is a very small family with 30 species in four genera, growing in tropical and subtropical America and Africa. In Ethiopia, the family is represented by the widely cultivated papaya. For beekeepers, *Carica papaya* is a very important nectar and pollen source because of its all year round flowering period.

***Carica papaya* L.**

Papaya (Amh, Eng, Gur, Oro, Tig, etc.).

An erect unbranched dioecious tree growing up to 6 m tall with a tuft of leaves at the top, with greenish bark bearing conspicuous triangular markings from the detached leaves. Leaves palmately lobed, very large and with long stalks. Flowers white, very fragrant, bell shaped; female flowers borne in small groups in leaf axils while the male flowers are in long inflorescence. The fruit is melón-shaped and easily digestible, turning yellow when mature.

It is cultivated in both homegardens and small and large plantations wherever there is sufficient water or wherever there is some water for irrigation, in mid-altitude areas of the country up to 1900 m. It is a native of Central and South Americas where it has been cultivated since ancient times. Now, it is widely distributed throughout the tropics of Africa, Asia, South America and the Pacific islands. It is easily grown from seeds once the outer gelatinous coat is removed. Trees of some varieties are either male or female and several are planted together and then, when flowering starts all the males except a few are removed.

Flowering all year around, honeybees collect nectar and pollen from the flowers. It is an important honey source world wide. Honeybees contribute over 90% for its pollination and recommended to place honeybee colonies in orchards for increased fruit production. The plant has various uses such as, medicinal and the fruit is edible, used as juice and animal fodder. All parts of the plant contain large quantities of a milky juice which is the commercial source of the protein digesting enzyme papain.



Figure 142 *Carica papaya*

CELASTRACEAE

The family is composed of trees, or shrubs, sometimes scandent, and sometimes with spines. Leaves alternate or spiral to subopposite or opposite, sometimes fasciculate on short shoots, simple, entire or crenate to spinose; stipules usually present, small. Flowers regular, bisexual or polygamous to unisexual; stamens (2)3-5(6), opposite the sepals. Fruit capsular and dehiscent loculicidally or indehiscent and baccate or drupaceous, sometimes winged; seeds sometimes arillate or winged, with or without endosperm.

The family comprises about 60-70 genera and 850-900 species, which are widely distributed. In Ethiopia, the family is represented by seven genera and 22 species (including subspecies), and the most important bee forage species of this family are *Maytenus gracilipes*, *M. obsura* and *M. putterlickioides*, which are important pollen and nectar source plants for honeybees.

***Maytenus gracilipes* (Welw. ex Oliv.) Exell**

ATAT (Amh, Gur & Tig); SHIKO (Kaf); KOMBOLCHA, HACHACHA (Oro).

A shrub or small tree 0.5-6 m high; stem with sharp, up to 4 cm long spines; the grey

to dark brown branches may be hairy and dotted with white breathing pores. Leaves alternate, sometimes growing out of spines, with small rounded teeth. Flowers white, very small in cyme with 3-many flowers borne on hairy stalks. It is propagated from seeds and seedlings.

Growing in the undergrowth in forests and along forest edges, in grasslands and river banks and humid forests, at altitudes between 1200 and 2500 m, in Bale, Ilubabor, Kefa and Welega floristic regions, and also in Eritrea, Sudan, Uganda, Kenya, Tanzania, Rwanda, Burundi and Dem. Rep. Congo.

Flowering from August to October, the plant is a potential pollen source for honeybees, serving as dearth period bee forage in most parts of southern and southwestern Ethiopia.

The plant is also used for firewood, farm tools, fodder, and live fence, and fencing material (thorny branches).



Figure 143 *Maytenus gracilipes*

Maytenus obsura (A. Rich.) Cufod.

HACAT (Agew); ATAT (Amh & Gur); ANGITO (Kaf); KOMBOLCA (Oro); ATAT, SL'LO (Tig);

TUTWA (Wol).

A shrublet or tree to 8-10 m high, with spines up to 4 cm long; branchlet dark grey to dark brown. Leaves elliptic or oblong to ovate or oblanceolate with crenate margins. Flowers bisexual or functionally unisexual, very small, greenish-white or creamy-white and arranged in clusters in the leaf axils.

Growing in open woodland, grassland, forest margins, sometimes along streams, at altitudes between (1700-) 2100 and 3100 m, in nearly all floristic regions, and also in Uganda, Kenya, Tanzania and Burundi.

Flowering from December to February, the plant provides pollen and little nectar for honeybees. It is an excellent dry period honeybee forage.

It is also used for making charcoal and firewood.



Figure 144 *Maytenus obsura*

Maytenus putterlickioides (Loes.) Exell & Mendonça

FOLKOLCHA, FONKONCHA (Oro).

A shrub or small tree 1-6 m high, often a many-stemmed bush with spines up to 6.7 cm long; branches grey to brown, with pale lenticels. Leaves elliptic to oblanceolate,

or obovate, leathery, densely pubescent on both sides. Flowers white, borne in cymes with 10-25 flowers in each cyme.

Growing in dry deciduous woodland, scrub, termite hills and riverine areas, at altitudes between 1000 and 1200 m, in Sidamo Floristic Region, and also in Kenya, Tanzania, ,Angola, Zambia, Zimbabwe, Malawi and Mozambique.

Flowering in December and January and producing scented flowers that are frequently visited by honeybees for pollen.



Figure 145 *Maytenus putterlickioides*

COMBRETACEAE

The family is composed of trees, shrubs or sometimes climbers. Members of this family have alternate, opposite, or less often whorled, simple and entire leaves. The flowers are arranged in terminal and axillary racemes, spikes or heads, mostly rather small, bisexual or less often unisexual. The petals are 4-5 and the stamens are commonly twice as many as the petals.

The Combretaceae is a small family with 20 genera and 400 species which are found in tropical and subtropical regions, especially in Africa. In Ethiopia, there are four genera and 28 species (including subspecies).

Members of the family Combretaceae are important components of the vegetation in broad-leaved deciduous woodlands and thorn scrub.

Terminalia brownii is known as an important nectar and pollen source and the most valuable source of honey in western and southwestern parts of Ethiopia.

Anogeissus leiocarpa (A.DC.) Guill. & Perr.

MOK (Amh); ADRITE, ARITE, RID, RIT (Anu); silag (Eng); GALALJO, MOK (Gam); KOKODAN, RIT (Mes); SILEK (Oro); HANSE, QRQRE (Tig).

An evergreen tree, growing up to 15 m high, elsewhere up to 30 m high; bark grey, flaking off in rectangular patches. Leaves alternately arranged, ovate to elliptic, light green and softly pubescent when mature. Flowers heavily scented, pale or greenish yellow and borne in solitary axillary heads. Fruit orbicular, yellowish to reddish brown, hairy near the apex and bearing two wings.

Growing in *Combretum-Terminalia* and *Anogeissus-Pterocarpus* woodland, wooded grassland and bushland, *Acacia-Lannea* bushland, often a dominant element and in river banks, at altitudes between 450 and 1900 m, in Tigray, Gondar, Gojam, Shewa, Wellega and Ilubabor floristic regions, and also from Ethiopia and Eritrea west to Senegal. Flowering in September and October, honeybees forage for the abundant nectar and pollen from the flowers. Beekeepers have often reported that large quantity of honey is harvested from this tree in western Tigray.

The tree is commonly used for firewood and charcoal. The bark, roots and leaves contain much tannin. Smoking wood is used to sterilize pots and this gives a special flavour to food. In local medicine, the bark is used to treat fever, diarrhoea and for wound dressing.



Figure 146 *Anogeissus leiocarpa*

Combretum molle R. Br. ex G. Don

AWLOA (Agew); ABALO, AVALO, BAGUR, FUTUKA (Amh); DOTH (Anu); velvet-leaved combretum (Eng); BEGOHA (Gum); ALBETPAHA (Kon); CHARNBERANG (Mes); BIK'AA, BIIQAA, DAANNISA, DADARNSAA, DANDAMSA, DIDDIQSSAA, DUGHEESSA, RUUKKEESAA (Oro); ABAH, ABELE, ABOL, ABOLE, ABUL, OBA, OBAH, OBALO, OBOL, OGADEN (Som); ABELIWA, AMFERFARO, ANFARFARO, HASIBA, SESEWE, WEIBA (Tig); SOOBUWA (Wol).

A small deciduous tree, to 15 m; bark grey-brownish or blackish smooth or deeply fissured; all parts glabrous to tomentose. Leaves opposite, narrowly ovate, or elliptic to broadly obovate, sparsely to densely covered with silvery or yellowish scales. Flowers yellow, or yellowish green, sweet-scented, scaly, borne in 3-10 cm long scale-covered spikes, which are usually axillary but more rarely forming short leafless panicles. Growing in woodland and wooded grassland, often on rocky slopes, usually with tall grass cover and subject to regular burning, often a dominant element, penetrating into riverine forest, dry *Juniperus*-forest, ground-water forest or even into lowland rainforest, at altitudes between 500 and 2200(-2500) m, throughout Ethiopia, and also in tropical and South Africa and Yemen. It is propagated from seeds.

Flowering in December and January, the flowers attract insects. This tree is a major pollen and nectar source in some parts of the country. It is reported that the plant is a good source of honey in the lowlands.

The tree is also used for firwood and charcoal.



Figure 147 *Combretum molle*

Terminalia brownii Fresen.

ABALO, QEY 'NCET, HOUBA, WEYBA, WEYFBA (Amh); brown's myrobalan (Eng); GALALDO, GLELIO, YOUNG GALALDO (Gam); AIBETPAHA, EUBATA (Kon); BUKWE (Mur); ABAALOO, ALULOO, BALANGAA, BARESAA, GALALDO, GLELIO, RESSAA (Oro); ARRA, ARU (She); ALULO, AYA VEINI, BIIRIS, BIRES, HARERI, WOL, WUUB, YOUNG (Som); WEYBA (Tig); GLELIO, HARE HAIYITA (Wol).

A semi-deciduous tree, growing up to 15 m high, often branching near the base and with a large spreading crown; bark greyish and longitudinally fissured; branchlets glabrous and the young shoots are hairy. Leaves elliptic to obovate. Flowers white or cream, strongly scented and arranged in long spikes. It is probably the commonest and most widespread *Terminalia* species in Ethiopia. It is propagated from seedlings and wildlings.

Growing in *Acacia-Commiphora*, *Acacia-Combretum*, *Combretum-Terminalia*, *Terminalia* and *Anogeissus* woodland, wooded grassland and bushland on a wide variety of soils but usually in rocky places, as relic tree in cultivated areas, river banks, dry riverine forest and often a dominant element, at altitudes between 300 and 2000 m, in most floristic regions of Ethiopia, and also in Eritrea Sudan, Somalia, Uganda, Kenya, Tanzania and Nigeria.

Flowering trees are found from April to July and the tree is very useful for beekeepers in the Awash, Tekeze, Borana, Bench-Maji and in peri humid parts of southwest Ethiopia. Honey from this plant is light and amber in colour and honeybees forage abundant nectar and pollen from the flowers all day round. The tree is recommended for planting to increase honey production.

The wood is very widely used for firewood and making charcoal. The durable wood is very suitable for tool handles, mortars, pestles, poles, posts and timber. Beehives are made from hollowed out stems. Smoking wood is used to sterilise pots and this gives a special flavour to milk and beverages. The leafy branches can be used for feeding livestock. It is a valuable tree for agroforestry practices for its mulch and soil improvement as well as shade. In traditional medicine, the bark is used to treat skin infections, hepatitis as well as dysentery.



Figure 148 *Terminalia brownii*

***Terminalia schimperiana* Hochst.**

ABALO, TAGYIE (Amh); BAGURE (Ahi); AMBE, BAGURE, KOLISA, QAXALEE (Oro); ABELIWA (Tig).

A tree to 10 m high; bark dark to blackish grey, fissured; branchlets glabrous, or rarely whitish pubescent. Leaves elliptic to obovate, apex acuminate to acute and base attenuate to rounded, dull green or olive green when young. Flowers white or cream, heavily scented.

Growing in *Combretum-Terminalia-Stereospermum-Piliostigma* woodland and wooded grassland, on rocky slopes on black clay or sandy soil, often a dominant element and also persisting in cultivated areas, at altitudes between 1300 and 2200 m, in almost all floristic regions. It is also wide spread outside the Flora area occurring in Uganda, Tanzania, Dem. Rep. Congo and West Africa.

The species is one of the major honey source plants in low altitude areas of the country and a pollen and nectar source for honeybees.



Figure 149 *Terminalia schimperiana*

COMMELINACEAE

A family of perennials or annuals with fibrous or tuberous roots, or rarely forming small bulbs, often succulent. Leaves cauline or basal, spirally arranged or distichous; sheath usually closed. Inflorescences terminal, or terminal and axillary, leaf-opposed, rarely all axillary, composed of 1-many cymes aggregated into thyrses or variously reduced, sometimes subtended by spathaceous bracts. Flowers regular or bilaterally symmetrical, bisexual or male, occasionally cleistogamous.

A cosmopolitan family distributed in temperate and tropical regions, with about 40 genera and 630 species. The family is represented in Ethiopia by nine genera and 55 species (including subspecies). *Tradescantia*, with three species, is only known in cultivation. A few species are widespread weeds and bee forage.

Commelina benghalensis L.

WOHANQUR, YEWUHA ANQUR (Amh); AMBACEIO, LALUNTYE (Gur); SHATO (Kaf); DILISHA, HOLAGEBIS, LABUNCHE, QAYO (Oro); MASHIL (Tig).

A straggling annual herb growing up to 3 m high, or with creeping stem that has sticky latex. Leaves broadly ovate. Flowers blue with orange anthers.

Growing in woodland, forest, rocky stream banks and hillsides, and as a weed of waste grounds, cultivated fields and gardens, at altitudes between 400 and 2500 m,

occurring in most floristic regions, and also in tropical and South Africa, Madagascar and Australia.

Flowering after big rains in September and October, it provides pollen during early active season for brood production.



Figure 150 *Commelina benghalensis*

***Cyanotis barbata* D. Don**

YEWOF QOLO, YEJIB DINICH (Amh); BRKO (Tig).

An erect herb bearing a small corm lying just below the soil surface; stems unbranched, hairy on one side or sometimes all over with wiry golden-yellow hairs. Leaves linear, glabrous or sometimes sparsely hairy near the base. Flowers blue, purple or purple blue.

Growing in grassland, often in marshy places, shaded stream and river banks and under bushes in open bushland and woodland, *Euclea* or *Erica* scrub, roadside, as a weed of gardens and crops, on black-clay soils overlying volcanic rocks, at altitudes ranging from (1400-)1600-4200 m, in nearly all floristic regions, and also throughout tropical Africa, Yemen, India, Nepal, China and Burma .

Flowering from August to October, honeybees collect reddish orange pollen loads from the flowers. It is an important pollen source for brood rearing during early nectar flow.



Figure 151 *Cyanotis barbata*

CONVOLVULACEAE

Members of this family are composed of herbs, climbers, shrubs, or trees. Leaves alternate, mostly simple, entire or often lobed, compound in some species; stipules absent. Inflorescences axillary cymes or racemes. Flowers small and inconspicuous to large and showy, with united petals forming funnel-, bell-, or urn-shaped corolla subtended by bracts and bearing five stamens, which are inserted on the corolla tube. The family is composed of about 50 genera and 1,500 species with a cosmopolitan distribution, but mainly in tropical and subtropical regions. There are 21 genera and 129 species (including subspecies) in Ethiopia.

Many species are very attractive to honeybees for rich nectar and some pollen supply and are also known throughout the world as being important honey plants, for example *Ipomoea jaegeri*, *I. purpurea* and *I. tenuirostris*.

Ipomoea jaegeri Pilg.

An erect or spreading subsucculent shrub, 30-70 cm long; shoots silvery pubescent, later becoming glabrous. Leaves linear-oblong to oblong-lanceolate, with entire margins. Flowers solitary, pale violet, lilac or purple having darker purple centre and funnel-shaped.

Growing in open grassland, grassy slopes in shallow depressions and in open dry

thorn scrub on black clay or sandy soil, at altitudes between 1450 and 2100 m, in Sidamo Floristic Region, and also in Kenya and Tanzania.

Flowering in December and January, it is a potential source of nectar and pollen.



Figure 152 *Ipomoea jaegeri*

***Ipomoea purpurea* (L.) Roth**

Common morning glory (Eng); DUN (Som).

An annual herb with trailing, or twining stem, glabrous or with short hairs mixed with long bristles. Leaves ovate to sub-orbicular. Flowers solitary, or in cymes, white, pink or deep bright purple.

Growing on hedges and fences in towns and escaped and established in waste ground, at altitudes between 1500 and 2500 m, in Welo, Shewa, Welega, Kefa, Sidamo, Bale and Harerge floristic regions, and also naturalized throughout the tropics but native of South America.

Flowering almost through out the year, the herb is a potential source of nectar for honeybees.



Figure 153 *Ipomoea purpurea*

Ipomoea tenuirostris Choisy

AYIT- HAREGE (Amh); bindweed, morning glory (Eng); ECHERE-TURA (Wol).

A perennial herb, twining or prostrate, up to 3 m long, more or less densely covered with yellowish spreading hairs. Leaves ovate to oblong. Flowers white to mauve or purple, borne in many-flowered cymes.

It grows in evergreen scrub, thickets, bushland, edge of forests, disturbed habitats along roads and rivers, at altitudes between 1650 and 2450 m, in most floristic regions, and also in upland Eritrea, Cameroon, Sudan, , Zimbabwe, Zambia, Malawi and Mozambique.

Honey bees collect nectar and pollen from the flowers.



Figure 154 *Ipomoea tenuirostris*

CRASSULACEAE

The family contains succulent herbs and subshrubs, which are occasionally annual or monocarpic. Leaves alternate, opposite or whorled, simple, rarely pinnately divided or compound. Inflorescences terminal, or axillary. Flowers regular, usually bisexual; stamens as many or twice as many as petals, rarely more, free or attached to the corolla; nectaries at bases of carpels, usually scale-like. Fruit a whorl of follicles, mostly dehiscent adaxially, or sometimes breaking transversely in species with few seeds.

A cosmopolitan family with about 35 genera and 1,500 species, with major centres of diversity in South Africa, Mexico and eastern Asia, but rare in wet tropics. There are ten genera and 35 species (including subspecies) recorded in Ethiopia, several of which are introduced ornamentals.

Most species of this family are visited by honeybees, mainly during early mornings when the nectar level inside the corolla-tubes is very high. Many species are very attractive to honeybees and provide good amounts of nectar which is produced by the female and male flowers. The pollen value is of minor importance and the bees face some difficulties to collect the coarse-grained pollen.

Kalanchoe densiflora A. Rich.

INDAHULA (Amh); ANDAHO (Gur); ANCORURA, BOSOQE (Oro).

A perennial herb, growing to 1.8 m. Leaves succulent with crenate margins. Flowers sweet scented, deep-pink to white.

Growing in open habitats, forest margins, near streams, often along roadsides and rarely epiphytic, at altitudes between (1000-)1300 and 2600 m, in Gondar, Gojam, Shewa, Arsi, Ilubabor, Kefa, Sidamo, Bale and Harerge floristic regions, and also in Sudan, Kenya, Uganda, Tanzania and Dem. Rep. Congo.

Flowering almost all year round, the flowers are often visited by butterflies and occasionally by honeybees.

The leaves are used for baking local bread 'DUFO' and 'KOCHO' and also in making a dressing to sores.



Figure 155 *Kalanchoe densiflora*

CUCURBITACEAE

The family includes mostly monoecious, or dioecious herbs, annual or perennial climbers, or with trailing stems, usually with tendrils, often with a tuberous rootstock. Leaves alternate, petiolate, simple and then usually palmately lobed, or compound; stipules absent. Flowers usually regular, rarely bilaterally symmetrical, usually either male or female, bearing usually five united petals, often with free lobes, but rarely free to the base; stamens five, nearly always variously united and alternating with the corolla-lobes.

The Cucurbitaceae is a medium-small family with 120 genera and 825 species, which are widespread in tropical and subtropical regions, occurring rarely in temperate or cool temperate climatic zones. In Ethiopia, the family is represented by 24 genera and 74 species.

Many species are very attractive to honeybees and provide good amount of nectar which is produced by both female and male flowers.

Cucumis pustulatus Naud. ex Hook.f.

HOLOTO (Oro); CAMBOB, CURARI, GARE DAMERE (Som); AFTO, DOKWA'TA, DQALA DUBA, HAFALO (Tig).

A trailing, or climbing annual herb, up to 2 m high. Leaves broadly ovate to reniform.

Flowers yellow, borne in leaf axils. Fruit hairy, ripening yellow.

Growing in deciduous woodland, *Acacia-Commiphora* bushland, abandoned cultivated field and sometimes as a weed, at elevations between 1000 and 2200 m, in Tigray, Shewa and Sidamo floristic regions, and also in upland Eritrea, west to Nigeria, south to Tanzania and east to Arabia.

Flowering in September and October, the herb is a nectar and pollen source for honeybees in semiarid and arid agro-ecologies of Ethiopia.



Figure 156 *Cucumis pustulatus*

***Cucurbita pepo* L.**

DUBA, YEBAHR QL, YEQURA HAREG, ZKUNI (Amh); pumpkin (Eng); BOTU (Gam.); MELPEPO (Ge'e); BUKEH, BUKO (Kaf); BUKO, BUQE, DABAQULA (Oro); DUBA (Sah); BOHOT (Som); DUBA, WSHSH, YEBAHR QL, YEQURA HAREG, ZKUNI (Tig).

A vigorously trailing annual herb, growing up to 5 m high. Leaves ovate or broadly triangular, or palmately 5-lobed, cordate, rough and covered with short spiny hairs. Flowers bright yellow.

It is widely cultivated at altitudes between 800 and 2500 m in many parts of Ethiopia. It is also widely cultivated throughout tropical, subtropical and temperate regions for its edible fruit. It is probably native of Mexico and USA.

Flowering from April to December, honeybees collect pollen and nectar from the

flowers. The sugar concentration of the nectar ranges from 30-40% and honey potential is 40-50 kg per acre. Honey from this plant is yellow and granulation is rapid. In traditional medicine, the seeds are used to expel tapeworm. Pumpkin is cooked and eaten by most people for nutritional supplement. In some parts of Ethiopia, the leaves are edible.



Figure 157 *Cucurbita pepo*

***Luffa cylindrica* (L.) M. J. Roem.**

LIPA (Anu); MADODOKI (Som).

A vigorous climber or trailer, growing up to 15 m. Leaves broadly ovate with cordate base. Flowers monoecious, female flowers solitary, deep yellow. Fruit ellipsoid to cylindrical.

Growing in river banks and cultivated places, and also cultivated, at altitudes between 500 and 500 m, in Ilubabor and Harerge floristic regions, and also in the palaeotropics where it is widely cultivated and also naturalized in both hemispheres.

Flowering from September to December, honeybees collect nectar and pollen from the flowers.



Figure 158 *Luffa cylindrica*

Zehneria scabra (Linn. f.) Sond.

AREG RESA (Amh); SE SEBIEQ, SABIEQ (Ge'e); HIDDA ADDI (Oro); GESANGES (Som); HAFAFLO, HAREG REYSA (Tig).

A climbing, or trailing herb to 10 m; old stems becoming woody with corky, ridged bark. Leaves ovate or pentagonal, densely tomentose beneath. Flowers dioecious, white, becoming cream, becoming yellow with age. Fruit globose to ellipsoid, sometimes apiculate, fleshy, green or green with darker longitudinal lines.

Growing in upland forest and woodland, wooded grassland, river and lake margins, also in secondary vegetation, plantations, hedges and cultivated places, at altitudes between 1200 and 3600 m. It is found in nearly all floristic regions in Ethiopia, and also in tropical and southern Africa and tropical Asia.

Flowering in September and October, the climber is a pollen and nectar source for honeybees during dry periods.



Figure 159 *Zehneria scabra*

DIPSACACEAE

Members of the family include annual, or perennial herbs, sometimes suffrutescent with erect stems. Leaves opposite, entire or dissected; stipules absent. Inflorescence one or several dense, cymose heads with convex receptacles. Flowers sessile, bisexual, zygomorphic, with united petals, which are with 4 or 5 spreading irregular lobes; stamens 2-4, alternating with the corolla lobes with exserted anthers. Fruit an achene surrounded by involucels and crowned by persistent calyx.

A small and primarily temperate family of eight genera and about 250 species, occurring in Eurasia and Africa. There are three genera and three species in Ethiopia, all of which are very important bee plants, particularly *Dipsacus pinnatifidus* and *Pterocephalus frutescens*.

Dipsacus pinnatifidus Steud. ex A. Rich.

KELM (Amh); teasel (Eng); GALLAM (Tig).

An erect branched, spiny herb, or shrub, growing to 3-4 m high; stem hollow and covered with short spines. Leaves ovate, or lanceolate, with spine toothed margins. Flowers white, or sometimes yellow, borne on stiff erect stems in subglobose heads. Growing in ericaceous scrub and grassland, at altitudes between 2000 and 4100 m,

in most floristic regions, and also in Sudan, Uganda, Kenya, Tanzania, Rwanda, Burundi, and Cameroon.

Flowering from September to November, the flowers are potentially visited by honeybees for pollen and nectar. The shrub also supports honey production when it flowers massively.



Figure 160 *Dipsacus pinnatifidus* being visited by honeybee

***Scabiosa columbaria* L.**

YETIJA ZAGO (Amh);THEILABI (Tig).

An erect perennial herb, growing from a thick rootstock. Leaves rosette, with entire or divided margins. Flowers pinkish-violet, arranged in dense heads with hairless bristles between the flowers.

Growing in grassland and scrub, especially on rocky ground, at altitudes between 2000 and 4100 m, in nearly all floristic regions, and also in upland Eritrea, East tropical Africa and west from Sudan to Cameroun and the Congo Republic.

Flowering any time of the year but more profusely after the rains, honeybees collect pink pollen loads from the exposed anthers.

In local medicine, the plant is used against constipation.



Figure 161 *Scabiosa columbaria*

ERICACEAE

The family composed of small trees, shrubs or subshrubs. Leaves simple, alternate, opposite, or whorled, usually evergreen; stipules absent. Flowers bisexual, actinomorphic, or slightly zygomorphic. Calyx and corolla usually 4- or 5-merous; stamens equalling the petals in number or twice as many, inserted on a receptacle disc. Fruit a capsule, drupe or berry.

A nearly cosmopolitan family of about 100 genera and 3,400 species, mainly occurring in temperate latitudes and at high altitudes in the tropics and subtropics. In Ethiopia, the family is represented by two genera and four species.

Erica arborea is the most important honey plant of higher altitude areas of Ethiopia.

Erica arborea L.

ADALE, ASTA, WUCHENA (Amh); briar root, bruyere, giant heath, tree heath (Eng); GEDERA, GDRA (Gur); WADADI, SAATOO, LABASSE; QAMATE (Oro); SHAKNTO (Tig); GEDRA (Wol).

A much-branched evergreen shrub, or a tree to 5 m. Leaves grow closely around the stems as in most heaths, narrow and pointed, grey-green and tough. Flowers white-pink, borne at the ends of short shoots, abundant and each flower is like a tiny hanging bell and the purple stigma is exerted outside the white flower. Fruit a capsule containing many tiny seeds. It can be propagated from seedlings.

Growing in steep, rocky slopes and wooded, often burnt and grazed grassland, some-

times on exposed lava flows, often kept down by burning, at altitudes between 2200 and 3900 m, in most floristic regions, and also in upland Eritrea, Somalia, East Africa, Canary Island and Mediterranean Region.

Honeybees collect the copious pink pollen and abundant nectar from the flowers very frequently and the plant is one of the most important honey sources of higher altitudes of the country. The honey is golden-red with an intense and strong aroma with higher percentage of glucose and fructose (51.03% and 43.76%) respectively. Due to heavy deforestation, burning and overgrazing of the *Erica* vegetation on mountains of Wonchii, Bale and others, there is decline in honey production. Conservation of *Erica* vegetation is required for sustainable honey production.

Ericaceous vegetation is also used for firewood and to make the large flaming torches during the festivals of Ethiopian New Year and the Meskel celebrations. Charcoal, fodder (leaves and shoots) and live fence are other uses of *Erica arborea*. In traditional medicine, the smoked parts of branches are used to fumigate houses against contagious diseases.



Figure 162 *Erica arborea*

EUPHORBIACEAE

The family is composed of trees, shrubs or herbs, sometimes succulent or climbing and sometimes spiny. Leaves mostly alternate, occasionally opposite or whorled, usually simple, entire or palmately lobed, occasionally reduced to scales, rarely palmate. Plants monoecious, or dioecious. Inflorescences axillary, or terminal, mostly raceme like, rarely cymose, or flowers very reduced and contained within flower like 'cyathia'. Flowers small to minute, sometimes reduced to a single naked stamen, or a naked ovary; petals often absent; annular disc or disc-glands often present.

A very large family with about 300 genera and 8,000-10,000 species, most numerous in the tropics. In Ethiopia, 34 genera and 231 species (including subspecies) have been recorded.

In Ethiopia, mainly *Euphorbia* species supply significant amounts of nectar for bees. Pure honey from *Croton macrostachyus* is harvested in many parts of the country and the species is considered an important tree for nectar and pollen supplies.

Clutia lanceolata Forssk.

FIYELE FEJ (Amh).

An herb, or a shrub to 2 m high, with robust stems. Leaves lanceolate-elliptic, or ovate but often narrower. Flowers light green with pale green male flowers. Fruit sometimes densely hairy.

Growing in evergreen bushland, open deciduous woodland, margins of *Juniperus* forest, often along streams and in disturbed areas, at altitudes between (1300-)2000 and 3000 m, in the Ethiopian Highlands (Ethiopia and Eritrea), and also in Arabia.

Flowering mostly from September to November, the flowers are sources for honeybees, which are occasionally visited.



Figure 163 *Clusia lanceolata*

***Croton dichogamus* Pax**

YESIGA BETIR (Amh); MAGOO, MUKAAFULAA, ULLE FOONI (Oro).

A shrub, or small tree 2-5 m high, densely branched; most parts except upper leaf surface with dense cover of overlapping silvery and brown peltate scales. Leaves narrowly ovate to elliptic-lanceolate, base rounded to subcuneate or subcordate, tip usually acute, with entire margins. Flowers borne in 2-4 cm long racemes.

It is usually found in open *Acacia* woodland and bushland, on limestone and sometimes forming dense stands, at altitudes between 1350 and 1800 m, in Shewa, Arsi, Gamo Gofa, Bale and Harerge floristic regions, and also occurs in Kenya, Uganda, Tanzania and Rwanda.

Flowering from December to March, it is an excellent pollen source for honeybees. The plant is used traditionally for drying meat and hence its name 'ulle foni' in Afaan Oromo.



Figure 164 *Croton dichogamus*

***Croton macrostachyus* Del.**

BISANA (Amh); ORBELOW (Anu); WAGGO (Kaf); MASSAGANTA (Kon); GOMELIT (Me'e); ALALOO, ANKOWAA, BAKANNOO, BAAKANNISAA, CACANIRAA, MAKKANISSA (Oro); AMADO, BUSINNA (Sah); MASINCHU, ULUSH, WOSHU, WUSHEA (She); MASICHOO (Sid); TAMBUK (Tig); ANKA (Wol).

A deciduous tree up to 25 m high, with longitudinally fissured slender trunk and spreading branches; bark grey. Leaves large, ovate, with base rounded to cordate and tip obtuse, or subacutely acuminate and deciduous. Flowers creamy yellow and sweet scented, arranged in erect spikes.

Growing in forest margins and secondary woodlands, extending into disturbed areas and along edges of roads, mostly in soils of volcanic origin, at altitudes between (500-)1050 and 2400 m, in nearly all floristic regions, and also west to Guinea, South to Angola, Zambia, Malawi & Mozambique.

Flowering from April to July, the tree is a very important source of honey. This exceptional flowering phenology makes the species the most important in ensuring sustainable honey production in areas where the species dominates. Honeybees collect both pollen and nectar from the flowers. The showy creamy-white flowers, together

with their fragrance, are attractive to honeybees. Consequently, the species is an important source of honey. An aromatic brownish honey is harvested from the flowers of this species.

The massive branches of the large trees of the species are used by the beekeepers to hang many traditional beehives both in the forest and at the backyard. The wood of *C. macrostachyus* is very soft, light, fine-textured and cream-coloured. It is suitable for indoor carpentry, agricultural tools, charcoal, and poles. The pulverized bark of *C. macrostachyus* is used together with dried *Hagenia abyssinica* flowers, soaked in water overnight, as a very effective purgative and anthelmintic, while the fruits, decoction of the bark of the root in "TEJ" or milk are used against venereal diseases. The ripe crushed fruits, mixed with juice from the petiole of the leaves and butter or honey, can be used to treat fungal skin diseases like ringworm.



Figure 165 *Croton macrostachyus*

***Croton zambesicus* Muell. Arg.**

YEFERENJ BISANA (Amh); GIGASA (Gam); BULITHOI (Mur).

A shrub or small tree, growing up to 8 m high; stem brownish. Leaves narrowly ovate to elliptic-lanceolate. Flowers occasionally dioecious, rather large.

Growing in stony stream beds, locally subdominant in damper hollows within broad-leaved deciduous woodland and planted as an ornament in homegardens, at altitudes between 600-1700 m, in Shewa and Gamo Gofa floristic regions, and also in Sudan,

Kenya, Uganda, Gambia east to Nigeria, south to Angola, Mozambique and Natal in South Africa.

The plant flowers from December to January and is a potential nectar and pollen source plant for honeybees.



Figure 166 *Croton zambesicus*

***Euphorbia abyssinica* Gmel.**

QULQWAL (Amh & Gur); KEREKARA (Had); GACHO (Kaf); ADAMII, HADAAMII (Oro); WALAL (Sah); HASSADIN (Som); QOLQWAL (Tig); TO HIT (Tob).

A tree that grows up to 10 m high, with a short, thick, fissured trunk; branches usually erect, persistent, forming dense, broadly obconical crown. Leaves well developed in seedlings but later scale-like and soon falling off, with obsolete spines; spines paired, straight. Flowers yellowish-green, clustered terminally on the top of branches. Fruit reddish brown and all parts of the tree produce milky latex. It is propagated from seeds and cuttings.

Locally abundant on steep rocky hillsides, sometimes forming pure stands, often around churches and also used for live fencing at higher altitudes between (1300-)1900 and 2400 m, in Tigray, Gondar, Gojjam, Shewa, Sidamo and Harerge floristic regions, and also in Eriteria, Sudan and Somalia.

Flowering in September and October, the plant is a good source of nectar and pollen and it is suspected to be poisonous for bees and honey from this plant has burning sensation at throat.

The soft wood from this tree is used to make household furniture, and the latex is used to repair cracked or broken containers.



Figure 167 *Euphorbia abyssinica*

***Euphorbia nubica* N. E. Br.**

AANNOO, ERGIN (Oro); AGNO (Sid); EN (Som); QNCB (Tig).

An erect shrublet to scandent shrub, woody at base but without trunk; stems pale green, up to 6 mm thick when dried, smooth, glabrous, with prominent leaf-scars. Leaves linear-lanceolate. Flowers small, solitary, yellow.

Growing in wide range of habitats, from very open *Acacia* bushland on rocky slopes to fairly dense *Acacia* woodland and along margins of *Juniperus* forest, probably a good indicator of overgrazed areas where it can become subdominant, at altitudes between 400 and 1900 m, in Tigray, Sidamo, Bale and Harerge floristic regions, and also in Eritrea, Sudan, Somalia, Kenya and Tanzania.

The flowers are rarely visited by honey bees for pollen.



Figure 168 *Euphorbia nubica*

Euphorbia pulcherrima Klotzsch.

Poinsettia (Eng).

A shrub, which is glabrous except for the inflorescences. Leaves alternate, sessile and elliptic-ovate. Flowers yellow, cup-like, borne in terminal pseudo-umbels.

An introduced ornament cultivated at altitudes between 1700 and 2500 m, which is native in Mexico, or other Central American countries.

Flowering throughout the year, the flowers produce copious nectar from the conspicuous bright yellow cup-like structure (erect almost tubular cyathial gland) and honeybees collect the nectar from the flowers.



Figure 169 *Euphorbia pulcherrima*

Manihot esculenta Crantz

Cassava, manioc, para arrow root, rio arrow root, sweet cassava (Eng); FERENGE BOYE, FUMGE (Gam); DEEKIKAA (Oro); BATATA, MANANGA, MOHOGO, MOOGO (Som).

A woody herb up to 5 m high; roots large, starchy. Leaves lanceolate. Flowers white, cup-like and borne in branched racemes.

It is cultivated in western and southern Ethiopia, at altitudes between 1300 and 1600 m, in Welega, Ilubabor, Kafa, Gamo Gofa and Sidamo floristic regions, and also widely cultivated throughout the tropics and as a pot plant but native of eastern tropical South America.

The plant is a major pollen and nectar source for honeybees, though mainly grown

for the edible roots which form a staple food in many tropical areas. Some cultivars are quite drought resistant, and the mature roots can stay long in the ground before being harvested. There are also forms which have been selected for their attractive foliage and their ability to withstand dry conditions in buildings



Figure 170 *Manihot esculenta*

***Phyllanthus ovalifolius* Forssk.**

YEKEBT SHMBRA (Amh); LAMON (Mes); JOLAAFA, KOTTUU (Oro).

A shrub often scandent, or a small tree 1.5-5 m high and glabrous throughout; bark papery and peeling. Leaves oblong to oblong-oblongate, or obovate. Flowers usually monoecious, pinkish, on leafy or specialized flowering shoots with scale-leaves, usually in groups.

Growing along river banks and lake shores, at altitudes between 300 and 1300(-1700) m, in most floristic regions, and also throughout the Old World tropics.

It flowers in September and October and is a potential pollen source plant for honeybees.



Figure 171 *Phyllanthus ovalifolius*

***Ricinus communis* L.**

QINCE HARA (Age); BULQA, CAQMA, GULO, GOLQWA (Amh); ULEERU (Anu); BOLUTT (Bod); castorbean, castor oil plant, castor oil tree (Eng); ATI, KALISHE (Gam); KOBBO (Gur); CHENGI (Mes); BOIUT (Me'e); BAMBALTA, HAMBALTA, QOEBOO (Oro); BALAMBAL, BALAN, BALON, GULI, MBALICA (Sah); BORA (She); BAR, KOBO, TOFOILE (Som); GULI (Tig).

An evergreen, soft-stemmed shrub or tree, growing upto 1-5 m high with hollow stem; young shoots often purplish with well marked leaf nodes. Leaves large, up to 50 cm wide, palmately veined. Flowers crowded on upright spike with creamy yellow stamens. It is propagated from seeds.

Growing in homegardens, in both rural and urban areas, also common along seasonally dry river beds, at altitudes between 400 and 2500 m, in most floristic regions of Ethiopia, and also in upland Eritrea; it is a pantropical weed.

Flowering in September and October, the plant produces both nectar and pollen. The leaves are used as feed for silkworm. The oil, which is produced commercially from the seeds has many recorded medicinal and industrial uses.



Figure 172 *Ricinus communis*

FABACEAE (LEGUMINOSAE)

The family is composed of trees, shrubs, herbs or climbers. Members of the Fabaceae can be identified by their alternate leaves which are often compound, and by their pea-like or bean-like fruits which typically splits along opposite sides into two separate halves to release several seeds.

The Leguminosae is one of the largest families of flowering plants with up to 590 genera and 17,000 species, which are distributed throughout the world, especially in tropical and subtropical regions. They play a dominant role in the vegetation of large areas in tropical Africa.

The Leguminosae are divided into three Sub-families: Caesalpinioideae, Mimosoideae and the Papilionoideae. The Fabaceae is the largest family of vascular plants in Ethiopia with 108 genera and 639 species (including subspecies). A family of great economic importance containing, besides the pulse crops, many species used for forage, pasture improvement, charcoal production, timber, gums, medicine and ornament. The ability of most members of the family to form associations with symbiotic bacteria which fix atmospheric nitrogen contributes greatly to improving soil fertility.

Because of their widespread occurrence, particularly the *Acacia* species, in drier habitats and the *Albizia* and *Trifolium* species are more humid climates, are very important for beekeepers and bee colonies.

FABACEAE-CAESALPINIOIDEAE

Bauhinia variegata L.

KOTEE ARBA, ABAYTABATA (Oro).

A shrub or small tree growing up to 3 m high. Leaves bilobed, with rounded and finely pubescent lobes. Flowers solitary, petals white or purplish.

It is cultivated but also naturalised, growing in deciduous woodland and wooded grassland, often in river valleys, at altitudes between 500-2300 m, in Shewa, Kefa, Sidamo and Harerge floristic regions, and elsewhere but it is native of Asia. It is propagated from seeds and seedlings.

Flowering all year round, honeybees collect abundant nectar and pollen from open flowers and anthers are elongated and covered with mass of pollen grains. The roots and bark have various medicinal properties and the wood is suitable for carpentry and construction. It is planted in parks, hotels and roadsides for ornamental purpose.



Figure 173 *Bauhinia variegata*

Caesalpinia decapetala (Roth) Alston

YEFERENJ-KITKITTA, QONTIR (Amh); Mysore thorn (Eng); HARAGAMMA (Oro).

A climbing or straggling woody shrub growing up to 10 m long, armed with scattered, sharp prickles on the branches and leaf rachis. Leaves compound with elliptic-oblong to ovate leaflets bearing 4-10 pairs of pinnae. Flowers yellow or yellowish and arranged in attractive, long, terminal racemes.

Growing in grassland, upland evergreen bushland, and frequently established on dry hillsides, valley slopes and often used as a hedge plant, forming an impenetrable fence, which may turn out to be invasive, at altitudes between 1700 and 2400 m, in Welo, Shewa, Kefa, Arsi and Harerge floristic regions, but native of tropical and subtropical Asia.

Flowering from October to January honeybees collect pollen and nectar from the flowers during forage scarcity. The seeds are used to make necklaces.



Figure 174 *Caesalpinia decapetala*

***Delonix elata* (L.) Gamble**

AMAY, DINE-AMAYTO (Afa); AMAY, YEDREDEWA ZAFF (Amh); SUKELA (Oro); DEBI, LEBI (Som).

A deciduous tree about 2.5-15 m high with rounded or spreading crown; bark smooth and shining. Leaves compound, bipinnate with 10-14 pairs of oblong or oblanceolate-oblong leaflets. Flowers pale yellow and arranged in terminal corymbs.

Growing in *Acacia-Commiphora* bushland and thicket, often on rocky slopes or by streams, at altitudes from sea level to 1500(-2200) m, in Afar, Welo, Kefa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also in Eritrea and Egypt, south to eastern Dem. Rep. Congo and Tanzania, east to Arabia and India.

Flowering from February to April, honeybees occasionally forage for pollen and nectar from the flowers during dry period.

The tree is a good source of feed for goats, sheep, camels and cattle which eat the foliage and young pods. The wood is preferred for fuel and charcoal making.



Figure 175 *Delonix elata*

Delonix regia (Boj. ex Hook.) Raj

YE-DIREDAWA-ZAF (Amh); lamboyant, flame tree (Eng).

An unarmed tree growing upto 12 m high. Leaves bipinnate, without specialized glands. Leaves compound with small, opposite leaflets. Flowers usually large, orange red, borne in short axillary corymbose racemes. Fruit pods, linear-oblong, flattened, dehiscent.

It is cultivated at several places, at altitudes between 1100 and 1800 m, in Shewa and Harerge floristic regions, mainly in Dire Dawa, and also in Eritrea, but native of Madagascar.

Flowering during a dry period, the plant is a potential source of nectar for honeybees. The wood has been used to make gun stocks.



Figure 176 *Delonix regia*

Dalbergia lactea Vatke

YAGBERO (Kaf).

A small tree, or shrub 3-9 m tall, evergreen, usually scandent, sometimes climbing with the aid of coiled branchlets or peduncles. Leaves oblong, or oblong-elliptic, glabrous to pubescent. Flowers white flushed mauve to purplish, many, congested on ultimate axes and arranged in long panicles.

Growing in forest margins, bushland and grassland, at altitudes between 1350 and 2100 m, in all floristic regions, and also widespread in tropical Africa.

The plant flowers after the main rainy season and provides abundant pollen for honeybees and also visited by carpenter bees.



Figure 177 *Dalbergia lactea*

Parkinsonia aculeata L.

Jerusalem thorn (Eng).

A shrub or small, spiny tree 4-10 m high and often branching near the ground with very thin drooping foliage. Leaves alternate, bipinnately compound, consisting of a very short axis ending in a spine. Flowers golden-yellow, irregular and slightly pea-shaped, showy, fragrant and borne in several clusters on long, slender stalks.

It is cultivated in Tigray, Shewa, Sidamo and Harerge floristic regions, and also naturalised at least in Tigray and Harerge and also widely cultivated for ornament, for shade and wind-breaks, and often becoming an escape but native of tropical and

subtropical America. It is propagated from seeds and roots or shoot cuttings, or air-layers.

Flowering from September to December, the large, fragrant and golden yellow flowers easily attract bees for pollen and nectar. Since it has long flowering period and can provide continuous feed supply for foraging honeybees during dry period, it can be recommended in arid and semiarid parts of the country.

Foliage and pods are browsed by livestock and young branches are lopped to feed goats and sheep. The flower and leaf extracts in alcohol are applied as a poultice to treat rheumatism. It is planted for erosion control, as a shade or shelter tree and known for nitrogen fixation and as an ornament.



Figure 178 *Parkinsonia aculeata*

Piliostigma thonningii (Schumach.) Milne-Redh.

FRQA (Age); ALAMATI, ALAMATIE, DABDI, YEQOLLA WANZA (Amh); AMBARDA, LILU (Gur); KORA (Oro); AMAM-GEMEL (Tig); QALQALLO (Wol).

Deciduous tree, rarely shrubby, 3-10 m high, with rough bark. Leaves mostly bilobed, densely reticulate and pubescent beneath. Flowers white or pinkish.

Growing in deciduous woodland and wooded grassland, often in river valleys, at altitudes between 500 and 2000 m, in most floristic regions, and also widespread in tropical Africa.

Flowering from December to February, the tree is one of the potential nectar and pollen source plants in arid and semiarid agroecologies. Its other uses include the

roots and bark having a variety of medicinal properties, and the latter also used for cordage and tanning. Its wood is suitable for carpentry and construction.



Figure 179 *Piliostigma thonningii*

***Pterolobium stellatum* (Forssk.) Brenan**

QONTIR, QENTAFÄ (Amh); GAROO (Kaf); HARAGAMA, GORA (Oro); KAJIMMA (Tig); GOMORYYA (Wol).

A well-armed climbing or straggling shrub with thick, knotted stem. Leaves pinnately compound, with recurved prickles; leaflets narrowly oblong or elliptic-oblong. Flowers pale creamy-yellow, sweetly-scented and arranged in dense terminal racemes.

It commonly forms thickets in upland dry evergreen degraded bushland, on evergreen forest margins and clearings and in *Acacia* woodland, at altitudes between 1200 and 2500 m, in nearly all floristic regions, and also in upland Eritrea, Sudan to South Africa and Arabia.

Flowering from October to May, honeybees collect pollen and nectar from the flowers and the plant is an important honey source in the country. The sweet-scented flowers attract large number of bees and butterflies. Honey from this plant is white in colour and granulation is reported to be rapid. It is recommended to plant it around apiary for honey production.



Figure 180 *Pterolobium stellatum*

***Senna bicapsularis* (L.) Roxb.**

Rambling cassia (Eng).

A spreading woody herb, or shrub growing up to 1-3 m high, branched from the base. Leaves lanceolate, with toothed margins. Flowers yellow or orange yellow borne in long spikes.

Growing in evergreen bushland and wooded grassland, often riparian, also in hedges and disturbed places, at altitudes between 1000 and 1900 m, in Kefa, Arsi and Harerge floristic regions, and it is native of West Indies and South America.

Flowering in September and October, it is a pollen and nectar source for honeybees.



Figure 181 *Senna bicapsularis*

Senna didymobotrya (Fresen.) Irwin & Barneby

A shrub up to 2 m high. Leaves compound with 10-15 leaflets. Flowers yellow, tinged with black and having unpleasant smell.

Growing in montane wooded grassland, evergreen thicket and bushland, often riparian or in disturbed places, at altitudes between 1450 and 2400 m, in Welo, Welega, Shewa, Arsi and Sidamo floristic regions, and also in eastern tropical Africa south to Zimbabwe and west to Sudan, Dem. Rep. Congo and Angola.

The flowers are rarely visited by honeybees but often visited by carpenter bees.



Figure 182 *Senna didymobotrya*

Senna italica Mill.

SANU (Afa); SENE-MEKKI (Amh); dog senna, Italian senna, Spanish senna (Eng); SALAMAKA (Som).

An erect to prostrate herb, or a small shrub; branches appressed puberulous. Leaves compound, 3-12 cm long, glandular; leaflets (3-)4-6(-7) pairs, obovate-elliptic to obovate-oblong; stipules triangular to ovate-triangular. Flowers yellowish white to bright yellow and arranged in 2-25 cm long racemes.

Growing in wooded grassland, *Acacia-Commiphora* bushland and semi-desert, open bushland, often by streams or in disturbed places, at altitudes from sea level to 1850 m, in Afar, Tigary, Gondar, Shewa, Arsi, Gamo Gofa and Harerge floristic regions, and

also widespread in northern Africa from Cape Verde Island to Egypt, extending south to Nigeria, Senegal, Mali, Namibia and South Africa, east to Sudan, Somalia and Socotra, also in Israel and Arabia to Iran, Pakistan and India.

Flowering in September and October, the flowers are rarely visited by honeybees for pollen.



Figure 183 *Senna italica*

***Senna septemtrionalis* (Viv.) Irwin & Barneby**

SENE-MEKKI(Oro).

A woody herb, shrub or small tree 1-5 m high, glabrous. Leaves 15-30 cm long, with columnar glands on rachis between each pair of leaflets except sometimes the uppermost; leaflets 3-4 pairs, lanceolate to ovate, tapering to acuminate to an acute apex; stipules linear, falling quickly. Flowers bright yellow and arranged in racemes that are mostly auxiliary but aggregated near branchlet-ends.

Growing in deciduous woodland, evergreen thicket and bushland, in hedges and disturbed places, at altitudes between 1700 and 2400 m, in Afar, Shewa, Arsi, Illuabor, Kefa, Sidamo and Harerge floristic regions where it is locally naturalised. It is also widespread throughout the tropics but probably native of tropical America.

The flowers are visited by honey bees for pollen during rutless period.



Figure 184 *Senna septemtrionalis*

FABACEAE-MIMOSOIDEAE

Acacia abyssinica Hochst. ex Benth.

BAZRA-GRAR (Ahm); ODARA (Kam); QSLTO (Afa); AMBO, DAGNISA, GARBI, LAFTO (Oro); ODORO, ODORWA (Wol).

A tree 20 m high when mature; bark rough, grooved and dark brown; prickles very variable, short or long. Leaves compound with 15-36 pairs of pinnate when mature and borne on stalk to 9 cm long. Flowers cream, borne in many heads. It is propagated from seeds and seedlings.

Growing in woodland, wooded grassland, forest margins and along sides of streams and rivers, at altitudes between 1500 and 2800 m, in nearly all floristic regions, and also in Sudan, Uganda, Kenya, Tanzania, Dem. Rep. Congo, Malawi, Zimbabwe and Mozambique.

Flowering in September and October, honeybees forage for abundant nectar and pollen. The species is an important honey source plant in the country. In dense stands, the bees will produce a significant surplus of honey and the tree contributes to mixed honey in the highlands in which its flavour will sometimes predominate. In most cases, the pollen and nectar of a single tree will strengthen the colonies and stimulate brood rearing significantly. It is recommended for planting to increase honey production.



Figure 185 *Acacia abyssinica*

***Acacia albida* Del.**

GERBI (Amh & Gur); apple-ring acacia (Eng); QERETOR (Gam); DEROT, GARBI (Oro); GARSHA, MOMONA (Tig).

A tree growing to 30 m high, with a spreading or rounded crown bark rough, dark brown or dull grey, fissured; prickless in pairs, straight and often pointing down. Leaves with pinnae 3-10 pairs. Flowers sweetly-scented, yellowish-white, sessile and borne in 3 to 17 cm long.

Growing in woodland and grassland and on seasonally waterlogged ground, at altitudes from sea level up to 2600 m, in floristic regions, and also widespread in tropical and subtropical Africa and also in Asia.

It is sometimes deliberately left on farmland. The tree retains its leaves during the dry season thus giving shade, but sheds them during rainy periods allowing light to penetrate to plants growing under it. This makes this tree species highly compatible with annual crop plants. It is propagated from seeds.

Flowering from May to July, honeybees forage abundant nectar and pollen from the creamy white flowers. The honey is harvested from this tree during October to November where the plant is found in many stands. Beekeepers also hang beehives on branches of the trees to catch the bee swarm.

The wood is used for making various tools. This species is widely used and now

promoted in agroforestry systems as it is a very good shade tree, termite resistant and soil stabilizing because of its deep taproot system. It tree is a nitrogen-fixing plant and the most important forage tree of much of dryland Africa. In some Sahel countries, the tree plays a significant role in tribal customs and traditional laws. In traditional medicine, the bark, fruits and leaves are used against headaches, colds and stomachaches.



Figure 186 *Acacia albida*

***Acacia brevispica* Harms**

KENTEFA, KONTEVL, MEZAZIGN, MEZEZIYO (Amh); wait-a-bit thorn (Eng); AME-ZAZE, HAMARECHA, SOKEUSA, QWANTA (Oro); FURGORI, QORQOR (Som); GWEMORIYYA (Wol).

A tree or more often a shrub, up to 7 m high, forming thickets, or scrambling over other plants; bark light grey to pale brown; young stems green, hairy and often zig-zag; prickles mostly hooked and scattered along the stems. Leaves compound with 3-8 pairs of pinnae. Flowers white or cream, fragrant and borne in round heads on branching stalks up to 12 cm; fruit a pod, which is usually straight to 15 cm long and reddish brown in colour at maturity. It is propagated from seeds and seedlings.

Growing in dry area forming thickets together with other shrubs and trees in bush-land and scrub, at altitudes between 900-2000 m, in many floristic regions, and also

widespread in tropical and southern Africa.

Flowering in September and October, the plant is a good source of nectar and pollen and the flower structure is well adapted for *Apis mellifera jementica*. It is a good honey source plant in pastoral and agropastoral areas of semiarid and arid agro-ecologies. It is also a source of firewood, medicine (roots), fodder (pods and leaves) and used as live fence.



Figure 187 *Acacia brevispica*

***Acacia dolichocephala* Harms**

LAFTO (Oro); GUGANTA (Wol).

A tree or shrub 3-10 m high; branchlets glabrous; stipular prickles up to 5 mm long; bark dark-brown to black and rough. Leaves compound with 12-35 pairs of pinnae. Flowers bright yellow, borne in large heads on long peduncles.

Growing in woodland and grassland, often at lake margins and riversides, at altitudes between 1100 and 2200 m, in Gojam, Shewa, Arsi, Gamo Gofa and Sidamo floristic regions, and also in Sudan, Uganda, Kenya and Tanzania. It is propagated from seeds.

Flowering in September and October and producing very sweetly scented flowers, it is a major pollen and nectar source plant for honeybees.

The wood is used for firewood and charcoal and individual trees of the species are also left as agroforestry trees on farmlands.



Figure 188 *Acacia dolichocephala*

Acacia etbaica Schweinf.

AJJO (Ala); DERIE, DORET, QERETA (Amh); BATE, DODOTA, DODOTI (Oro); QURACH, SUGSUG, YUBA (Som); SERAW (Sah & Tig); CHIGINDA (Wol).

Tree 4.5-9 m high; young branchlets pubescent to puberulous; prickles in pairs, re-curved, up to 3 mm long. Leaves compound with pinnae 4-8 mm. Flowers white and borne in long spikes, which are clothed in yellow indumentum. Fruit a pod, straight or slightly curved.

Growing in woodland and wooded grassland, at altitudes between 1700 and 2100 m, in Gondar, Gojam, Shewa, Kefa, Sidamo and Harerge floristic regions, and also in Sudan, Uganda and Kenya.

Flowering from August to October, the tree is a potential honey source plant providing honeybees with nectar and pollen. This species has repeatedly been reported by the beekeepers about the quality of the honey produced and as a major honey source plant in semiarid agro-ecologies.



Figure 189 *Acacia etbaica*

Acacia lahai Steud. & Hochst. ex Benth.

WTTIE, CHEBA (Amh); red thorn acacia (Eng); QERETOR (Gam); BURQUQQE, DEROT, GARBI, LAFTO, SONDI (Oro).

A tree growing up to 15 m high; bark grey to dark brown, usually straight, rough, grooved; branchlets brown purple and hairy; prickles usually straight, grey brown, to 7 cm. Leaves compound with 2-8 cm long leaf stalk and 6-15 pairs of pinnae. Flowers creamy white and arranged in up to 8 cm long spikes that cover branches. It is propagated from seeds and seedlings.

Growing in upland woodland and scrub, wooded grassland and woodland of cool, moist areas, at altitudes between 1700 and 2600 m, in Welo, Gojam, Welega, Shewa, Kefa and Harerge floristic regions, and also in Eriteria, Kenya, Uganda and Tanzania.

Flowering during dry period, the tree is a major honey source for lowland areas and the honey is white in colour and granulation is rapid.

The other uses of the tree include firewood, charcoal, timber, posts and nitrogen fixation.



Figure 190 *Acacia lahai*

***Acacia mellifera* (Vahl) Benth.**

ANKUY QONTR, QONTR, SBANSA (Amh); hook-thorn (Eng); ATNKUY, SABANSA, HARAGMA (Oro); ADAL, BLAL (Som); QUENTB, QENTBI, QENTIBA (Tig).

A shrub or small tree, growing up to 8 m high; young branchlets brownish and pubescent or glabrous; bark grey-brown, smooth with white lenticels; prickles arranged in pairs, hooked and up to 5 mm long. Leaves compound, with 2-3 pairs of pinnae and leaflets 1-2 pairs, obovate. Flowers fragrant, cream to white and arranged in long spikes. It is often an indicator of overgrazing and spreading very rapidly, both from seeds and vegetatively.

Growing in deciduous bushland, dry scrub, often forming thickets and overgrazed areas, at altitudes between 400 and 2500 m, in Welo, Shewa, Kefa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also from Eritrea and Egypt south to Tanzania and in Angola and Namibia, and also in Arabia.

Flowering from May to August, the species is very useful for beekeeping in arid and semi-arid climates. Honeybees forage vigorously abundant pollen and nectar from

the flowers from late morning to mid afternoon. The honey is colourless with a slow granulation and the tree is an important source of honey at lower and medium altitudes.

The wood is generally used for fuel and charcoal. The wood has also been used as spear shafts and in construction of hut frames and the branches as walking sticks. The branches are widely used to make fences and a fibre is made from the bark. The leaves, flowers, pods and branchlets are browsed by goats, sheep and game animals.



Figure 191 *Acacia mellifera*

***Acacia nilotica* (L.) Willd. ex Del.**

ALARO (Amh); Egyptian thorn (Eng); BURQUQE (Oro).

A tree 2.5-14 m high; bark on trunk rough brown-black, fissured; branchlets glabrous to tomentose; prickles up to 8 cm long. Leaves compound with 2-11 pairs of pinnae, borne on leaf stalk. Flowers bright yellow, fragrant and arranged in heads. Pods straight to slightly curved and indehiscent.

A common tree growing in arid and semi-arid areas in scrub, at altitudes between 600 and 1700 m, in Shewa, Arsi, Kefa, Gamo Gofa, Sidamo and Harerge floristic regions, and also in Eritrea, Sudan, Egypt and westwards to Senegal.

Flowering from April to May, the plant is a potent pollen source for honeybees.



Figure 192 *Acacia nilotica*

***Acacia oerfota* (Forssk.) Schweinf.**

CHELEGMA (Agew); AJO, WANAGYO (Oro); GUMERO (Som); GAMROT (Tig).

A shrub or tree growing up to 5 m high and often branched from the base; young branchlets yellowish–green, globrous to spreading pubescent and prickles straight. Leaves compound, with leaflets of 5-16 pairs. Flowers whitish, or greenish, aggregated into heads. The plant produces pungent smell when the bark is peeled. It can be propagated from seeds and seedlings.

Growing in deciduous bushland, semi-desert scrub and at margins of lakes, at altitudes between 1000 and 1600 m, in Afar, Tigray, Welo, Shewa, Sidamo, Bale and Harerge floristic regions, and also in Eritrea, Egypt, Sudan, Somalia, Uganda, Kenya, Tanzania and in Arabia.

Flowering in September and October, the flowers are highly foraged by honeybees for the abundant nectar and pollen. The plant is an important source of honey in semiarid agro-ecologies of the country and honey from the plant is reported to be white and easily granulated.

The plant is also used for firewood, charcoal, and an extract of the bark is used to treat rheumatism and the wood is used in making hut frames. It is also used for animal fodder (leaves and pods), nitrogen fixation, soil conservation (riverbanks), wind-break, gum, dye (seeds), live fence and tooth brushes.



Figure 193 *Acacia oerfota*

Acacia pilispina Pic-Serm.

ACQ-GRAR (Amh); LAFTO (Oro); CHE'A (Tig).

A shrub or tree 1-15 m high, with brownish young branchlets, which are densely clothed with long grey to yellowish spreading hairs; trunk usually short and sloping to one side and forming branches from near the base; prickles straight or nearly so and 1 cm long. Leaves with pinnae mostly 5-10 pairs and leaflets 12-23 pairs. Flowers white or cream and arranged in heads. Pods slightly woody, straight or slightly curved and longitudinally veined. It is propagated from seeds and seedlings.

Growing in woodland, wooded grassland and bushland, at altitudes between 1650 and 3100 m, in Tigray, Gondar, Welo, Gojam, Shewa and Harerge floristic regions, and also in Tanzania, Zambia, Malawi and Mozambique.

Flowering over a long period from July to December, the species is a potential pollen and nectar source for honeybees. Honeybees forage for the adequate nectar and pollen from the flowers. It seems the tree yields enough nectar to contribute to mixed honey. In the dry season, trees can be found completely covered in blossoms and sweetly scented.



Figure 194 *Acacia pilispina*

***Acacia polyacantha* Willd.**

GMARDA (Amh); GWMERO (Tig).

A tree up to 20 m high; young branches pubescent or puberulous; prickles in pairs. Leaves with 13-60 pairs of pinnae; leaflets 25-68 pairs, usually only the midrib visible beneath. Flowers yellowish-white, sessile and arranged in long spikes.

Growing in wooded grassland, deciduous woodland and bushland, riverine and ground water forest, at altitudes between 500 and 1600 m, in Tigray, Gondar, Gojam, Shewa, Ilubabor, Kefa, Gamo Gofa and Sidamo floristic regions, and also widespread in tropical Africa.

Flowering twice a year, in September and October and also in April and May, the plant is a potent nectar and pollen source for honeybees and beekeepers reported that honey is harvested from the trees during its peak flowering time. Honey is white in colour.

A species has many uses, including as firewood and charcoal, as a source of salt substitute and its gums are used in confectionary and adhesives.



Figure 95 *Acacia polyacantha*

***Acacia senegal* (L.) Willd.**

GIARI, QONTIR (Amh); AKKRSA (Gam); MAHARA (Kun); QARXAFFA, SAPHANSA (Oro); ADAD, ADADI-MERU (Som); QENTIBA, QENTIBI (Tig).

A shrub or small tree growing up to 10 m high; branchlets subglabrous to densely pubescent; bark grey to brown or blackish; prickles borne just below the nodes, in threes with the middle one hooked downwards and the lateral ones curved upwards. Leaves compound with 3-8 pairs of pinnae, which are linear to elliptic-oblong. Flowers white or cream, fragrant and borne on long spikes. It can be propagated from seeds and wildings.

Growing in deciduous bushland and wooded grassland, deciduous bushland and dry scrub, at altitudes between 600 and 1700 m, in many floristic regions, and also widespread in tropical Africa.

Flowering from August to October, honeybees collect nectar and pollen from the tree and it is a major honey source plant in arid and semiarid parts of the country, including the rift valley. Honey from this plant is light brown and abundantly produced in arid and semiarid agro-ecologies, particularly in the lowlands of Bale during April to May. The honey from this plant has low moisture content (17.5-18.5%) and granulation is very rapid.

The tree yields commercial gum arabic and a strong rope can be made from the bark fibers. The wood from the tree is used for tool handles. The young foliage makes good forage for livestock. It is useful for afforestation of arid environment, soil reclamation and as windbreaks.



Figure 196 *Acacia senegal*

***Acacia seyal* Del.**

MAKANI, ADIQENTO (Afa); CGINDA (Gam); WACHU, WAJJI, WAKKO-DIMO, WASIYA (Oro); AFLO (Sah); FULAÄY, JIIQ (Som); QEYHYH-CHE'A, SA'DA-CHE'A (Tig).

A shrub or small tree growing up to 9 m high; bark red-brown to greenish; prickles up to 8 cm long, straight, sometimes fused into "ant-galls". Leaves dark green, compound and bipinnate with 3 to 10 pairs of leaflets. Flowers fragrant, bright yellow and arranged in heads, usually appearing before the leaves. It is propagated from seeds.

Growing in woodland, wooded grassland and also found as a shade tree on farmlands, at altitudes between 1200 and 2100 m, in most floristic regions, and also widespread in northern tropical Africa, extending to Egypt.

Flowering from August to February, honeybees collect nectar and abundant pollen from the flowers frequently and under favourable conditions and in numerous population stands, the tree is a valuable honey source plant in arid and semi-arid regions. The aroma of the honey is said to be mild and it is recommended for planting to increase honey production.

Leaves, young shoots and pods are very valuable browse for livestock. The wood is very suitable for firewood and charcoal as well as for making tools. The bark and gum have medicinal uses and a red dye can also be extracted from the bark. An edible medium-quality gum is produced which, in the Sudan, shares ten percent of the annually exported gum arabic



Figure 197 *Acacia seyal*

***Acacia sieberiana* DC.**

DEWENI-BUNNA (Gur); BURQUQQE (Oro); CERIN (Som); CEA (Tig).

A tree 3-18 m high, young branchlets glabrous to tomentose; prickles up to 9 cm long, straight. Leaves with pinnae 8-35 pairs; leaflets 13-45 pairs. Flowers white or very pale yellow and borne in heads.

Growing in deciduous woodland and riverine forest, at altitudes between 500 and 2200 m, in Welo, Shewa, Welega, Illubabor, Kefa and Sidamo floristic regions, and also from Eritrea and Sudan to Senegal in the west and southwards to Malawi and Mozambique.

Flowering from October to December, the plant provides pollen and nectar for honeybees.



Figure 198 *Acacia sieberiana*

***Acacia tortilis* (Forssk.) Hayne**

BEHBAY (Afa); GIRAR (Amh); umbrella thorn (Eng); TEDECHA (Oro); AQBA, TSA'DA-AQBA (Tig).

A tree 4-15 m high, mostly with flat crown and spreading or rounded; bark grey-brown and fissured when mature; prickles in pairs, some short, hooked and up to 5 mm long mixed with other straight slender ones up to 10 cm long. Leaves with 2-10 pairs of pinnae on a short stalk, with lealets 6-22 pairs. Flowers whitish, fragrant, borne in heads.

Growing in woodland, wooded grassland and dry scrub, at altitudes between 600 and 1900 m, in Afar, Tigray, Welo, Shewa, Arsi, Bale and Hargee floristic regions, and also in upland Eritrea, Sudan, Somalia and southwards to southern tropical Africa. It can be propagated from seeds and seedlings.

The flowering time of this plant is variable depending on agro-ecology, mostly flowering in April and May but in the lowlands of Borana it flowers during December to February. It is a pollen and nectar source for honeybees and honey from this plant is white, easily granulated and commonly harvested in the central rift valley and Borana

area of the country. The honey has a very characteristic aroma. Granulation is relatively slow with a coarse crystallization. The tree is also used for firewood, charcoal, timber, poles, posts, fodder, soil conservation and nitrogen fixation.



Figure 199 *Acacia tortilis*

***Albizia grandibracteata* Taub.**

ADEWO (Anu); ELELE, KOFALE (Oro).

A deciduous tree; bark smooth; young branchlets with short, dense and spreading pubescence, slowly becoming glabrescent. Leaves with (1-)2-3 pairs of pinnae and each pinna broadening upwards; leaflets 3-6 pairs, obliquely rhombic to obovate. Flowers pink to white. It is propagated from seedlings and wildings.

Growing in rainforest and riverine forest, at altitudes between 1200 and 1700 m, in Welega, Shewa, Iluababor, Kefa and Sidamo floristic regions, and also in Sudan, Uganda, Kenya and Tanzania .

Honeybees collect a large quantity of pollen and nectar from the flowers. Honey from *Albizia grandibrcteata* is pale yellow with strong flavour.

The tree is also used for firewood, farm tools, medicine, ornamental, mulch and nitrogen fixation.



Figure 200 *Albizia grandibracteata*

***Albizia malacophylla* (A. Rich.) Walp.**

CGONO, NFFASIA, HAMASERRANA (Tig).

A deciduous tree reaching 25 m; bark grey-violet with rusty-brown breathing pores. Leaves compound with oblong or elliptic-oblong leaflets. Flowers greenish-yellow, fragrant and borne in brush heads on a stalk, short-lived.

Growing in wooded grassland and riverine forest, at altitudes between 500 and 2200 m, in Tigray, Gondar, Gojam, Welega and Ilubabor floristic regions, and also in upland Eritrea, Sudan, Uganda and wetwards to West Africa. It can be propagated from seeds and seedlings. Seedlings are easily raised from seeds and germination is quick.

Honeybees collect the abundant nectar and pollen very frequently throughout the day. In dense stands, the bees will produce a surplus honey. The wood is yellowish-brown and moderately hard. It is fairly durable and commonly used for making tools and suitable for plywood. It is sometimes used for firewood, and charcoal making and timber production. It is a useful tree for shade in coffee plantations and for soil conservation measures at altitudes between 1400 and 2000 m.



Figure 201 *Albizia malacophylla*

***Albizia schimperiana* Oliv.**

SESA (Amh); AMBABESSA, MUKKA-ARBA, SANKILE, YUNGO (Oro); CATTO (Kaf).

A tree with umbrella-shaped crown; bark smooth, grey or sometimes brownish. Leaves with 2-7 pairs of pinnae and 6-21 pairs of leaflets. Flowers white or pale yellow. Seedlings are easily raised from seeds and germination is quick. I

Growing in Afromontane rainforests, riverine forests and evergreen bushland, at altitudes between 1600 and 2600 m, in nearly all floristic regions, and also in Sudan, Somalia, Kenya, Uganda, Tanzania, Mozambique, Malawi, Zambia and Zimbabwe.

It is often left as a single tree in farmland and used for hanging beehives in the branches. In afforestation programmes, a mixture with *Cordia africana* and *Millettia ferruginea* is advisable because of attack of moth larvae.

Flowering from January to May, honeybees collect abundant nectar and pollen from the flowers very frequently throughout the day. In dense stands, the bees produce even a surplus of honey and the species contributes to mixed honey in the western part of the country.



Figure 202 *Albizia schimperiana*

***Dichrostachys cinerea* (L.) Wight & Arn.**

ADER, ERGETT-DIMMO (Amh); ADESA, HATTE, JIRME, WORSAMESA (Oro); DHIGDAR, GALOOL-SUR (Som); GONNOK (Tig).

A small shrubby tree growing up to 6 m high; bark grey, thick and armed with spines terminating short lateral twigs. Leaves bipinnate with many pairs of leaflets. Flowers borne in characteristic bicoloured cylindrical, dense, petioled, pendulous spikes and fragrant; the two-coloured spikes are with pink upper half and yellow lower.

Growing in areas with strong seasonal climate, usually on poor, occasionally clay soils, in woodland, bushland and thickets, at altitudes between 400 and 2000 m, in nearly all floristic regions, and also native to Djibouti, Somalia and from Eritrea and Sudan west to Nigeria and Ghana and south to South Africa and Swaziland and also Madagascar. It also occurs in Arabia, tropical Asia and Australia. It can be propagated from seeds and seedlings.

Flowering nearly all year round but mainly from September to May, the plant is a good source of pollen for honeybees and it is frequently visited during dry period. It is common bee forage in arid and semiarid parts of the country and is adapted to *Apis mellifera jementica*.



Figure 203 *Dichrostachys cinerea*

***Mimosa invisa* Mart. ex Colla**

ESSWARWOD (Som).

A shrub or prostrate herb densely armed with recurved prickles, growing upto 6 m high. Leaves sensitive to touch and moving violently. Flowers pale pink, arranged in sub-globose heads.

It is widespread in western parts of Ethiopia where it grows along roadsides, river banks and as live fence, at altitudes between 1400 and 2200 m, in Illubabor and Kefa floristic regions. It is native in tropical America.

Flowering from May to October, honeybees collect large quantity of pollen loads from the flowers during sunny days, and it is one of the major pollen sources for brood rearing.



Figure 204 *Mimosa invisa*



***Prosopis juliflora* (Sw.) DC.**

Honey mesquite (Eng).

A shrub or an evergreen tree with a large crown, growing to a height of 5-10 m; stem greenish-brown, resinuous and twisted, with prickles situated on both sides of the nodes and branches; bark somewhat rough and thick, greenish-grey and becoming scaly with age. Leaves compound with 13-25 pairs of leaflets that are oblong. Flowers golden-yellow, fragrant and borne in densely crowded 5-10 cm long spikes. It is propagation from seeds, root cuttings and grafting.

It is an introduced and naturalized species, which is salt-tolerant, growing near water-holes and along wadis, at altitude from sea level to 1700 m, in Tigray, Afar, Welo, She-wa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also widely cultivated in the tropics for shade, timber and forage but native of South America.

Flowering in April and May, this species is a major honey source in Ethiopia (Afar) due to its very copious nectar flow. Because of a recent colonization of Afar Region by this species, a lot of bee swarms are produced in rock cavities resulting in high populations of bee colonies in the Region. A light amber-coloured honey is produced fetching good price with good flavour.

Even though the species is considered an aggressive weed and an invasive alien species, it has a strong apicultural value for production of high quality honey. Its wood is excellent for firewood and charcoal. Seasoned wood is used for fence posts, furniture and crafts. It is planted as windbreaks and shelterbelts. It is also suitable for soil conservation because it is an aggressive colonizer, tolerant of very poor, degraded soils. Despite being a very notorious invasive alien species, it has many uses. The sweet pods are edible, which are pounded into flour and used for making flat bread. The leaves and pods are browsed by goats, sheep and camels. This species is also reported to have medicinal uses and edible lipids can be extracted from the seeds.



Figure 205 *Prosopis juliflora*

FABACEAE-PAPILIONOIDEAE

Adenocarpus mannii (Hook.f.) Hook.f.

A shrub up to 4-5 m high; stems much branched, densely pilose. Leaves clustered on short shoots, shortly petiolate. Flowers bright yellow, borne in dense, many-flowered terminal racemes. Fruit pods, straight with a short downward pointing beak, rough with projecting glands.

Growing in upland grassland and scrub and forest margins, at altitudes between 2900 and 3300 m, in Shewa, Kefa and Sidamo floristic regions, and also widespread in tropical Africa.

Flowering from September to October, it is a pollen source plant for the honeybees.



Figure 206 *Adenocarpus mannii*

***Argyrobium ramosissimum* Bak.**

GERENGERE (Amh).

A perennial herb with numerous woody spreading or ascending stems, 10-70 cm high. Leaves compound with oblanceolate to obovate leaflets covered in scattered hairs. Flowers yellow, borne in subumbelliform racemes, on long peduncles.

Growing in upland grassland, bushland and forest margins, at altitudes between 2000 and 3600 m, in most floristic regions of Ethiopia, and also in west Kenya.

Flowering from June to November sometimes forming dense carpets on the ground, honeybees collect pollen and nectar from the flowers frequently.



Figure 207 *Argyrobium ramosissimum*

***Cajanus cajan* (L.) Millsp.**

YE'RGB-ATER, YEWEF-ATER (Amh); pigeon pea (Eng); GITEE (Had); OHO-TA-FARENGOTA (Kon); SALBOKO-GED (Som); AFWA-ATERIYA, KAFO-ATARA (Wol).

A perennial herb or shrub, 1-2 m high with erect stems, which are ribbed and densely pubescent, dotted with breathing pores. Leaves compound, bearing elliptic to lanceolate leaflets. Flowers yellow.

It is cultivated for its edible seeds and an important plant in soil and water conservation work throughout the medium altitudes, and also growing as an escape at altitudes between 1000 and 2400 m, in Gondar, Gojam, Shewa, Kefa, Gamo Gofa,

Sidamo, Bale and Harerge floristic regions, and also in upland Eritrea and cultivated throughout the tropics but not known in the wild state.

It flowers from September to October and may stay flowering longer whenever there is moisture. The flowers are pollinated by honeybees and carpenter bees, though commonly visited by honeybees for nectar and pollen. The plant is used as a feed for domestic animals.



Figure 208 *Cajanus cajan*

***Crotalaria incana* L.**

HAWWI-LEYTI (Tig).

An annual or a short-lived perennial, up to 1.5 m tall; stems with spreading pilose hairs or shortly pubescent. Leaves copmound with three leaflets, which are narrowly obovate to suborbicular and glabrous above, but subglabrous to thinly pilose beneath. Flowers with standard elliptic, with yellow and purplish veins; keel bent at right-angles in the lower half, 8-11.5 mm long, with a straight untwisted beak.

Growing in bushland, grassland and on disturbed ground, at altitudes between 1300 and 1900 m, in almost all floristic regions, and it also occurs in other parts of the tropics but native in tropical America.

It profusely flowers after main rainy season and honeybees collect pollen and nectar from the flowers.



Figure 209 *Crotalaria incana*

***Crotalaria petitiana* (A. Rich.) Walp**

An erect herb 0.5-2 m tall; branches short pubescent. Leaves with three narrowly lanceolate to broadly elliptic leaflets; stipules absent. Flowers yellow with brown veins and arranged in pedunculate many-flowered racemes, with long bracts and bracteoles.

Growing in grassland, forest edges, swamp margins and on cultivated grounds at altitudes between 1780 and 2500 m, in Tigray, Gondar and Gojam floristic regions, and also in Sudan, Uganda, Kenya, Tanzania and Dem Rep. Congo.

Flowering in September and October, the flowers are rarely visited by honeybees for pollen but frequently visited by carpenter bees.



Figure 210 *Crotalaria petitiana*

***Cytisus proliferus* L.f. (syn. *Chamaecytisus proliferus* (L. f.) Link)**

Tree lucerne (Eng).

A fast growing shrub or small tree, with long, drooping, branches, often planted for forage, growing up to 4 metres high. Leaves compound, alternate, borne on short stalks, dark- green and bearing three leaflets. Flowers white and pea-lik and borne in clusters on short twigs.

Introduced as a hedge plant from the Canary Islands, but it is now found in waste places near habitation, in most parts of Ethiopia. It is also grown in moist and dry highlands, at altitudes between 1700 and 3300 m. It can be propagated from seedlings. The plant is a potential source of pollen and nectar for honeybees. It is visited during the rainy season and highly recommended for planting around apiary to prevent starvation of honeybees during rainy season.

Other uses of the shrub or tree include firewood, fodder (leaves and pods), mulch, nitrogen fixation, soil conservation, windbreak and live fence.



Figure 211 *Cytisus proliferus*

***Desmodium velutinum* (Willd.) DC.**

A perennial herb or shrub growing up to 3 m high; stem branched, densely pubescent. Leaflet single, thick, sub-orbicular to elliptic. Flowers white to pink or purple corolla and borne in a dense leafy panicle or raceme, with primary and secondary bracts.

Growing in grassland and woodland, at an altitudes of about 1200 m, in Welega, Iluba-

bor, Kefa and Gamo Gofa floristic regions, and also widespread in Africa, Madagascar, South East Asia and Malaysia.

Flowering from September to October, the plant is a minor source of nectar and pollen for honeybees.



Figure 212 *Desmodium velutinum*

***Desmodium uncinatum* (Jacq.) DC.**

Silver leaf desmodium, silverleaf Spanish clover (Eng).

A scrambling herb with ascending flowering stems; stems densely covered with hooked hairs. Leaves with three leaflets, which are usually marked along the midrib above, narrowly ovate, acute and pubescent or pilose on both sides. Flowers white and borne in lax, unbranched racemes. Fruit strongly attached to animal skin and human clothing.

It is cultivated experimentally as forage or as a cover crop at least in Arsi, Kefa and Sidamo floristic regions, and naturalised along roadsides and at forest margins, e.g. in Ilubabor (Yayu Forest) but native of tropical America.

Flowering in September and October, honeybees collect nectar and little pollen from the flowers during peak flowering period. It is also used as animal forage and for increasing soil fertility. The species may turn out invasive in the southwest.



Figure 213 *Desmodium uncinatum*

***Erythrina abyssinica* Lam.**

KORCH (Amh); BORTO (Gam); WOLENSU (Oro).

A shrub or tree to 10 m tall; branchlets prickly, at first tomentose, later glabrescent. Leaves compound with leaflets usually broadly ovate or rhomboid. Flowers red to orange in dense erect, cone-like inflorescences. Fruit pods that are woody, 4-16 cm long, strongly constricted between the seeds.

Growing in grassland, woodland, forest edges and rocky places, at altitudes between 1300 and 2400 m, in almost all floristic regions, and also widespread in eastern tropical Africa south to Zimbabwe and Angola.

The plant provides nectar and pollen for honeybees during dry periods. The tree is widely used to form live fences around homesteads. A brown dye can be extracted from the bark.



Figure 214 *Erythrina abyssinica*

***Erythrina brucei* Schweinf.**

KORCH, QUARA (Amh); KOLLACHO (Kaf); WOLLESU (Oro).

A deciduous tree up to 5-20 m high with single trunk; bark thick, corky, dark brown; branches prickly. Leaves compound with three oval leaflets up to 23 x 16 cm, acuminate at the tip. Flowers orange-red and occasionally light-yellow, in large racemes borne on bare tree. It can be grown easily from cuttings and is used to form live fences in both urban and rural areas.

An endemic tree growing at edges and in open places of upland forests or woodlands, at altitudes between 1400 and 2600 m, in nearly all floristic regions.

Flowering from October to February, the tree produces a large quantity of nectar and less pollen for honeybees. Because of high volume of nectar, the flowers are visited by sunbirds, weavils and other birds.

The wood is very soft and hollowed out stems are used for traditional beehives, mortar and drums, and the species is also used in traditional medicine.



Figure 215 *Erythrina brucei*

***Glycine max* (L.) Merr.**

AKURIATER (Amh); soy, soya bean, soybean (Eng).

An annual herb 20-200 cm high. Leaves compound with leaflets ovate to lanceolate. Flowers white or lilac and born in 5-8 flowered racemes.

It is cultivated for its edible oily seeds, which are rich in protein and also as a fodder and green manure. It has been grown experimentally at a number of medium altitude locations in Shewa and on some State Farms, particularly in Gojam. The soya bean probably originated from East Asia where its wild relatives are found.

Flowering in September and October, the flowers are occasionally visited by honeybees for pollen.



Figure 216 *Glycine max*

Glycine wightii (Wight & Arn.) Verdc.

YEAYIT JORO (Amh); glycine (Eng); GURAA HANTUTA (Oro).

A climbing perennial herb, stems glabrescent to densely velvety, growing up to 3 m high. Leaves pinnately compound with ovate to elliptic trifoliate leaflets. Flowers white with lilac spots, usually drying orange and arranged in many-flowered racemes. Growing in grassland, woodland and sometimes in cultivations, at altitudes between 400-2600 m, in all floristic regions and also widespread in tropical Africa and Arabia. Flowering throughout the year, honeybees collect nectar and pollen from the flowers, which are excellent sources of dry season honeybee forage. The herb is also used as animal feed.



Figure 217 *Glycine wightii*

Indigofera schimperi Jaub. & Spach

AGAGARO, AWAER (Som).

A shrubby perennial up to 1.5 m tall, silvery pubescent. Leaves compound with rachis up to 6 cm long, alternate, elliptic or obovate. Flowers redish purple and borne in many-flowered racemes.

Growing in grassland, bushland, woodland and seasonally swampy places, at altitudes between 300 and 1600 m, in Tigray, Gondar, Shewa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also widespread in tropical Africa and South Africa.

Flowering from September to November and the plant is a pollen source for hon-



Figure 218 *Indigofera schimperi*

Lablab purpureus (L.) Sweet

YEAMORA GUAYA (Amh); bonavist, hyacinth bean, lablab (Eng); OKALA (Kon).

A climbing perennial herb with pubescent or glabrous stems growing to 2 m. Leaves compound with ovate- triangular leaflets. Flowers white or crimson purple, arranged in axillary racemose inflorescences.

Growing in grassland, bushland and gallery forest and also cultivated for animal forage seeds and as a hedging plant or for its edible seeds, at altitudes between 400-2400 m, in nearly all floristic regions, and also in Eritrea, throughout tropical Africa and Cape Province of South Africa.

Flowering from October to April, honeybees gather both pollen and nectar and they are important pollinators for seed production.



Figure 219 *Lablab purpureus*

***Lathyrus sativus* L.**

GUAYA (Amh & Gur); chickling vetch, grass pea (Eng); GAYAA, GAYOO (Oro); SEBERERE (Sah & Tig).

A glabrous annual herb 30-60 cm high. Leaves with two narrowly elliptic-oblong leaflets. Flowers violet-blue or white.

The herb is cultivated for its edible seeds and fodder at medium altitudes up to 2200 m, mainly in the highlands north and east of the Rift Valley, including Harerge Floristic Region.

It flowers from September and November. Honey from the herb is light golden or golden-yellow and usually harvested in December from vertisols of the central highlands and granulation is medium.

If the grass pea exceeds 30 percent of the diet, it severely affects the nervous system resulting in paralysis.



Figure 220 *Lathyrus sativus*

***Leucaena leucocephala* (Lam.) De Wit**

Lead tree (Eng); LUKINA (Amh, Oro & Tig)

Shrub or small tree; young branchlets densely grey puberulous. Leaves with pinnae 3-7 pairs; leaflets obliquely oblong-lanceolate, acute at apex, puberulous on margins and sometimes also on midrib beneath. Flowers white with hairy anthers.

Cultivated in Welo, Harerge, Kefa, Gomo Gofa and sometimes naturalized, and widespread in the tropics, native in the New World. Widely planted in Ethiopia in soil and water conservation programmes, at lower altitudes and it is suitable for animal forage.

The plant provides nectar and pollen for honeybee and it is appropriate for dry season since it flowers during early dry season of the year.



Figure 221 *Leucaena leucocephala*

***Lotus discolor* E. Mey.**

A perennial woody herb or creeping in its lower portion and ascending and growing up to 1 m high in its upper part, much branched. Leaves compound with leaflets very variable in size and shape, but mostly ovate to oblanceolate, hairy. Flowers white with pink markings and aggregated at ends of the branches.

Growing in upland grassland, scrub and forest edges, at altitudes between 2000 and 4000 m, in most floristic regions and also widespread in tropical and southern Africa. Flowering from September to November, the herb is a pollen and nectar source for honeybees.



Figure 222 *Lotus discolor*

***Lupinus angustifolius* L.**

GBTO (Amh); white lupin (Eng); GBSO (Tig).

A shortly hairy annual 20-80 cm tall. Leaves with linear to linear-spathulate leaflets, which are -glabrous above. Flowers bright blue, alternate and borne in 10-20 cm long racemes.

Introduced for cultivation as a forage crop in Arsi Floristic Region at intermediate altitudes, and also cultivated elsewhere for forage but native to the Mediterranean region.

It flowers after the main rainy season in September and October and provides bees with nectar and pollen. The honey bees contribute for the pollination, increasing seed set and weight



Figure 223 *Lupinus angustifolius*

***Medicago sativa* L.**

Alfalfa, lucerne (Eng); Lucern (Ger).

A perennial herb with much branched, erect or sometimes decumbent stems, 0.3–1 m high. Leaves pinnately trifoliolate; leaflets obovate-oblong. Flowers purplish-blue, borne in racemes of 5-40 flowers.

The herb is cultivated for fodder in the highlands and under irrigation also in more arid areas down to 350 m. The plant is a potential source of nectar and pollen and with high sugar concentration that ranges from 28.4 to 44.4%. Its honey is light, hardly affected by heating and its flavour is mild. Honeybees also contribute for higher seed set and the percentage increment in seed set is 60-70%. It is highly recommended to plant around apiary for honey and seed production.



Figure 224 *Medicago sativa*

***Melilotus alba* Desr.**

White melilot, white sweet clover (Eng); stel nkee (Ger).

An erect annual or a long-lived perennial woody herb, growing up to 1 m high. Leaves 3-foliolate with toothed margins. Flowers white, strongly scented and borne in many-flowered racemes. All parts of the plant smell strongly of coumarin.

Growing in cultivated or disturbed ground, at altitudes of about 2000 m, in Shewa and Harerge floristic regions, and also in Europe and Asia, but introduced in East Africa and elsewhere.

Flowering from June to February, honeybees collect nectar and pollen from the flowers.

The plant is used for nitrogen fixation and as animal fodder. The shoots are also used in making paper pulp elsewhere.



Figure 225 *Melilotus alba*

***Melilotus suaveolens* Ledeb.**

White melilot (Eng); stel nkee (Ger).

An erect annual herb often more than 1 m high. Leaves trifoliate; leaflets oblong with toothed margins. Flowers yellow, strongly scented, borne in many-flowered racemes. All parts of the plant smell strongly of coumarin.

Growing in grassland, disturbed areas and as a weed of cultivated land, at altitudes between 1500 and 2600 m, in most floristic regions, and also in Eritrea, Tanzania, India and north Asia. A drought resistant plant used to improve and protect the soil.

It widely grows in cultivated or disturbed grounds, at altitudes between 1500 and 2600 m, in Shewa and Harerge floristic regions, and also in East Africa and elsewhere but it is native in Europe and Asia.

The plant provides flowers when there is enough water, and it stays in flower for more than 4-6 months. It is a major source of nectar and pollen for honeybees and highly recommended to be planted around apiary for dry season bee forage and honey production.



Figure 226 *Melilotus suaveolens*

***Millettia ferruginea* (Hochst.) Bak.**

BRBIRA (Amh, Gur & Tig); ASRA, DEDATU (Ged); ZAGYA, ZAGIE (Gof & Wol); BILEWU-HAQA (Had); BIBERO, YAGO (Kaf); RENGAZENA (Kam); SOTELLI, YAGOY (Mes); AKSIRA, ASRA, BIRBIRA, DEDATU, KARCECCE, KOTELLU, NGDICCO, SARI, SOTELLU, YAGO (Oro); ZIYAG, ZIYAGU (She); 'NGEDICCO (Sid).

A large tree up to 35 m high; bark smooth and grey. Leaves compound, bearing up to 13 pairs of leaflets plus one at the tip, each leaflet to 9 cm long with pointed tip and hairy below. Flowers violet, large, borne on up to 30 cm long stalk. It is propagated from seeds and seedlings.

An endemic tree growing in upland forests, rain forests and forest remnants, at altitudes between 1000 and 2500 m, in Tigray, Gondar, Gojam, Shewa, Welega, Ilubabor, Kefa, Sidamo, Bale and Harerge floristic regions.

Flowering from December to January, the flowers are occasionally visited by honeybees for nectar and pollen but much more visited by carpenter bees because of the hard corolla of the flowers. The species is an important shade tree grown for coffee shade by peasant farmers in southern and southwestern Ethiopia and also for agro-forestry. The wood is used to make farm tools and firewood, the seeds are used to poison fish while the roots are used for treating Elephantiasis and wet Eczema.



Figure 227 *Millettia ferruginea*

***Phaseolus vulgaris* L.**

ADENGWARE (Amh, Gur, Oro & Tig); GOBBO (Kaf); common or french or green or haricot or kidney bean (Eng).

An annual climber or suberect herb densely branched up to 2 m. Leaves compound with ovate leaflets. Flowers whitish-green or pink, small.

It is commonly cultivated throughout the mid-altitudes of Ethiopia and almost naturalized in many localities. It is native in America and now cultivated throughout the world.

Flowering in September and October, the flowers are sweet-scented and honeybees collect copious nectar and pollen from the flowers. It is a major honey source plant in its distribution area. The beans are edible and sometimes used for animal feed.



Figure 228 *Phaseolus vulgaris*

***Pisum sativum* L.**

ATER (Amh); pea (Eng); ATERE (Gof); ATERE, GISHEWE (Gur); ATERO, GITEE (Had); ATARO, GISHI-SHAATO (Kaf); ATARA, ATERA DONGOLO, DANGULLE (Oro); AYNI-ATER (Tig); ATARA, ATERIYYA (Wol).

A cultivated annual herb growing up to 1 m high. Leaves opposite, ovate, bearing tendrils. Flowers pink with black markings.

Growing mainly in Tigray and Wello but known also from Shewa, Arsi, Bale and Harerge floristic regions.

Flowering in September and October, it is visited by honeybees for pollen only.



Figure 229 *Pisum sativum*

***Psophocarpus grandiflorus* Wilczek**

A perennial climbing herb growing up to 5 m. Leaves compound with ovate leaflets. Flowers blue and borne in long racemes. Pods square in cross-section, prominently winged.

Growing in upland bushland, forest and grassland and occasionally cultivated, at altitudes between 1600 and 2300 m, in Welega, Kefa and Sidamo floristic regions, and also in Uganda and Dem. Rep. Congo.

Flowering in September and October, the flowers are visited by honeybees for pollen and nectar. The plant is also visited by carpenter bees and stingless bees.



Figure 230 *Psophocarpus grandiflorus*

***Sesbania sesban* (L.) Merr.**

ALQM, BOFEFFIE (Amh); HARCHA, INCHINI (Oro); GETBEYO, HALEMBALBYOT (Som); SHAHSHAHTA, TETEM-AGAZEN (Tig).

A deciduous shrub or small tree growing up to 8 m high; bark reddish brown; young shoots hairy. Leaves compound, with 10-25 pairs of leaflets that are oblong with notched narrow tip. Flowers yellow or pale yellow speckled maroon.

Growing by streams and on the borders of freshwater lakes, at altitudes between 300 and 2000 m, throughout Ethiopia, and also in Eritrea, Somalia and west to Lake Chad and south to Natal.

Flowering in August and September, the flowers are rarely visited by honeybees for pollen and nectar because of hard corolla, which is easily handled by the stronger carpenter bees.

It is also used for firewood, nitrogen fixation, animal forage, shade, mulch, fibre and soap.



Figure 231 *Sesbania sesban*

***Tephrosia vogelii* Hook.f.**

YEJIB ATER (Amh).

A shrubby herb or shrub growing up to 4 m high. Leaves compound with 10-25 cm long rachis; leaflets elliptic oblong or elliptic-oblongate. Flowers white, or purple in dense rusty tomentose, long pendunculate inflorescences. Fruit flat and rusty hairy. It grows in forest margin and wasteland and also cultivated, at altitudes between 1800 and 2000 m, in Shewa, Kefa and Harerge floristic regions, and it also occurs throughout tropical Africa. It is usually cultivated for fish poison.

Flowering in September and October, the flowers are occasionally visited by honeybees and most frequently by carpenter bees.

Elsewhere insecticides and molluscicides have been extracted from the leaves and essential oils from the roots. It has been used as wind break and for erosion control.



Figure 232 *Tephrosia vogelii*

Trifolium acaule Steud. ex A. Rich.

AMAGET (Amh); SIDISSA (Oro).

A rhizomatous perennial herb with taproot. Leaves trifoliolate with narrowly to broadly obcordate leaflets. Flowers lilac to blue-violet and borne in 1-5-flowered heads.

A very common plant found in fields, particularly in fallow, throughout the wetter and cooler highlands. It is also an important pasture plant, growing in short grass and rock crevices, at altitudes between 2500 and 4200 m, in most floristic regions, and also in upland Eritrea and along the border between Uganda and Kenya.

Flowering from June to December, honeybees collect nectar and pollen and the plant is an important honey source in mountainous areas of Ethiopia.

In local medicine, the plant is used to treat elephantiasis.



Figure 233 *Trifolium acaule*

***Trifolium ruppellianum* Fresen.**

AMAGET (Amh); AMAQETA, SIDISA (Oro).

A creeping annual herb growing up to 20 cm long. Leaves ovate, opposite with entire margins. Flowers pink and borne in heads.

Growing in upland grassland, at altitudes between 1700 and 3650 m, in Ethiopian Highlands (Ethiopia and Eritrea), and also widespread in tropical Africa.

Flowering profusely during September and October, the herb is a major honey source plant in the highlands. It contributes for honey production in association with other plant species and the honey fetches higher price in local markets.



Figure 234 *Trifolium ruppellianum*

***Trifolium steudneri* Schweinf.**

AMAGET (Amh); SIDISSA (Oro).

An annual herb growing to 60 cm high. Leaves pinnately compound; leaflets narrowly elliptic, to 4 cm long. Flowers purplish, arranged in globose heads of up to 20 mm across.

Growing in upland grassland and bushland, especially in damp places, at altitudes between 1100 and 2800 m, in Tigray, Gondar, Welo, Gojam, Shewa, Arsi and Kefa floristic regions, and also in upland Eritrea, Uganda and Kenya.

Flowering from August to October, honeybees forage for the copious nectar and some pollen.



Figure 235 *Trifolium steudneri*

***Vicia sativa* L.**

Vetch (Eng); wickel (Ger).

A straggling or ascending annual up to 80 cm long. Leaves compound with leaflets linear to obovate in 6-16 pairs. Flowers solitary, corolla purplish, arranged in elongated racemes with up to 30 flowers.

Cultivated for forage and fodder in the highlands in most floristic regions and also in upland Eritrea and widespread in E and N Africa, Europe to India. This is a drought-tolerant crop that is very palatable to livestock.

Flowering from April to December, honeybees collect nectar and pollen from the flowers and the herb is a major honey source in the highlands of the country.



Figure 236 *Vicia sativa*

Vigna membranacea A. Rich.

KACHE (Oro); NTRTAROT (Tig).

A creeping or climbing annual or perennial herb. Leaves opposite, ovate to oblong. Flowers pink.

Growing in grassland, bushland and woodland, at altitudes between 100 and 2400 m, in almost all floristic regions, and also in Eritrea, Sudan, Uganda, Kenya and Tanzania.

The herb is a pollen source for honeybees. The plant is also used for animal fattening.



Figure 237 *Vigna membranacea*

GUTTIFERAE

The family comprises trees, shrubs, herbs or (rarely) woody climbers, often containing resins which make the plant aromatic. Leaves opposite, simple, with venation flabellate or pinnate, and usually with glands or resin canals seen as translucent spots or streaks, margin entire or rarely with a fringe of glands; stipules almost always absent. Flowers regular, bisexual or polygamous to unisexual; stamens basically of two whorls or fascicles, the outer often sterile or absent, the inner free or with filaments variously united, or rarely each fascicle reduced to a single stamen. Fruit capsular and dehiscent septically (very rarely also loculicidally) or indehiscent and either a berry or a drupe. Seeds sometimes arillate or winged.

A family of about 45 genera and 1,100 species, widely distributed in tropical regions, with two genera also in the temperate zone. In Ethiopia, there are three genera and 13 species (including subspecies).

The important bee forage species in this family is *Hypericum revolutum*, which is attractive to honeybees and considered a potential honey source in highlands of Bale Floristic Region.

Hypericum quartinianum A. Rich.

AMIJA (Amh); RIGA GANZI, ULLE FONI (Oro).

A shrub or small tree 3–4 m high. Leaves simple, opposite, ovate, grey-green, clasping the stem at the base and the tip pointed. Flowers bright yellow, rather few in terminal bunches, with many yellow stamens. Fruit a dry brown capsule, breaking open to set free seeds when ripe.

Growing in rocky places, gulleys and river banks in upland grassland or deciduous woodland, at altitudes between 1500 and 3000 m, throughout the highlands of Ethiopia, and also in eastern Africa, from Ethiopia to Zambia, Malawi and Mozambique, and also in Yemen.

The flowers are sources of pollen and nectar for honeybees. Honey from this plant is golden and produced in Bale Mountains.

It is also important as browse species for mountain nyala.



Figure 238 *Hypericum quartianum*

***Hypericum revolutum* Vahl**

AMIJA (Amh); curry bush, giant St. John's wort (Eng); EDERA, GARAMBA, GORGORA FONI, HINE (Oro); AWIDI (Tig).

A shrub or occasionally a small tree, which can reach 10 m in height; bark reddish-brown and scaly; young stems 4-angled. Leaves opposite, closely spaced and crowded at the ends of branches. Flowers terminal, solitary, showy, bright yellow, with central mass of stamens and the sepals are edged with black dots.

Growing in open forest, forest margins, montane grassland, often with *Erica arborea* and/or *Hagenia abyssinica*, at altitudes between 2250 and 3700 m, in nearly all floristic regions, and also in upland Eritrea, eastern Africa from Ethiopia to Cape province, also in Nigeria and Cameroon, and in SW Arabia.

Flowering from June to November, the plant provides both nectar and pollen for honeybees. The plant is one of the major sources of honey in high altitude areas of Bale mountains. The honey produced from this species is reported to be golden in colour with strong flavour. It is important to conserve the existing *Hypericum* woodland for sustainable honey production from this species.

It is also used as firewood, timber and for soil conservation.



Figure 239 *Hypericum revolutum*

HYDROPHYLLACEAE

It is composed of annual or perennial herbs, sometimes under shrubs, often scabrid. Leaves usually alternate or radical, entire to deeply pinnately or palmately lobed; stipules absent. Flowers regular, in scorpioid or 3-branched cymes, false racemes or clustered, less often solitary, bearing often blue corolla, which is variously shaped with usually five (or rarely 8-12) lobes; stamens as many as the corolla lobes, inserted low in the tube. Fruit a capsule, usually loculicidal, less often septicidal, 2-valved or splitting irregularly releasing oblong, globose or angled seeds with tuberculate, reticulate or rugose testa.

The family is composed of about 18 genera with about 300 species, mainly American. No member of the family was recorded from Ethiopia before (see Flora of Ethiopia and Eritrea, Volume 5, p. 63). *Phacelia tancetifolia* has now been found cultivated in Addis Ababa and Holeta, which is a major nectar source for honeybees and also used as green manure.

***Phacelia tanacetifolia* Benth.**

Phacelia (Eng); buschelsschon (Ger).

An introduced cultivated annual herb growing up to 40-70 cm high, with hairy stems which are hollow and much-branched. Leaves opposite, compound with leaflets. Flowers purplish-pink and arranged in conspicuous heads.

Grown at altitudes between 1600 and 2400 m, in most apiaries and private gardens, becoming naturalized, and also widely distributed in temperate countries but native in California.

It flowers all year round under irrigation conditions. The plant is a potent nectar and pollen source. Nectar secretion is high and usually ranges from 0.80-85 micron and sugar concentration ranges from 40-43%. The pollen load from the flower is dull brown or dark blue. The honey potential is usually 5-9 kg per colony and honey is light green and granulation is rapid. The plant is also used for soil fertility and mulching.



Figure 240 *Phacelia tanacetifolia*

LAMIACEAE

The family is composed of herbs, subshrubs or less often shrubs or trees, usually pubescent with glandular hairs; plants often sweet- or spicy-smelling when crushed. Leaves decussate, sometimes whorled, or scattered; blade mostly simple and toothed, sometimes pinnately lobed or palmately compound. Inflorescence thyrsoid with

(1-)2(-3) cymes per node or racemoid, unbranched or branched, lax to dense and sometimes head-like; bracts similar to or distinct from the ordinary leaves. Flowers pedicellate or sessile, bisexual or sometimes female, bearing united petals with (3-)4-5-lobes, corolla slightly to strongly bilaterally symmetrical, mostly distinctly 2-lipped, sometimes apparently 1-lipped; stamens four or rarely two. Fruit dry or sometimes fleshy, separating into four (or fewer, due to abortion) nutlets (mericarps), or not separating.

A family of about 236 genera and 7,200 species, cosmopolitan in warm and temperate parts of the world. In Ethiopia, there are 44 genera and 194 species (including subspecies).

The important plant species for honeybee forage are *Becium grandiflorum*, *Hoslundia opposita*, *Leonotis ocymifolia* and *Ocimum basilicum*, and honey from *Becium grandiflorum* is well known from Tigray and Welo.

***Achyrospermum schimperi* (Hochst. ex Briq.) Perkins**

ONGOOG, ONGOK (Mej); BALADALECHA (Oro).

A subshrub or woody perennial herb growing to 2 m high. Leaves broadly elliptic or narrowly ovate. Flowers purple or white, arranged in dense terminal spikes.

Growing in partial shade, in forests or at forest margins, in bushland and coffee plantations, at altitudes between 1600 and 2900 m, in most floristic regions, and also in East Africa and perhaps also in other parts of the continent.

Honeybees collect large quantity of pollen from the elongated flowers, and the subshrub is a minor honey source plant in the country.



Figure 241 *Phacelia tanacetifolia*

Agastache foniculum (Pursh) Kantze

Agiatoch (Eng).

An annual herb growing up to 80 cm high. Leaves opposite, aromatic. Flowers bluish pink and arranged in long spikes.

It was introduced from the temperate region for bee forage and now naturalized and found along roadsides and as an ornamental plant in homegardens and mostly grown in apiary for its nectar and pollen supply.



Figure 242 *Agastache foniculum*

Becium grandiflorum (Lam.) Pic.Serm.

METETA (Agew); MADUSSIEI, MENTESA, TEHATIS, YEDEGA-MINTSE (Amh); ACHA (Gum); ISKEE, TABAB, TEHAG (Tig).

A small aromatic woody herb or shrub growing to 1.5 m high, with light brown bark. Leaves light green with a slightly toothed margin and a fairly strong acid smell when crushed. Flowers pale pink with violet veins, large and arranged in terminal inflorescences.

The species is endemic to the Ethiopian Highlands (Ethiopia and Eritrea), growing on eroded soils, particularly in rocky slopes and sandy ground, in montane bushland and pastures, at altitudes between 1600 and 3100 m, in Tigray, Gondar, Welo, Shewa, Welega and Sidamo floristic regions of Ethiopia, and also in upland Eritrea.

Flowering throughout the year but more profusely after the short rains, honeybees visit the flowers for pollen and nectar. The flowers have a very pleasant sweet scent, a bit like honey. The plant is particularly important as a honey source in the northern part of Ethiopia. Honey from this plant is creamy white and granulates rapidly. Because of its attractive colour, honey is preferred by consumers as it is also light to eat and it fetches a premium price in both local and international markets. It is recommended to plant the shrub around apiary to increase honey production.

In local medicine, the herb is used against malaria. The whole flower is plucked from a branch and eaten fresh. Farmers and other experienced people stated that when eating this flower one's stomach will get filled up that it makes ideal food stuff for long journeys on foot.



Figure 243 *Becium grandiflorum*

Clerodendrum alatum Gürke

MSIRICH (Amh).

An erect perennial herb up to 1.5 m; stems usually unbranched with longitudinal ridges. Leaves in whorls of three, sessile, lanceolate to oblanceolate, sometimes rounded at base. Flowers bluish with deep violet lower lobe.

Growing in wooded grassland, at altitudes between 500 and 1700 m, in Gojam, Welega and Illuabor floristic regions, and also in Sudan, Tanzania, Dem. Rep. Congo, Nigeria, Cameroon and Ivory Coast.

The flowers are visited by honeybees for nectar and pollen.



Figure 244 *Clerodendrum alatum*

Clerodendrum myricoides (Hochst.) Vatke

MSIRICH (Amh); DUMPAKEN (Ari); AGHIO (Kaf); PASHUN (Bod); ADITIRRO, MARACHISSA, MARASSISA, SOYAMA HARMAL (Oro); MEDSISA (Sid); TIRRO (Som); SURLIBATRI (Tig).

An herb or sometimes a subshrub, usually aromatic. Leaves opposite, rarely whorled or alternate, simple to pinnately dissected or compound. Flowers generally arranged in compound inflorescences, but sometimes solitary and axillary, subtended by leaves or bracts and equipped with long anthers.

Growing in grassland, bushland, woodland, gallery forests, roadsides, rocky outcrops, lava plains and termite hills, at altitudes between 700 and 2600 m, in nearly all floristic regions and also in Eritrea and most parts of Africa, to Nigeria in the west and South Africa in the south and also in Madagascar.

It has a very long flowering season with flowers seen nearly all year round, and the flowers are visited by honeybees for nectar and pollen. The herb is also medicinal against snake bite.



Figure 245 *Clerodendrum myricoides*

***Hoslundia opposita* Vahl**

MANKOCH (Bod); QORSA/QORICHA MICHII (Oro).

A subshrub or weak shrub, growing up to 1 m high with the stem sparsely branched toward the apex. Leaves ovate to narrowly ovate, sessile to shortly petiolate. Flowers whitish-green, borne in cymose inflorescences, which are usually with several rather short branches.

Growing in open woodland and bushland, at altitudes between 900 and 2200 m, in most floristic regions, and also widespread in tropical and southern Africa.

Flowering in September and October, honeybees collect light green pollen loads

from the flowers. It is recommended for planting in degraded area to increase honey production and for environmental re-habilitation.



Figure 246 *Hoslundia opposita*

***Lavandula angustifolia* Miller**

Lavandula (Eng).

A subshrub or perennial herb, up to about 8 cm tall, with strong fragrance, and a greyish indumentum of short branched hairs. Leaves sessile, unlobed, linear or narrowly oblanceolate, with entire or revolute margins. Flowers bluish violet and arranged in thyrsoid inflorescences that are long and usually rather dense.

Cultivated ornamental at about 2400 m, in Shewa Floristic Region (Addis Ababa) but native in southern Europe, often cultivated elsewhere as an ornamental or for production of essential oils.

The plant remains in flower for 3-4 months with continuous supply of water. It provides both nectar and pollen, especially during dry period. An estimated hundred bees can be at work simultaneously on each lavandula plant. This activity is due to the strong secretion of nectar. Honey from lavandula is famous for its high quality. It has a clear, almost white with pleasant taste and fineness of crystallization. The honey is excellent for health and anti-inflammatory respiratory and antispasm virtues have been attributed to it.



Figure 247 *Lavandula angustifolia*

***Leonotis ocymifolia* (Burm. f.) Guerke**

RAS KIMIR, YEFERES ZENG (Amh).

An erect and stiff woody herb or shrub up to 3 m tall. Leaves ovate, apex acuminate or acute, with a strong smell when crushed. Flowers orange and borne in whorls.

Growing often in rocky outcrops on shallow soil, in montane forest margins, grassland often on disturbed grounds, roadside and abandoned cultivations, at altitudes between 500 and 3700 m, throughout Ethiopia, and also in upland Eritrea and from East Africa to South Africa.

Flowering from October to March, the flowers secrete abundant nectar but produce little pollen and they are highly visited by honeybees and sunbirds.

In local medicine, the leaves are used against hookworm and the roots are used against gout, leishmaniasis and MISHIRO NEKERSA.



Figure 248 *Leonotis ocymifolia*

***Leucas abyssinica* (Benth.) Briq.**

DERTA, CHIDAM (Amh); KERTA TUME (Oro); DULULU, DULULO, GAMO DERI, GEED-CAD, YIBLULA, YILLUA, WEYLOWAD, XARMO-XARMOOD (Som).

A shrub up to 2.5 m tall; stems covered with white hairs. Leaves sessile or subsessile, opposite, linear to narrowly obovate. Flowers white and borne at the end of the branches in up to 70 cm long numerous verticils.

Growing in montane bushland, along roadside and in degraded mountain sides, at altitudes between (700-)1300 and 2600 (-3000) m, in most floristic regions, and also in Eritrea and Somalia.

Flowering in September and October; honeybees collect nectar and pollen from the flowers.



Figure 249 *Leucas abyssinica*

***Leucas calostachys* Oliv.**

BAISIISHIL (Ari); KIZA (Gur); BELBELETE, DARGU (Oro).

A subshrub up to 3 m tall. Leaves sessile to shortly petiolate, elliptic, ovate or obovate. Flowers white and arranged in spike-like terminal racemes bearing 6-25 flowers. Growing in montane grassland, bushland and rocky slopes, at altitudes between 1000 and 2500 m, in Shewa, Welege, Kefa and Sidamo floristic regions, and also in South Sudan, East Africa, Rwanda and Burundi.

Flowering in November and December, it is a pollen and nectar source for honeybees.



Figure 250 *Leucas calostachys*

***Ocimum basilicum* L.**

AJUBAN, ASHKUTI, ATUMBAR, BESOBILLA, HULKOT, TIQR ASHKUTI, ZQAQEBI (Amh); KARKO (Ben); basil, sweet basil (Eng); DIRO, KEFO (Kaf); GOYDE (Mej); KASI, KEFO, KENDAMA, ZAHAHENE (Oro); REHAN (Som); SESAG, SESAK (Tig).

An annual or short-lived perennial herb, woody or slightly fleshy at the base, sparsely pubescent. Leaves shallowly and remotely crenate-serrate or subentire. Flowers white to lilac and scented, borne in rather dense and much branched short spikes.

Cultivated from sea level to 2600 m, in Welo and Shewa floristic regions, and probably also in other floristic regions of Ethiopia, and also in Eritrea, and also widely cultivated in tropical to temperate regions.

Flowering throughout the year, honeybees collect nectar and pollen from the flowers. The leaves and flowers are used to flavour BERBERE and WOT.



Figure 251 *Ocimum basilicum*

Ocimum lamiifolium Hochst. ex Benth.

ANCHEBA, DAMMAKESSIE, YAHEYA ZIQAQEBA (Amh); KUKO (GUM); HANCH-ABI, QORSA/QORICHA MICHII (Oro); DAMACHU, DAMAKHER (Tig).

An erect, robust branching aromatic shrub or shrubby herb growing up to 3 m high. Leaves simple, opposite, ovate. Flowers pinkish, arranged in racemes and located at the end of the branches.

It is commonly growing in clearings and at edges of primary and secondary mountain forests and bushland, tall grassland, abandoned fields and rarely also cultivated as an ornamental, at altitudes between 1200 and 2900 m, in nearly all floristic regions, and also in upland Eritrea, East Africa to Malawi, and Cameroon.

Flowering from April to December, honeybees collect pollen and nectar from the flowers frequently. The leaves are used against eye diseases and headache.



Figure 252 *Ocimum lamiifolium*

***Ocimum urticifolium* Roth**

ANTEN BIYE (Age); DAMAKASSE, YECHAKA BESOBILLA (Amh); BAKILA (Bod); DAMAKSE (Had); DAMO, SHOBO (Kaf); ANCHABI, CHEBICHA, ENNA, HANCHABI, KORSА/KORICHA MICHI (Oro).

An herb or a shrub growing up to 2 m high; stems and branches usually 4-angled. Leaves opposite, rarely whorled or alternate. Flowers light green or orange, generally arranged in terminal panicles.

Growing in forest clearings and at edges of primary and secondary mountain forests and bushland, abandoned fields, and also cultivated as an ornamental, at altitudes between 1200 and 2900 m, in most floristic regions, and also in upland Eritrea, East Africa to Malawi and Cameruoон.

Flowering in September and October, honeybees forage for nectar and pollen and the plant is one of the potential honey sources in the country.

The plant is used for making torch for new year celebrations and for firewood.



Figure 253 *Ocimum urticifolium*

Otostegia fruticosa (Forssk.) Schweinf. ex Penzig.

GERAMTUNGUT (AMH); TUNGIT (Oro); FESIHADIMA, SASA (Tig); MIKIYA (Wol).

A shrub with woody pubescent branchlets. Leaves very small, thick, oblong, with obtuse apex and crenate margins. Flowers with funnel-shaped white corolla, with yellow-orange lower lip, densely pubescent.

Growing in rocky slopes, montane bushland and deciduous woodland, at altitudes between 1000 and 2500 m, in Tigray, Gondar and Shewa floristic regions, and also in Sudan, Cameroon and the Arabian Peninsula.

Flowering throughout the year, the shrub is a major source of nectar in high altitude areas of the country for honey production. It is also an important source of pollen for maintaining honeybee colonies during dry period.

The plant is also used for smoking and making torch for new year celebrations.



Figure 254 *Otostegia fruticosa*

Otostegia tomentosa A. Rich.

GERAM TUNGUT, NECHITA, TUNGUT (Amh).

A medium-sized shrub growing up to 3 m high. Leaves lanceolate. Flowers white, funnel-shaped, scented.

Growing in semiarid bushland and woodland, clearings, fallowlands, rocky slopes and roadsides, at altitudes from sea level to 2800 m, in Shewa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions and also in Eritrea, eastern part of Africa, from Egypt to Transvaal in South Africa, Namibia and Arabia.

Flowering from September to November, the flowers are visited by honeybees for nectar and pollen and honey from this plant is not reported but the shrub contributes for honey production in association with other plants flowering in the same season. The roots are used in local medicine against bloat.



Figure 255 *Otostegia tomentosa*

***Plectranthus barbatus* Andrews**

AGWASHIR, YEFİYEL DOQA, YEFİYEL DUBA, YEMARIAYAM-WEHA-QEJI (Amh); DUKARU, KARIKA (Ari); TAKANECH (Bod); GEED-HAWLEED, HARAMO, MAR-QO MAYDH (Som).

A perennial, more or less succulent aromatic herb, or shrub, 0.3 to 4 m high, often decumbent at the base and more or less woody; rootstock woody and on occasions tuberous. Leaves narrowly ovate. Flowers blue, borne in terminal whorls of pseudo-racemes.

Growing in grassland, dry open woodland, scrub, rocky slopes and in degraded open bushland, at altitudes between 900 and 2800 m, in Tigray, Shewa, Welega, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also widespread in tropical Africa and in the Arabian Peninsula.

Flowering in September and October, the flowers are frequently visited by honeybees for pollen and nectar.



Figure 256 *Plectranthus barbatus*

***Plectranthus edulis* (Vatke) Agnew**

OROMO DINICH, YEWOLAITA DINICH (Amh); BUNDUNKE (Gum); DINCHO (Had); AJO (Kaf); AJAYA, DAUNECH, DINICHA OROMO, DINICHA-WELAMO, DONIKE, WALAITA DINCHOUA (Oro); WALAITA DONNUA (Wol).

A large, erect aromatic annual herb, up to 1 m high; stems glandular and rooting at the base with swollen nodes, in some strains producing edible underground potato-like tubers on slender rhizomes. Leaves elliptic-lanceolate. Flowers blue, borne in terminal, 10-20 cm long spikes.

Commonly cultivated for its edible tubers, but also growing in marshy areas, at altitudes between 1300 and 2600 m, in Gondar, Ilobabor, Welega, Kefa, Sidamo and Harerge floristic regions, and also widespread in E Africa and in Dem. Rep. Congo. Flowering in September and October, the plant provides pollen and nectar for honeybees. The tubers are edible.



Figure 257 *Plectranthus edulis*

Plectranthus garckeanus (Vatke) J.K. Morton

DENOGGULE (Amh); YIERO (Kaf); AJAYA, AJESSA, GOGORO (Oro).

A coarse aromatic perennial herb, 0.5-3 m high, with unpleasant smell; stems shortly glandular-pubescent, branched, woody at the base. Leaves lanceolate with acuminate apex, petiolate and up to 15 cm long, with toothed margins. Flowers bright blue, funnel-shaped and borne in long, terminal panicles.

An endemic species growing in montane forest, forest edges and in thickets and often forming a dense mass, at altitudes between 1700 and 2700 m, in Gondar, Gojam, She-wa, Ansi, Kefa, Sidamo and Bale floristic regions.

Flowering in September and October, honeybees collect nectar and pollen from the flowers. Nectar secretion of the flowers is very high and honeybees were observed sipping nectar from the bottom of the corolla through holes made by carpenter bees.



Figure 258 *Plectranthus garckeanus*

Plectranthus lanuginosus (Hochst. ex Benth.) Agnew
AGASHUR (Amh); DHALEOL (Som); ANDEFDEF, ZOMER (Tig).

An aromatic coarse perennial herb, erect or decumbent at the base and sometimes producing small tubers, 0.3-2 m high. Leaves very variable, ovate to lanceolate, abruptly cuneate (rarely slightly cordate) into petiole, crenate along the margins, usually acute at the apex, thick and more or less fleshy. Flowers purple-blue, borne in terminal pseudoracemes, which are dense when young, elongating and interrupted in fruit. Growing in rocky and stony places in grassland, scrub and woodland, at altitudes between 400- 3400 m, in most floristic regions, and also widespread in Eritrea, eastern Africa south to Tanzania and Rwanda and also in Yemen.

Flowering in September and October, honeybees collect nectar from the tubular flowers.



Figure 259 *Plectranthus garckeanus*

***Plectranthus punctatus* (L.f.) L'Herit.**

DEMBO (Amh); BUDUNKH (Ben); MOTJO (Kaf).

A branched annual, pubescent herb 15 to 75 cm high, with weak stem covered with weak hairs and often with long branches. Leaves ovate to ovate-elliptic, obtuse, cuneate, upper leaves sessile but lower ones shortly petiolate. Flowers light blue, borne in terminal and axillary dense spikes.

Growing in swampy area and along roadside, as a weed, in open ground by streams and forest edges, at altitudes between 1300 and 3200 m, in nearly all floristic regions, and also widespread in East Africa and the mountains of west Africa.

Flowering in September and October it is a pollen and nectar source for honeybees



Figure 260 *Plectranthus punctatus*

***Premna schimperi* Engl.**

CHOCHO (Amh); CHOCHI, TWANGE, URGESSA, WEGESA (Oro).

A small spreading shrub or tree to 5-7 m high; young branchlets densely hairy. Leaves opposite, broadly ovate, yellow-green above, pale beneath, aromatic. Flowers greenish-white, very small but numerous, tubular and swollen at the base and arranged in a branched terminal panicle.

Growing in degraded and secondary forests, grassy meadows and along paths in forests, at altitudes between 1350 and 2400 m, in most floristic regions, and also in Sudan, Kenya and Tanzania.

Flowering throughout the year, it is a nectar and pollen source plant for honeybees. The plant is also used for firewood, charcoal, medicine and fencing material.



Figure 261 *Premna schimperi*

***Pycnostachys eminii* Guerke**

ASHOAL (Had).

An erect woody perennial herb or a shrub, growing to 3 m high. Leaves narrowly ovate with distinct scent when crushed. Flowers blue to violet, arranged in terminal spikes.

Growing in wooded or grassy slopes, waste ground and sometimes cultivated as hedge-plant, at altitudes between 1600 and 2400 m, in Shewa, Arsi, Welega, Ilubabor, Kefa, Gamo Gofa and Sidamo floristic regions, and also widespread in tropical Africa. Flowering from March to November, the herb is a good source of pollen and nectar and extremely foraged by honeybees during peak flowering time.



Figure 262 *Pycnostachys eminii*

***Salvia tiliifolia* Vahl**

An annual herb growing up to 30-80 cm high. Leaves petiolate, broadly ovate to oblate, base broadly cuneate or truncate, apex acuminate and crenate at the margins. Flowers with the corolla 5-7 mm long, light blue with almost equally long lips, and a lax inflorescence bearing thin thyrses, which are often wide and extending to near the base of the plant.

An introduced species growing in hill slopes near road in woodlands, at altitudes between 1700 and 2500 m, in Welo and Shewa floristic regions, but indigenous in Central America. It is wide spread as a weed occurring in many other parts of the world. It was reported as introduced to Ethiopia in the 1980s, which is now spreading vigorously and replacing native herbs at some sites.

Flowering from August to September, the flowers are frequently visited by honeybees for nectar and pollen.



Figure 263 *Salvia tiliifolia*

***Salvia leucantha* Cav.**

Mexican bush sage (Eng).

A subshrub or perennial ornamental herb, growing upto 40-100 cm and much branched, densely pubescent with white hairs. Leaves lanceolate, densely pubescent, often whitish beneath, base rounded, crenate at the margins and apex acute. Flowers whitish pink. or pale violet

It is cultivated as an ornamental and often naturalized in the wetter regions of the Flora area, at altitudes between 1800 and 2800 m, in most floristic regions, and also in upland Eritrea and elsewhere but native in Mexico.

Flowering all year round, it is an excellent source of bee forage during dry period. Nectar is collected by honeybees through a hole made by carpenter bees.



Figure 264 *Salvia leucantha*

Salvia merjamie Forssk.

ABBA DABBO, JEWALA, TOLELAT, YEWUSHA DINBELAL (Amh); GEED CARRO (Som); ENDADE-WALCHA, INTATII-WALKA, NTATI-UALACHA, NTATI-UAICHA (Tig).

Perennial herb with a woody rootstock, growing to 60-70 cm high. Leaves in a basal rosette and along the stems, shortly petiolate to sessile, oblong, elliptic or ovate, irregularly crenate to pinnately lobed along the margins. Flowers bluish violet, purple or white.

Growing in grassland, open shrub or woodland, bare ground, often on roadsides or hillsides, at altitudes between 1700 and 4200 m, in Tigray, Gondar, Welo, Gojam, She-wa, Arsi and Bale floristic regions, and also in upland Eritrea, Somalia, Kenya, Uganda, Tanzania and Yemen.

Flowering from September to November, the plant is a nectar and pollen source for honeybees. This plant is an important honey source in high altitude areas of the country.



Figure 265 *Salvia merjamie*

Satureja paradoxa (Vatke) Engl. ex Seybold

NADDO, ZENADDAN (Amh); CHAJ (Ben); NADDO (Kaf).

An herb with weak stem with runners, 20 to 40 cm high. Leaves elliptic with undu-

late-crenate margins. Flowers violet to pink and borne in head-like axillary, apparently terminal head-like clusters.

An endemic species growing in masses along stream banks and on moist soils in open and shady grassland, in forests or rarely as a weed in tea-plantations, at altitudes between 1300 and 3500 m, in nearly all floristic regions of Ethiopia.

Flowering during and after the rains, honeybees collect pollen and abundant nectar from the flowers frequently, and the plant is a major honey source in the country.



Figure 2.66 *Satureja paradoxa*

LAURACEAE

Members of this family are trees or shrubs, with hard, sometimes unpleasant smelling wood, rarely parasitic herbaceous vines. Leaves alternate, rarely opposite or absent. Inflorescences cymose, umbellate, capitate or paniculate, rarely flowers solitary, mostly bisexual, rarely polygamous or dioecious. Flowers perigynous, with the perianth tube sometimes enlarged in fruit; stamens usually twice the number of perianth segments in four or more whorls. Fruit a berry, drupe or a nut-like structure enclosed in the enlarged calyx tube.

A family of about 50 genera, distributed mainly in the tropics of both the old and the new Worlds. The family is represented by three genera, each with a single species in Ethiopia.

Persea americana (avocado pear) is known as an important source for honey production in Ethiopia, besides its cultivation for its fruits which are becoming increasingly

popular (as fruit and juice) and in international trade as both a fruit and a source of high quality oil.

***Persea americana* Mill.**

AVOCADO (Amh); alligator tree, avocado pear, avocado tree (Eng).

An evergreen tree up to 10 m high, or more with a straight trunk; bark grey brown. Leaves large, up to 20 cm long, leathery, alternate, elliptic, cuneate to rounded at the base, acuminate to acute at the apex. Flowers small, inconspicuous, greenish to cream coloured and borne in large terminal panicles.

It is cultivated for its edible fruit, at altitudes between 1600 and 2400 m, in Welega, Shewa, Arsi, Kefa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also widely cultivated in all warmer parts of the world but originally from Central America.

Flowering in September and October, honeybees collect pollen and nectar from the flowers. Nectar secretion is abundant in favourable conditions but greatly affected by bad climate and low soil moisture. Sugar concentration is medium (44-49%) often preferred by bees as a nectar source. The colour of honey is dark amber and granulation is slow. Honeybee pollination also increases the fruit yield by 10.2-44.4%. It is also used as food (fruit), shade, cosmetics and oil.



Figure 267 *Persea americana*

LINACEAE

The family is composed of herbs or small shrubs. Leaves simple, alternate, opposite or whorled; stipules present or reduced to glands. Inflorescence a terminal or axillary cyme, rarely flowers solitary. Flowers regular, bisexual, with the stamens usually as many as or twice the number of the sepals, filaments united at base. Fruit a capsule or drupe.

A family of about 25 genera and 300 species, nearly cosmopolitan. In Ethiopia, the family is represented by six species belonging to two genera. The most well-known species is *Linum usitatissimum*, which is mostly grown for fibre, linseed meal, livestock feed and fibre. In Ethiopia it is grown since ancient time for oil and bee forage.

Linum usitatissimum L.

TELBA (Amh & Gur); flax (Eng); TALBA (Had, Kaf & Wol); MUTTO (Kaf); MUUTA (me'e); KONTAR, TALBA (Oro); DAADO, HANDHUUDH SHIMBIREED (Som); LINA, NT'ATI (Tig).

An erect annual herb, growing up to 80 cm high. Leaves alternate, linear-lanceolate. Flowers bluish-white, borne in corymbose cymes.

It is cultivated and growing as an escape, often on black cotton soil, at altitudes between 1600 and 3800 m, throughout the highlands, and also widely cultivated in the temperate parts of the Old and New Worlds and on the mountains of the tropics.

Flowering in September and October, a pollen and nectar source plant for honeybees. The bees collect blue pollen loads.

The seeds are used for wound dressing and boiled seeds are also used to treat stomach ulcer in local medicine.



Figure 268 *Linum usitatissimum*

LOGANIACEAE

The family is composed of trees, shrubs, climbers or sometimes herbs. Leaves usually opposite, less often in whorls or subopposite, simple and pinnately veined. Flowers mostly bisexual, 4- or 5-merous, bearing mostly coloured corolla, which is variously shaped. Fruit a berry or a capsule.

The family is composed of 29 genera and about 570 species mainly in the tropics. In Ethiopia, there are four genera and 11 species. *Nuxia congesta* is an important bee forage in this family.

Buddleja davidii Franch.

Butterfly bush (Eng).

A shrub upto 3 m tall, much branched; branchlets more or less 4-angled, stellate-tomentose or glabrescent. Leaves shortly petiolate, narrowly ovate or narrowly elliptic, with serrate to subentire margins, cuneate at the base, acuminate at the apex. Flowers violet or lilac and orange-yellow in the throat.

It is cultivated in Welega, west Shewa and Addis Ababa but native of China. Flowering in December and January, the shrub is one of the major honey source plants in the highlands, and nectar and pollen source for honeybees. It is recommended to plant around apiary for honey production and to maintain honeybee colonies during dry period.



Figure 269 *Buddleja davidii*

***Nuxia congesta* R. Br. ex Fresen.**

ASKWAR, CHECH' IHO, SEGED, TIKUR-ASQUAL (Amh); ATARO (Kaf); ANFARE, BITTEENA, BIXXAANA, DAMMAYYII, IRBBA, KAYYISA, MALQAQQOO , MUKKA-DAAMU, ODESSA, QARXAMMEE, QWWEESSA (Oro); ATKWARO (Tig).

A shrub or small tree 3-15 m high, with the stems 20-60 cm in diameter; bark grey or dark brown, shedding long fibrous strips with age. Leaves rather leathery, dull green scaly, usually in whorls of threes, crowded at the ends of branches. Flowers white, arranged in dense crowded heads at maturity, fragrant and numerous. It is propagated from seeds and seedlings.

Growing in degraded montane *Juniperus-Podocarpus-Olea* forest, particularly at higher altitudes and with *Erica*, degraded woodland and as isolated trees in cultivated fields, and in live fences around houses, at altitudes between (1100-)1500 and 3800 m, in nearly all floristic regions, and also in Eritrea and Somalia west to Gunea, south to Angola, Namibia and South Africa, and also in Saudi Arabia.

Flowering in December and January, the flowers attract honeybees with their rich pollen and nectar during dry period. The shrub/tree is a valuable honey source in mid-altitude areas of the country and at favourable weather conditions, the nectar secretion is high and hence honeybees produce surplus honey. It is also used for firewood, charcoal and medicine.



Figure 270 *Nuxia congesta*

LORANTHACEAE

Members of this family are shrubs or rarely herbs, or seldom trees, semi-parasitic and growing upon the branches of trees and shrubs or they are terrestrial. Stems brittle, not articulated. Leaves alternate or opposite, rarely whorled, simple, fleshy, sometimes deciduous, pinnately or palmately veined; stipules absent. Inflorescences axillary or terminal, racemose or umbellate. The flowers are bisexual or unisexual, regular or somewhat irregular and are often arranged in groups of three or two, lacking petals and the sepals are petal-like; stamens 4 to 6 and opposite the sepals. Fruit a 1-seeded berry with a viscin (sticky) layer outside the vascular cylinder.

The Loranthaceae is a medium-small family with about 65 genera and 900 species which are widespread mostly in tropical and subtropical regions. There are 11 genera and 30 species in Ethiopia.

Oliverella hildebrandtii (Engl.) Tieghem

A small shrub; stem equipped with breathing pores and all parts of the plant are covered with simple hairs. Leaves alternate to opposite and pinnately veined, lanceolate with acute apex. Flowers solitary, corolla red with grey tip on the exterior, interior reddish with dark lobes.

Growing (usually on *Grewia*) in dense *Acacia* bushland with *Dracaena ellenbeckii*, at an altitude of about 1400 m in Sidamo Floristic Region, and also in Kenya and Tanzania. Flowering from September to November, the flowers are sources of nectar and pollen for the honey bees.



Figure 271 *Oliverella hildebrandtii*

Tapinanthus heteromorphus (A. Rich.) Danser

BALEDDO (Oro).

A large semi-parasitic shrub, shoots often tomentose when young, soon glabrescent. Leaves subopposite, lanceolate to ovate, all parts usually densely hairy. Flowers orange-reddish, tubular and aggregated together in leaf axils, usually covered with sparse to dense short-branched red to orange hairs, and arranged in 3-10-flowered umbels.

Growing on *Combretum* and *Terminalia* in broad-leaved deciduous woodland and wooded grassland, at altitudes between 1300 and 1900 m, in Tigray, Welega, Ilubabor, Sidamo and Bale floristic regions, and also in Eritrea, Sudan, Cameroon, Nigeria and Togo.

Flowering almost throughout the year, the flowers secrete abundant nectar. Honey from this plant is reddish in colour. The bark and leaves are used to fumigate cattle for curing from cough.



Figure 272 *Tapinanthus heteromorphus*

LYTHRACEAE (including Punicaceae)

Members of the family are composed of herbs, shrubs and trees. Leaves usually opposite decussate, simple, entire and pinnately veined. Inflorescences usually cymose, sometimes congested into raceme-like thyrses. Flowers bisexual, usually with regular petals, when present, inserted on hypanthium, delicate, often with claw, crumpled in bud, pink to purple or white, soon falling off; stamens usually up to twice as many as sepals, more in some woody genera, inserted on hypanthium, bending inwards. Fruit usually a capsule, often included within hypanthium.

The family comprises about 25 genera and 500-550 species, mostly in the tropics and subtropics, less numerous in the temperate regions. The family is represented in Ethiopia by eight genera and 23 species (including subspecies).

In Ethiopia, the widely cultivated *Punica granatum* is an important pollen source plant for honeybees.

Cuphea micropetala Kunth

An erect perennial herb or subshrub much branched, growing up to 0.5 to 1.2 m high with hollowed stem. Leaves opposite, narrowly elliptic and rough. Flowers or-

ange and tubular with long exerted stamens, solitary in upper leaf axils. The flowers produce an exudate that is a glisten

It is widely grown in homegardens for ornamental purpose, at altitudes between 1650 and 2500 m, in Shewa Floristic Region, and perhaps elsewhere in Ethiopia but native of Mexico, occurring as an escape elsewhere in Africa.



Figure 273 *Cuphea micropetala*

***Punica granatum* L.**

ROMAN (Amh).

A much-branched shrub or small tree growing up to 3 m high; branches sometimes spine-tipped, glabrous throughout. Leaves opposite or sometimes subopposite, oblanceolate to narrowly oblong, without gland dots. Flowers reddish with white anthers, terminal, solitary or in small groups and emerge from leaf axils. Fruit a globose leathery berry, which is red or yellow suffused with red. It can be propagated from seeds and seedlings.

Cultivated mostly in gardens, sometimes in small orchards, at altitudes between 1000 and 2500 m, in Shewa and Kefa floristic regions, and probably elsewhere in Ethiopia, and also in Eritrea and widely grown throughout the drier tropics and subtropics, but native to Turkey, Iran and Afghanistan.

The flowers are pollinated by honeybees and the plant is a potential pollen and nectar source for honeybees.

In local medicine, the leaves are used against liver disorders and the fruit against diarrhea. The plant is very rich in tannins and is used for treating leather. The flesh from the fruit is edible and is used to make juice.



Figure 274 *Punica granatum*

MALPIGHIACEAE

The family is composed of mostly woody climbers, or sometimes shrubs or small trees. They have usually simple oppositely arranged leaves with unusual hairs. The flowers are with glandular sepals and distinct petals, and they are arranged in terminal or axillary racemes, panicles, corymbs, or cymes, bisexual or seldom unisexual. The Malpighiaceae is a medium-large family with 1,200 species in 60 genera which are distributed throughout the tropics and extending into the subtropics and they are very abundant in the New World. In Ethiopia, the family is represented by eight species in four genera.

***Caucanthus auriculatus* (Radlk.) Niedenzu**

GALLE ADDI (Oro).

A climber growing upto 5 m long; younger stems densely covered with short soft hairs while older ones are finely pubescent or glabrous. Leaves ovate with cordate base, membranous pubescent above, grey tomentose beneath and with 2 large glands near the base. Flowers yellow, borne in dense axillary and terminal corymbs, with unpleasant smell.

Growing in deciduous *Acacia* woodland, *Balanites aegyptiaca*-*Ziziphus* woodland, bushland and thickets, often in riparian or rocky places, at altitudes between 1200 and 2000 m, in Welo, Shewa, Arsi, Gamo Gofa, Sidamo, Bale and Harerge floristic regions of Ethiopia, and also in Uganda, Tanzania, Mozambique, Malawi and Zimbabwe.

Flowering from September to December, honeybees collect pollen from the flowers.



Figure 275 *Caucanthus auriculatus*

MALVACEAE

Members of the family include herbs, shrubs and small trees. Leaves alternate, simple, often digitately lobed, rarely divided; stipules present. Flowers solitary or clustered in leaf-axils, often merging into more or less well-defined terminal inflorescences, regular, bisexual; petals 5, free but adnate to staminal column, usually obliquely obovate and retuse to emarginate; stamens 5-many, filaments united into a column around the style. Fruit a capsule or a schizocarp of achenes or follicles around a central columella or indehiscent.

The family comprises about 90 genera and 2,000 species, which are widespread in all tropical, subtropical and temperate regions, but particularly numerous in tropical America and Africa to India. In Ethiopia, there are 17 genera and 136 species.

The introduced *Hibiscus rosa-sinensis* is elsewhere known as a valuable honey plant, whereas the cultivated cotton plants, *Gossypium* species, are known worldwide as major honey sources.

***Abutilon angulatum* (Guill. & Perr.) Mast.**

YEQOLA NECHLO (Amh).

A shrubby herb or shrub growing up to 2 m high and all parts of the plant covered with long and simple hairs. Leaves cordiform, with crenate margins. Flowers yellow to orange, arranged in large terminal and lateral panicles.

Growing along roadsides, in riverbanks, *Acacia* woodland and grassland, open rocky areas and lava flows, and in wasteland, at altitudes between 400 and 3300 m, in most floristic regions, being common in the Rift Valley and Gibe River Valley and it is also widespread in the Mediterranean area.

Flowering from August to November, honeybees forage for pollen and little nectar. Honeybees have been observed collecting yellow pollen loads from the flowers.



Figure 276 *Abutilon angulatum*

***Abutilon mauritianum* (Jacq.) Medic.**

AREZO (Agew); FIEF'NJERA (Amh); KOMPOLTO (Car & Sha); ALKEE, DANNISA, KAASUM (Oro); DANSA (Sid).

A shrubby herb or shrub up to 2.5 m high; all parts pubescent tomentose and with long simple hairs. Leaves ovate to cordiform with broadly denticulate margins. Flowers yellow, borne in leaf axils or on short axillary branches.

Growing in riverine forest and river banks, at altitudes between 1200 and 2200

(-2500) m, in most floristic regions and also widespread in the drier parts of tropical and South Africa and Comoro Islands.

Flowering in September and October, it is a major pollen source plant for honeybees.



Figure 277 *Abutilon mauritianum*

***Alcea rosea* L.**

Holly hock (Eng); stok rose (Ger).

A coarse annual herb growing up to 3 m high, with the stem covered with small hairs. Leaves simple, ovate, soft and hairy. Flowers subsessile, white to pink or violet, arranged in axillary clusters merging into spike like panicles.

It is widely grown for ornamental purpose in parks, hotels and homegardens, at altitudes between 1600 and 2400 m, in Shewa Floristic Region (in and around Addis Ababa), but possibly a hybrid widely cultivated in Europe and often naturalised.

Flowering all year round, the herb is a nectar and pollen source plant for honeybees.



Figure 278 *Alcea rosea*

***Gossypium hirsutum* L.**

TIT (Amh); PODDO (Arb); American upland cotton, cotton (Eng); FUTOTA (Kon); JIRBI (Oro); AFOLA (She); TUT (Tig).

A perennial herb or shrub, growing up to 3 m high; branchlets subglabrous to pilose. Leaves opposite, ovate with cordate base, unlobed or shallowly 3-5-lobed, hairy, pointed at apex. Flowers white to yellow, bisexual with five showy petals.

In Ethiopia, it is widespread growing from sea level to 2000 m, sometimes escaped or growing in abandoned cultivation. Originally from America, now widely cultivated in all tropics and subtropics.

It flowers from September to November. Nectar is secreted at the base of the flowers and there are also extra-floral nectaries and honeybees collect pollen and nectar. The honeybees contribute for the pollination of the crop for better seed yield.



Figure 279 *Gossypium hirsutum*

***Hibiscus berberidifolius* A. Rich.**

BEZEZ (Amh); GAAJOO, HADABOWISSA (Oro).

A stiffly erect shrub to 2.5 m, many-stemmed from base; stems sparsely to densely prickly. Leaves ovate or elliptic to orbicular, subglabrous to pilose on veins. Flowers bright white to pale yellow.

Growing in riverine forest, secondary forest and scrub, mostly at edges of montane bushland and grassland, on roadsides and in old cultivations at altitudes between 1750 and 2650 m in Tigray Gondar, Gojam, Shewa, Welega, Ilubabor, Kefa and Harerge. It is also wide spread in Uganda, Keny, Tanzania and Rwanda.

The brightly colored white flowers attract honeybees for nectar and pollen. Honeybees collect creamy pollen loads from exposed flowers.



Figure 280 *Hibiscus berberidifolius*

***Hibiscus cannabinus* L.**

ORORMAIE (Arb); ARANGALEICIA (Ghe); DANUNU (Oro); KULDENNKHA, LEE-SCIA (She); BALAMBAL, EDI LIBAH (Som); AKOR HARISHM, SGOT (Tig).

A stiffly erect coarse annual herb growing up to 2.5 m high; stems sparsely to densely prickly covered with upward pointed short prickles. Leaves broadly ovate with cordate base, untoothed near the base and deeply 3-7-lobed or almost divided near the apex. Flowers white to pale yellow or greyish, with maroon centre and borne in well defined racemes in leaf axils.

Growing in *Acacia* woodland and *Acacia-Commiphora* bushland on red sand, wooded grassland, on grey to black alluvial soil, swamps, grassland, riverbanks, roadsides and as a weed in irrigated crops, at altitudes between 400 and 1900(-2200) m, in almost all floristic regions, and also in upland Eritrea and widespread in all tropical and sub-tropical regions

Flowering from June to December, honeybees forage for pollen and nectar.



Figure 281 *Hibiscus cannabinus*

***Hibiscus ludwigii* Eckl. & Zeyh.**

SANSURI (Amh).

A branching erect, soft wooded shrub, growing up to 3 m high; stem covered with spiny hairs which are irritating when touched. Leaves alternate, with palmate nerves. Flowers bright yellow.

Growing in dry evergreen *Juniperus-Podocarpus* forest, mostly on edges, in secondary

upland bushland and scrub, at altitudes between 1800 and 2800 m, in Shewa, Arsi, Kefa, Sidamo and Bale floristic regions, and also through eastern Africa to South Africa.

Flowering almost throughout the year, the shrub provides yellow pollen loads. The honeybees also collect nectar from the base of the corolla. The leaves of the plant are used in local medicine against paralysis.



Figure 282 *Hibiscus ludwigii*

***Hibiscus micranthus* L.f.**

NACHA, YEBERIE LEBQ, YETJA CHENGER (Amh); SHARDETCFARH (Das); KI KA CAACI (Koe.); ZEMUT (Me'e); ANCH'A, ANC'HI, BEZEZ, BUNAA KOROBOO, GAAJOO HADABOWISSA, HOOLEE, KOOSAA, QUNCEE, SEFA (Oro); BURURI (Som); LGEE ATAL, MERSEN ATAL, QERNI TIEL (Tig); FAGATEDAWI (Tse).

A stiffly erect shrub up to 2 m high. Leaves alternate, narrowly ovate to ovate or elliptic, sessile and acute to rounded at the apex. Flowers pink, tinged outside, with or without maroon centre; borne in leaf axils or in short racemes.

Growing in *Acacia* bushland, stream banks and beds, and as a weed on a multitude of different soils, at altitudes from near sea level to 2000 m, but commonly between 1200 and 1800 m, in most floristic regions, and also widespread in tropical Africa and India.

Flowering in September and October, it is a major pollen source plant in arid and semiarid agroecologies.



Figure 283 *Hibiscus micranthus*

***Hibiscus panduriformis* Burm. f.**

HINCINII (Oro); AEDISSE (Som).

An erect perennial herb to 2.5 m; stems densely puberulous to tomentellous and with long simple or branched irritating hairs. Leaves whitish tomentellous to lanate. Flowers pale yellow to yellow with maroon centre and arranged in leaf-axils or in well-defined racemes.

Growing in *Acacia* woodland and wooded grassland on black cotton soil, alluvial clay flats, riverbanks, as weed on black soil and roadsides, at altitudes between 400 and 2000 m, in nearly all floristic regions, and also widespread in tropical Africa, Madagascar, Yemen, tropical Asia and Australia.

Flowering in September to October, the herb is a potential pollen and nectar source for honeybees.



Figure 284 *Hibiscus panduriformis*

***Hibiscus rosa-sinensis* L.**

Rose mallow, Chinese rose (Eng).

A large shrub with much branched stems. Leaves dark green, unlobed, with dentate margins. Flowers usually red or pink, large and showy.

Widely cultivated in Ethiopia as an ornamental shrub, and also much planted throughout the tropics and subtropics, often used as hedge plant but native of tropical Asia.

Flowering throughout the year, it is a pollen and nectar source for honeybees. It is used for strengthening honey colonies during dry period.



Figure 285 *Hibiscus rosa-sinensis*

***Malva verticillata* L.**

ADUGAR (Amh); LITI (Oro).

A perennial herb growing up to 3 m high. Leaves alternate, usually angled, lobed, or dissected. Flowers white to purplish, borne mostly in leaf axils, solitary or clustered.

It is a common weed growing along paths and in clearings in upland forest, upland grassland and cultivated areas, at altitudes between 2000 and 3700 m, in nearly all floristic regions, and also in upland Eritrea and widespread in the tropical, subtropical and warm temperate regions of the Old World.

Flowering from September to January, honeybees collect large quantity of pollen and

some or little nectar from the flowers. It is recommended to conserve the plant around apiary site for continuous supply of pollen for the bees.

The young leaves and shoots of this plant have been eaten since, at least, the 8th century B.C. The flowers and leaves are good for sensitive areas of the skin, which are applied as poultice to reduce swelling and to draw out toxins. Taken internally, the leaves reduce gut irritation and have a laxative effect.



Figure 286 *Malva verticillata*

***Pavonia urens* Cav.**

ABLALIT (Amh); ABLATA, DUBBA, INHCINI, LITI, KARCHABAA, KITAA, LEETA (Oro); HAMAT SGOT (Tig).

A shrubby herb or shrub to 2(-3) m; branchlets and petioles with large stellate and/or simple easily detached irritating hairs, growing up to 4 m high; stem light red. Leaves ovate, pilose to tomentose, covered with stellate and/or simple hairs. Flowers white to pink, solitary or in dense clusters, usually in clearly delimited spike-like panicles.

Growing along edges, paths and clearings in upland and riverine forests, secondary forest and scrub, abandoned cultivations and as a weed, at altitudes between 1500 and 3000 m, throughout the Ethiopian Highlands (Ethiopia and Eritrea) and also widespread in tropical Africa and Madagascar.

It is a potential pollen and nectar source for honeybees. Honeybees collect pollen and nectar from the exposed flowers and it is one of the major honey source plants in the country.



Figure 287 *Pavonia urens*

***Sida rhombifolia* L.**

GORJEJIT, KARABA (Amh); Broomjute sida, cormnon sida, jelly leaf, poddy's lucerne, queens land hemp (Eng); INASA (Ghe); KALABA, KARRABAA (Oro); CIUNBISCIA (She); DA'RO MDRI, DEKE-DAHRO, DEQIJ DA'RO, QERNITIEL (Tig).

A perennial or shrubby herb up to 2 m high, with vegetative parts puberous to tomentose. Leaves ovate to elliptic, with serrate or dentate margins. Flowers pale yellow to orange, solitary or arranged in short axillary cymes.

Growing along paths and in forest clearings, riverine forest and river-banks, upland grassland and bushland, roadsides and as weed, at altitudes between 1000 and 2300 m, in most floristic regions, and also throughout the tropics.

Flowering from September to November, honeybees collect pollen from the flowers. The whole plant is used for sweeping house floor.



Figure 288 *Sida rhombifolia*

MELASTOMATACEAE

Members of the family include herbs and shrubs. Leaves opposite, decussate, rarely whorled, simple, usually entire, with two or more strong longitudinal veins parallel to midrib from base. Inflorescence terminal in Ethiopian taxa. Flowers regular except for stamens; petals free, often pink or purple; stamens usually twice as many as petals. Fruit a loculicidal capsule or berry.

A pantropical family with about 200 genera and 4,000 species, which are usually found in high rainfall areas, most in South America, fewer in Africa and rarely in the subtropics. There are five genera and 11 species in Ethiopia.

In Ethiopia, the *Dissotis* species are reported to be visited by honeybees. Most members of the Melastomaceae are without nectar and only visited by pollen gathering insects.

Dissotis canescens (Graham) Hook.f.

GONJAMAT (Gim).

A hairy perennial herb growing up to 1 m high. Leaves sessile and oblong-linear. Flowers bright purple, borne on erect stalk.

Growing in seasonally water-logged grasslands and wet flushes, at altitudes between 1600 and 2000 m, in Welega and Kefa floristic regions, and also west to Nigeria and South to the Cape.

Flowering from November to February, the flowers are pollinated by carpenter bees and honeybees. The honeybees visit the flowers for both nectar and pollen.



Figure 289 *Dissotis canescens*

MELIACEAE

The family includes shrubs and small trees, which are sometimes scrambling. Leaves simple, entire, sometimes fasciculate. Flowers bisexual, solitary or fasciculate or in axillary or terminal cymes or false racemes with (4-)5 petals, which are much longer than the calyx; stamens usually ten with cylindrical staminal tube, sometimes expanded distally, terminated by simple or 2-lobed, free or partly or completely fused appendages, opposite to or alternating with the anthers. Fruit a small leathery or woody loculicidal capsule with (4)5-10(-20) valves; seeds with a small orange or red aril.

The Meliaceae consists of 51 genera and 550 species, which are widespread throughout tropical and subtropical regions, with some taxa in temperate habitats. In Ethiopia, there are seven genera and 15 species.

Several species are known world-wide as important bee forages, for example, *Azadirachta indica*, *Melia azedarach*, *Trichilia havanensis*, *Toona ciliata* and *Khaya senegalensis*.

Ekebergia capensis Sparrm.

CHURI (Agew); LOL, SEMBO (Amh); cape ash (Eng); ORORO (Kaf); DUDUNA, SOMBO, TESELIMO (Oro); QWET (Tig).

A deciduous tree up to 30 m high; bark grey-brown, rough and dotted with whitish breathing pores. Leaves pinnately compound with 3-6 pairs of leaflets, which are lanceolate to oblong and tapering to an acuminate or subacuminate apex. Flowers small, white and heavily scented. It can be propagated from seedlings and wildlings.

Growing in montane forest, at altitudes between 1680 and 2500(-3000) m, in almost all floristic regions, and also widespread in tropical Africa from Senegal to Eritrea and southwards to South Africa.

Flowering from January to March, the tree is a potential source of nectar and pollen for honeybees and when the species grows in large population stands, honey can be harvested from the trees.

It is also used as poultry feed, smoking material for swarm attraction, firewood, timber (furniture, light construction), poles, medicine, fodder (leaves), shade, ornamental, soil conservation and windbreak.



Figure 290 *Ekebergia capensis*

Turraea holstii Gürke

A shrub or small tree up to 8 m high, sometimes scrambling. Leaves mostly in fascicles, obovate to broadly spathulate. Flowers white, tubular, solitary or borne in 2-6 fascicles.

Growing in montane forest and *Acacia* woodland, at altitudes between 1600 and 2500 m, in Gondar, Gojam, Welega, Shewa, Arsi, Ilubabor, Kefa, Sidamo, Bale and Harerge, and also from Ethiopia to Malawi to the south.

Flowering in December and January, it is a major nectar source plant for honeybees and it was observed that honeybees collect a copious nectar from the tubular flowers.



Figure 291 *Turraea holstii*

MELIANTHACEAE

Members of this family include shrubs and trees. Leaves alternate, pinnate; stipules present and often large. Flowers hermaphrodite or often functionally unisexual, \pm irregular and arranged in conspicuous racemes. Petals 5, free, unequal and clawed; stamens 4-6, free or somewhat united. Fruit a papery or woody capsule bearing large seeds.

The family has two genera, one in tropical Africa and the other in South Africa and *Bersama abyssinica* is the only representative of the family in Ethiopia.

Elsewhere the genus *Melianthus* is sometimes cultivated as an ornamental and well known for its abundant nectar production.

Bersama abyssinica Fresen.

AFFAJESHN, AZAMIR (Amh); ZAGIE (Gam); SEBATALLA (Gur); BOQO (Kaf); BOQO, DOLKIISA, EBERRAKO, ETIBIRO, FORAKA, GESSA, HORAQQA, JUMEFOK, KORAKA, LOLCISA, QARACCA, TERBERQO, TIBIRA (Oro); TEBERAQO

(Sid): ASHA-OM, BRSIMA, TEBERAKO (Tig); ASHA-OM, BERSMA, WELESSIENU (Wol).

A shrub or small tree usually 3-7 m high; bark brown and smooth, becoming grey with age. Leaves compound, with 5-10 pairs of dark-green leaflets, plus one at the tip; leaf stalks reaching 60 cm, lightly winged and white grey at the base. Flowers greenish-cream or slightly pink, each 2 cm across. It can be propagated from seeds and wildings.

Growing in *Juniperus-Podocarpus* forest and degraded remnants of it, in thickets, in grassland and open woodland and cultivations, often on slopes and hills, also in gallery forest and montane scrub, at altitudes between 1700 -2800 m, in almost all floristic regions, and also in upland Eritrea, East Africa to Malawi and Zambia.

Flowering in December and January, beekeepers have a high regard for this plant as a valuable nectar and pollen source for their bee colonies during dry period.

It is considered an important plant in traditional medicine; the roots are used against ascariasis and rabies. The tree is also used for fuelwood and as agroforestry tree on farm lands.



Figure 292 *Bersama abyssinica*

MORINGACEAE

Members of this family are trees or shrubs, with tuberous rootstocks, sometimes with swollen trunks, often with a hot spicy taste and smell. Leaves compound, 1-3 imparipinnate, alternate, petiole and rachis sometimes persistent. Inflorescences axillary panicles, often many-flowered. Flowers regular or somewhat irregular, bisexual, white, red or yellow, floral parts borne on a cup-like receptacle.

The family has a single genus with a centre of endemism in Northeast Tropical Africa. In Ethiopia, the family is represented by seven species (including subspecies). *Moringa stenopetala* is an important nectar and pollen source bee forage in Ethiopia.

Moringa stenopetala (Bak.) Cufod.

SHIFERAW (Amh); cabbage tree, moringa (Eng); ALEKO, ALUKO, HALACO, HALAKO (Gam); ALUKO, HALEKO (Kon); WUAME, MAWE (Som).

A deciduous tree growing up to 10 m high, usually smaller, with feathery foliage; bark grey, thick and corky, peeling in patches. Leaves compound, pale green; leaflets usually ovate with rounded tip. Flowers creamy-white, fading yellow. Fruit a long capsule.

Growing in riverine and *Acacia-Copmmiphora* woodland and on rocky ground, and cultivated in terraced fields, gardens and small towns, in Gamo Gofa floristic region and in parts of the Rift Valley, at altitudes between 1200 and 1700 m, and also in N Kenya. It is proapagted from seeds.

The flowers are sweetly scented attracting many insects. The tree is a pollen and nectar source for honeybees.

The leaves are used as fodder and the tree for soil conservation, as shade, for medicine, as wind break, live fence, boundary marker, fibre and spice. The trees are cultivated for their leaves that are boiled and eaten like cabbage, and are also sold in local markets. The seeds can be used to purify water.



Figure 293 *Moringa stenopetala*

MYRSINACEAE

The family is composed of shrubs and trees. Leaves alternate, occasionally opposite or in whorls; stipules absent. Inflorescence cymose, umbellate, racemose or paniculate, axillary or on older wood. Flowers unisexual or bisexual, small, regular, usually marked with dark resinous dots; corolla usually with (3-)4-6(-7) petals united into a short tube and lobed or occasionally free; stamens equal in number to the petals and opposite to them, joined to the corolla, free or more or less joined.

The family includes about 1,000 species in 39 genera, which are distributed throughout the tropics and subtropics. In Ethiopia, there are four species in three genera.

Maesa lanceolata is a well known honey source plant as pollen source for brood rearing.

Maesa lanceolata Forssk.

KEMBA GUDRI (Agew); ABALIYEH, AKALUA, ALGALUA, QELEWA (Amh); CHESH (Ben); CHAGO, SHAGO (Kaf); ABBAYYII, CUGGII, GEESHII, MEEQWAARSAA, MERQAAQOO (Oro); GEWACHO (Sid); SEWARIA (Tig); IMBIS, QOBUWA (Wol).

A straggling shrub to 3 m high, or small tree with a single stem up to 9 m tall; bark grey-brown, rough and with dots of breathing pores on branchlets. Leaves simple, spirally arranged, broadly ovate, tapering to pointed tips and with toothed margins. Flowers minute, bisexual, sweetly scented, white or yellow, in many-flowered pani-

cles, borne in the axils of leaves and at the ends of branches.

Growing in gallery forest, margin of evergreen forest, along river banks and streams, open woodland and valleys, at altitudes between 1350 and 3000 m, in nearly all floristic regions, and also throughout tropical Africa, extending to South Africa, Madagascar and Arabia.

Commonly flowering in September and October but it has been observed flowering on and off throughout the year when moisture is available. The white and scented flowers are very attractive to honeybees and they provide large quantity of pollen for brood rearing. It has also been observed that nectar is produced from the cup-like flowers.

The roots are used for steaming and as a purgative to remove pimples. The plant is also used for firewood, charcoal, baking bread (leaves), medicine against tapeworm (fruit) and as live fence. A paste of pounded fruits and seeds of the species with butter or vaseline/petroleum jelly is also used to treat scabies.



Figure 294 *Maesa lanceolata*

MYRTACEAE

Members of this family include trees or shrubs. Leaves usually opposite, less often alternate or in whorls of threes or fours, simple with entire margins. Inflorescences axillary or terminal, panicle or umbellate, fasciculate, composed of small cymose umbels in *Eucalyptus*. Flowers sometimes solitary in leaf-axils, bisexual, rarely unisexual by abortion, regular.

The Myrtaceae comprises more than 100 genera and over 3,000 species and the family is largely tropical. It is very well represented in tropical America, Asia and Australia, but more poorly represented by indigenous species in tropical Africa. However, a large number of species, particularly of *Eucalyptus*, have been introduced and a few of these are now extensively used in forestry plantations and in village woodlots.

There are nine genera and 63 species (including subspecies) in Ethiopia, the majority of which are introductions.

In Ethiopia, *Syzygium guineense* with its three subspecies is a very important nectar and honey source. Where *Syzygium* forest exists abundant honey can be harvested. But the major honey producing tree species of the country belong to the genus *Eucalyptus*, which are planted throughout the country, including *E. camaldulensis*, *E. citriodora*, *E. globulus*, *E. grandis* and *E. saligna*. Their prolonged flowering seasons and their widespread occurrence make the eucalypts essential for beekeeping.

***Callistemon citrinus* (Curtis) Skeels**

Bottle brush (Eng).

A medium-sized shrub or small tree with numerous drooping branches; young shoots pink or red; flower-bearing part of the branches up to 12 cm long, with many long-lasting flowers. Leaves lanceolate to narrowly elliptic, with distinctive veins on both sides but without distinct petiole. Flowers red or rarely white, bearing many stamens. It can be propagated from seeds.

It is cultivated as an ornamental tree in parks and town gardens, at altitudes between 1200 and 2500 m, in Shewa, Kefa, Sidamo and Harerge floristic regions, and also in upland Eritrea and elsewhere. It is indigenous in New South Wales and Victoria in Australia, now very well established as an ornamental in the tropics and the warm

temperate countries throughout the world.

It flowers almost all year round and widely cultivated for honeybee forage at mid-altitude areas and is frost and drought tolerant. It provides a sufficient quantity of nectar and pollen for honey production, initiating brood rearing and supplying nectar and pollen throughout the year for strengthening honeybee colonies.



Figure 295 *Callistemon citrinus*

***Eucalyptus camaldulensis* Dehnh**

KEY BAHIR ZAF (Amh); red river gum, murray red gum (Eng); BARGAMOO DIMMA (Oro).

A tall evergreen tree usually to 30 m high, deeply branched but also with a long straight bole; bark smooth, white to grey brown or red. Leaves alternate, ovate to broadly lanceolate (juvenile) and lanceolate to narrowly lanceolate (adult) and pendent. Flowers white, borne in axillary 7-11-flowered umbels. It is propagated by direct sowing the seeds at site but the seedlings require careful management in the early stages.

Growing in parks, trial plots and pilot plantations, woodlots, shelter belts, large scale plantations and as single trees on farmland, at altitudes between 1200 and 2800 m, in Tigray, Gondar, Shewa, Kefa and Harerge floristic regions, and also widely grown throughout the low rainfall areas of tropical Africa but indigenous in extensive parts

of the Australian mainland, where it is known as red river gum (except southern Western Australia and the eastern coast).

The tree is a potential source of nectar and pollen and its flowers secrete high amount of nectar and sugar concentration ranges from 61- 81%. The honey is clear golden and with mild aroma. Other uses include firewood, charcoal, timber, poles, ornamental and windbreak.



Figure 296 *Eucalyptus camaldulensis*

Eucalyptus globulus Labill.

NECH BAHIRZAF (Amh); WEJU BARZAAFA (Kam); BARGAMO (Oro).

A tree usually to 45 m high, sometimes reaching 70 m; bark usually smooth, white to cream, yellow or bluish-grey. Leaves lanceolate to narrowly lanceolate, sometimes falcate, acuminate, green, and uniform in colour. Flowers white and borne in 7-flowered umbels.

Growing in pilot plantations, woodlots, large scale plantations and also frequently as an isolated tree in farmlands, at altitudes between 1700 and 2800 m, in Gondar, She-wa, Arsi, Kefa and Harerge floristic regions, and also in Eritrea and reported grown in mountain habitats of East Africa and Zambia, but native to Australia and Tasmania with three subspecies cultivated in Ethiopia.

This species is one of the most important sources of honey in the country. It pro-

The family is composed of about 30 genera and 300 species, which are most numerous in the New World tropics, but extending into temperate regions around the world. In Ethiopia, there are six genera and 17 species.

***Commicarpus plumbagineus* (Cav.) Standl.**

KOKO BALA, QOBBOO BAALLAA, RAMAK RINCHE (Oro); ANA MAISN, BASCALLA, BASGALLA, GEED IRMAN, MAK RINEHE (Som); HAMLQOLA, HA'MUGILA, 'MITA'WA (Tig).

A many branched scandent herb growing up to 3 m high. Leaves ovate, entire or with wavy margins and slightly succulent. Flowers red or dark pink, usually aggregated into irregular panicles.

Growing in woodland, often with *Acacia*, mostly near water courses and often in \pm disturbed situations, at altitudes between 400 and 2200 m, in Tigray, Shewa, Gamo Gofa, Sidamo and Harerge floristic regions, and also in Eritrea and tropical Africa, Madagascar, Saudi Arabia and Spain. The plant is a good source of nectar and pollen. It has extended flowering period and honeybees frequently collect pollen throughout the dry period.



Figure 301 *Commicarpus plumbagineus*

of the Australian mainland, where it is known as red river gum (except southern Western Australia and the eastern coast).

The tree is a potential source of nectar and pollen and its flowers secrete high amount of nectar and sugar concentration ranges from 61- 81%.The honey is clear golden and with mild aroma. Other uses include firewood, charcoal, timber, poles, ornamental and windbreak.



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A tree usually to 45 m high, sometimes reaching 70 m; bark usually smooth, white to cream, yellow or bluish-grey. Leaves lanceolate to narrowly lanceolate, sometimes falcate, acuminate, green, and uniform in colour. Flowers white and borne in 7-flowered umbels.

Growing in pilot plantations, woodlots, large scale plantations and also frequently as an isolated tree in farmlands, at altitudes between 1700 and 2800 m, in Gondar, She-wa, Arsi, Kefa and Harerge floristic regions, and also in Eritrea and reported grown in mountain habitats of East Africa and Zambia, but native to Australia and Tasmania with three subspecies cultivated in Ethiopia.

This species is one of the most important sources of honey in the country. It pro-

duces abundant nectar and pollen. The sugar concentration of the nectar is medium and the protein-rich pollen is pale yellow to creamy white. Honeybees start to work on the flowers early in the morning from 5 a.m. Colonies near *E. globulus* flowers develop very fast with a tendency to swarm. The honey has a distinctive flavour and is light amber in colour.



Figure 297 *Eucalyptus globulus*

***Psidium guajava* L.**

ZEYTUN, ZEYITUNA (Afa, Amh & Oro); guava (Eng); ZEYITON (Har).

A small evergreen tree or shrub to 8 m high; bark smooth, pale brown but later peeling, quadrangular. Leaves elliptic to oblong, leathery and apex rounded or acute. Flowers solitary in leaf axils, white or yellow with numerous anthers depending on variety.

Planted as an ornamental or for its fruits in parks and gardens and also naturalized, at altitudes between 1700 and 2000 m, in Welega, Ilubabor, Kefa, Sidamo, Bale and Harerge floristic regions, but indigenous in Brazil, Paraguay, Uruguay and Argentina.

Flowering from October to December, it is a major nectar and pollen source for

honeybees. Nectar secretion is abundant all day. Sugar concentration of nectar is reported to be 28%. It is also of the best pollen producing species of Myrtaceae. There is no data on honey yield and physio-chemical properties of the honey from this plant. Honeybees forage intensely for pollen and nectar from early morning up to late afternoon. The juice from damaged fruit is also said to be collected by bees. Cross-pollination by insects gives higher fruit yields.

Care should be taken in promoting the planting of this species as it has been reported being invasive in other countries including South Africa. There is a sign of invasiveness depicted by the species in west and south Ethiopia.



Figure 298 *Psidium guajava*

***Syzygium guineense* (Willd.) DC. subsp. *afromontanum* F.White**

AWLISH (Agew); ANQA, DGTA, DOKMA (Amh); GIU (Anu); ANOT, AROT, SETERE BIELON (Ge'e); guinea syzygium, water berry (Eng); DOQMA (Gur); DUBANA, GEGARNE, KURUNFULI (Had); CORAT, CORUT (Me'e); YINO (Kaf); AACHA, BADDESSA, DEKERICHO, DUANDOO GOFA, GASII, GOMORII, MOCHAA, OCHU, OICHA, QURRUNFULI, WORARICHO (Oro); DUANDO, WORARICO, WORARIKO (Sid); A ACHA, DUWENCHO (She); DAIR (Som); LA'HAM, LIHAM, ROHAZ (Tig); BADESA, OOCHEBA (Wol).

A forest tree, growing up to 10–35 m; bark grey to dark brown and fairly smooth, but

slightly fissured. Leaves opposite, narrowly ovate to ovate-elliptic, smooth and waxy grey-green and broadest about the middle. Flowers white with showy stamens and arranged in densely branched heads. It is propagated from seedlings.

Growing in upland rainforest, forest edges or secondary growth, occasionally left as a single tree in farmland recently cleared from forest, at altitudes between 1400 and 2600 m, in most floristic regions, and also from Sudan through East Africa, Dem. Rep. Congo and Rwanda, south to Angola, Zambia, Malawi and Zimbabwe.

The flowers of this tree are abundantly visited by honeybees. They secrete abundant nectar and pollen and the tree is a major honey source plant in the country. Honey is harvested in March and April and the honey is golden brown in colour and tests mild and granulation is rapid.

Other uses of the tree include firewood, charcoal, timber, poles, tool handles, carvings, food (fruit), medicine and tannin. The fruits are also used to treat dysentery and the roots are used against intestinal diseases.



Figure 299 *Syzygium guineense* subsp. *afromontanum*

Syzygium guineense* subsp. *macrocarpa (Engl.) F.White
GOSSUU (Oro).

A tree growing up to 7 m high, and often multi-stemmed with ovate-elliptic leaves and yellowish-white flowers in terminal and axillary panicles.

- Restricted to woodlands growing, at altitudes between 1400 and 2500 m, in Shewa, Welega, Kefa, Sidamo and Bale floristic regions, and also widespread in tropical Africa.
- The nectar secretion is abundant and also large quantities of pollen are produced by the flowers. Honeybees forage on the flowers very frequently and the subspecies is an important honey source.



Figure 300 *Syzygium guineense* subsp. *macrocarpa*

NYCTAGINACEAE

The family is composed of herbs, shrubs, trees and woody climbers, with indumentum of simple, sometimes gland-tipped hairs; stems usually with anomalous secondary thickening. Leaves mostly opposite, often unequal at the same node, occasionally alternate, simple; stipules absent. Flowers bisexual or unisexual, in terminal or axillary cymes, often modified into thyrses, whorls or umbels; perianth with tepals fused into 5-merous tube, upper part petaloid, forming a 'perianth-limb', often sharply differentiated and falling off from the persistent lower part surrounding the ovary; stamens 1-40, hypogynous, free or basally united into a tube. Fruit usually an 'anthocarp' consisting of a 1-seeded achene enclosed within the specially thickened perianth-base.

The family is composed of about 30 genera and 300 species, which are most numerous in the New World tropics, but extending into temperate regions around the world. In Ethiopia, there are six genera and 17 species.

***Commicarpus plumbagineus* (Cav.) Standl.**

KOKO BALA, QOBBOO BAALLAA, RAMAK RINCHE (Oro); ANA MAISN, BASCALLA, BASGALLA, GEED IRMAN, MAK RINEHE (Som); HAMLII QOLA, HA'MUGILA, 'MITA'WA (Tig).

A many branched scandent herb growing up to 3 m high. Leaves ovate, entire or with wavy margins and slightly succulent. Flowers red or dark pink, usually aggregated into irregular panicles.

Growing in woodland, often with *Acacia*, mostly near water courses and often in \pm disturbed situations, at altitudes between 400 and 2200 m, in Tigray, Shewa, Gamo Gofa, Sidamo and Harerge floristic regions, and also in Eritrea and tropical Africa, Madagascar, Saudi Arabia and Spain. The plant is a good source of nectar and pollen. It has extended flowering period and honeybees frequently collect pollen throughout the dry period.



Figure 301 *Commicarpus plumbagineus*

ONAGRACEAE

Plants in this family are mostly herbaceous, sometimes becoming shrubby, rarely arborescent, but occasionally aquatic. Leaves simple, alternate or opposite, rarely whorled. Flowers bisexual, rarely unisexual, regular, infrequently irregular, solitary or paired and then axillary or aggregated into spikes, racemes or panicles.

There are about 20 genera and 650 species, which are widely distributed, mainly in the temperate and subtropical regions of the New World. The family is represented by three genera, one of which is introduced and ornamental, with 11 species in Ethiopia.

About half of the species are self pollinated, while the others are pollinated by various insects including honeybees.

Fuchsia hybrida L.

Fuchsia (Eng).

An ornamental, much branched, perennial herb growing up to 60 cm high. Leaves opposite with slightly serrate margins. Flowers red and inverted down/drooping to facilitate or enhance self pollination.

It is commonly grown as an ornamental herb in gardens, hotels and parks.

Flowering throughout the year, honeybees have been observed collecting a mass of pollen from the anthers of the drooping flowers, and nectar is also secreted from the base of the corolla.



Figure 302 *Fuchsia hybrida*

Ludwigia stolonifera (Guill. & Perr.) Raven

A terrestrial or an aquatic herb, with glabrous, or sometimes \pm pubescent stem, which is much branched, prostrate or ascending, reddish and rooting at the nodes and when floating, producing clusters of white to pink, inflated spongy fusiform pneumatophores from the nodes. Leaves alternate, narrowly lanceolate to narrowly elliptic or flowering stems. Flowers solitary, axillary, pink and surrounded at the base by depressed white-hairy nectaries.

Growing in swamps, pools and along rivers and lakes, floating, sometimes forming large masses, at altitudes between 1000 and 2200 m, in Gondar, Gojam, Welo, Shewa, Kefa, Arsi and Sidamo floristic regions, and also in north and tropical Africa south to Transvaal and Natal, Madagascar, Mauritius and from Israel and Lebanon to Iraq. Flowering almost throughout the year, honeybees are attracted to the pollen and nectar.



Figure 303 *Ludwigia stolonifera*

PAPAVERACEAE

Members of this family are annual, biennial and perennial herbs with watery, white, yellow or orange latex. Leaves alternate, rarely whorled, entire to palmately or pinnately lobed; stipules absent. Flowers solitary, or in simple or branched racemes,

bisexual, regular or irregular.

A family with 41 genera and 660 species, mainly in the northern temperate regions with a few representatives in tropical African mountains and South Africa. The family is represented by five species in four genera in Ethiopia. The family provides a number of showy garden ornamentals, for example *Eschscholzia californica*.

Members of the family are insect-pollinated plants but do not have nectaries. The stamens supply abundant amounts of fine and protein-rich pollen, which is considered to be more valuable for honeybees.

***Argemone mexicana* L.**

DANDARO, NECHO, YEAHYA SUF (Amh); devil's fig, golden thistle of Peru, white thistle, Mexican poppy, prickly poppy, yellow poppy (Eng); WOS'O WOS'O (Me'e); FIFO, KOSHESHILA, MEDAFE, MEDAFE-TILIAN, SHOQAT (Tig).

An annual herb, much branched; stem grey, hollowed. Leaves grey with spine, with serrate margins. Flowers whitish-yellow, arranged in erect clusters at the end of the branches.

A widespread weed and opportunistic plant, often growing in almost pure stands, particularly conspicuous in the dry season, at altitudes from sea level to 2400 m, in Gondar, Gojam, Welo, Shewa, Arsi, Sidamo, Bale and Harerge floristic regions. It is native to the West Indies and Central America but now a cosmopolitan tropical and subtropical weed.

It flowers from September to December and the plant is a good source of pollen and nectar for honeybees. The roots are used against constipation and the oil is edible.



Figure 304 *Argemone mexicana*

***Eschulozia californica* L.**

MESHEDANA EDRU (Amh); four o'clock plant (Eng).

A fast-growing annual herb about 30 cm high. Leaves feathery, bluish-green enjoying a sunny site with poor, well-drained soil and is particularly well-suited to gravel gardens. Flowers reddish-orange.

It is widely grown in homegardens for ornamental purpose. The fresh leaves can be boiled and taken in the form of tea for stimulation.

Flowering all year round, the herb is a major pollen source plant for honeybees.



Figure 305 *Eschulozia californica*

PEDALIACEAE

The family comprises deciduous small trees or shrubs with swollen (succulent) stem or main branches, or shrubs and semi-shrubs without swollen stems, perennial herbaceous plants, sometimes with a short swollen stem and tuberous or annuals; all aerial parts, especially the leaves, covered with mucilage glands which produce mucilage when wetted, often with additional simple hairs. Leaves generally opposite, in large woody representatives and occasionally in the floral parts of annuals alternate. Flowers bisexual, slightly to distinctly irregular, hypogynous with 5-lobed corolla, white, yellow or various shades of red and purple; stamens four, didynamous, usually inserted near the base of the corolla and normally included in the tube.

The family is composed of 13 genera and about 70 species, distributed mainly in the arid regions of Africa south of the Sahara, with a few outliers in Madagascar, India, Sri Lanka, Malaysia and N Australia. Five genera and ten species have been recorded in Ethiopia.

The family contains the important oil-yielding crop plant *Sesamum orientale*, which is also known world-wide as an important honey plant.

***Sesamum orientale* L. (syn. *S. indicum* L.)**

SELID (Afa); MENCH SELIT (Amh); GNIMINI (Anu); oriental sesame, sesame (Eng); SELITU (Har); NYOMI (Nuw); DAISA, SALIXA, ZEDI (Oro).

An annual cultivated herb with a single glabrous stem, or sometimes branched, growing up to 1-2 m high with glabrous stems. Leaves opposite and lanceolate, with entire margins. Flowers whitish-pink and borne in small clusters in leaf axils.

It is widely cultivated in arid climate and also growing in cultivated fields or sometimes along roadsides, at altitudes between 500 and 1800 m, in Gondar, Gojam, Wellega, Ilubabor (Gambella), Kefa and Gamo Gofa floristic regions. It is also cultivated in most tropical and subtropical countries all over the world.

The herb flowers from June to October. It has both floral and extra-floral nectarines, which are located on either side of the base of the flowers and flower stalks. Honey from this plant is clear and light in colour. It also provides pollen for brood rearing and is recommended to put honeybee colonies in sesmum field for honey production and pollination.

It is an oil seed crop and the oil is used for making sauces and bread. It is also an important cash crop for export.



Figure 306 *Sesamum orientale*

PHYTOLACCACEAE

The family includes trees, shrubs and herbs, which are erect or scrambling. Leaves alternate, simple, entire, with crystals generally visible when young; stipules minute or absent. Flowers small, regular and often unisexual, arranged in racemes, spikes or panicles. Petals generally absent. Stamens (3-)4 to many in 1-several whorls, usually on a disk. Fruit of 1-many, free or united carpels, fleshy or dry, sometimes winged, bearing subglobose, disc- or kidney-shape seeds.

A family of about 16 genera and 100 species, mostly in tropical and subtropical America and represented in Ethiopia by two genera and three species.

Phytolacca dodecandra L'Herit.

INDOD, MEKAN INDOD (Amh); AZAB, HSP (Ge'e); YINGAMO (Kaf); DENKE (Mej); ANDODE, ANDOTE, HANDODE (Oro); SIBID, SIBIL (Sah); SHORSHU (She); SHBTI (Tig).

A scrambling much branched shrub or tree up to 8 m long, growing from woody base. Leaves simple, alternate, shiny oval to 25 cm, tip blunt and rather thick and juicy. Flowers dimorphic, yellowish-green, scented, arranged in axillary or terminal racemes.

Growing in evergreen bushland and forest edges, disturbed places and habitations, at altitudes between 1500 and 3000 m, in nearly all floristic regions, and also in upland Eritrea, tropical and South Africa and Madagascar. It is propagated from seedlings and cuttings.

Flowering from December to April, it is an excellent dry period honeybee forage and it provides abundant nectar and pollen for honeybees.

It is widely used as a soap berry for washing cloth. It is also a medicinal plant used against schistosomiasis and a notorious poisonous plant for animals and humans. Juice from the leaves or roots can cause abortion. The commonest medicinal use is for killing intestinal worms.



Figure 307 *Phytolacca dodecandra*

PIPERACEAE

Members of the family are herbs, sometimes woody at base, often epiphytic and/or climbing and stems with scattered vascular bundles. Leaves alternate, opposite or whorled, simple, entire; stipules absent or adnate to petiole and enclosing terminal bud. Inflorescence a dense spike of minute flowers, usually terminal or leaf-opposed, sometimes in apparently axillary umbels. Flowers bisexual or unisexual and subtended by peltate bracts. Perianth usually absent. Stamens (1-)2-6(-10), free. Fruit fleshy or sticky, indehiscent.

A large pantropical family, most numerous in forested areas, variously estimated to

include seven to ten genera and 1,400 to over 2,000 species. The family is represented in Ethiopia by 12 species in two genera.

***Piper capense* L.**

TIMIZ (Amh); TINJA (Dwa); pepper, wild pepper (Eng); TUF, TURFO, TURIFO (Kaf); TUNJO, TURFO -(Oro); GURDAI (Sha); TONJO, TUNJOI (Tig).

A weakly erect aromatic shrubby herb growing up to 1-5 m high, with glabrous or hairy stems that are swollen at the nodes. Leaves ovate to elliptic and distinctly acuminate at the apex. Flowers creamy white.

Growing in moist Afromontane forest between 1350 and 2400 m, in Welega, Ilubabor and Kefa floristic regions, and also west to Sierra Leone and south to Cape Province of South Africa.

Flowering from April to June, the flowers are good sources of pollen for honeybees, which are visited during extraordinarily dry time when the major bee forages shed their flowers.

The leaves of *P. capense* are used to treat stomachache and ease indigestion and the species is a source of one of the non-timber forest products usually collected by women and children as cash income since its fruit is used as a spice (called TIMIZ).



Figure 308 *Piper capense*

PLANTAGINACEAE

The family is composed of herbs or sometimes shrubs. Leaves in basal rosettes, less often opposite or alternate, simple or lobed, with parallel, or less often, palmate, secondary venation. Flowers in spikes or solitary, regular or slightly irregular, small, usually protogynous and wind-pollinated, bearing corolla with (3-)4-10 lobes and membranous; stamens (1-)4, free, with long filaments, attached to and exerted far beyond the corolla-tube. Fruit a circumcissile capsule or an achene.

The Plantaginaceae is a small cosmopolitan family with about 250 species in three genera and found throughout the world. The family is represented in Ethiopia by the genus *Plantago*, which has seven species.

Plantago lanceolata is a very valuable and rich pollen source for honeybees and other insects, although the flowers are also wind pollinated.

***Plantago lanceolata* L.**

GURTEB, GORTEM, YEBEG LAT, WOMEBERT (Amh); lambs tongue, ribgrass, rib-worth plantain, ripple grass (Eng); GAMBELA (Gam); QORTOBI (Oro); MENDELTO (Tig).

A herb growing up to 30 cm, often with several densely tufted flowering shoots. Leaves in basal rosettes, with a more or less petiole-like base, narrowly elliptic or narrowly oblanceolate. Flowers light-green or whitish and borne in dense spikes.

Growing on roadsides, as a weed in crops and abandoned fields, waste ground and pastures, at altitudes between 1200 and 3200 m, in nearly all floristic regions, and naturalized throughout the world but native of Europe and Asia.

Flowering almost throughout the year whenever it rains, and honeybees collect a large quantity of pollen from the flowers. A strong colony of honeybees can collect 50-100 gm of pollen pellets per day.



Figure 309 *Plantago lanceolata*

POACEAE

The family is composed of herbs with stems (called culms), which are often hollow between the nodes and usually round in cross-section. The nodes are usually thickened and solid within. The leaves are alternate or basal, borne in two usually opposing ranks, simple and entire, often narrow with parallel venation. The leaf-base is clasping and enclosing the stem in a usually open sheath. The very small flowers are bisexual or sometimes unisexual and are lacking petals and are usually enclosed in a series of tiny bracts and called spikelets. The spikelet is the basic unit of the inflorescence of members of the Poaceae.

The Poaceae is one of the largest families of flowering plants with 500 genera and 8,000 species, which are cosmopolitan and widespread, especially in tropical and north temperate semi-arid regions with seasonal rainfall. The Poaceae is the second largest family in Ethiopia with 570 species in 149 genera.

Members of the family are especially important in eastern Africa where a large portion of the vegetation is savanna and grassland. The grasses are plants of greatest importance to man. They are used for the nourishment of the various domestic animals, which produce animal protein like meat, milk and eggs and which serve for draught and transport and which provide also clothes from wool and leather.

Members of the Poaceae provide staple foods for the human society. They include grain crops such as finger millet, barley, rice, sorghum, wheat and TEFF.

The grasses are wind-pollinated and many are frequently visited by honeybees for pollen supply and are therefore important for brood rearing and honeybee colony development.

***Sorghum bicolor* L.**

MASHILA, TINQISH, ZENGADA (Amh); broomcorn, guinea corn, sorghum, white sorghum (Eng); BISINGA, SHANGO (Kaf); AMAZIMBA (Kon); BISSINGA, BOBEE, MISSINGA (Oro); MISSINGA (Som).

A annual tall grass up to 6 m high, the node glabrous or pubescent. Leaves large, and upto 90 cm long. Flowers in panicles, which are up to 60 cm long. Most cultivars are annuals, but few are perennials. They vary in grain colour from pale yellow through reddish brown to dark brown depending on the cultivar.

It is widely grown in the country up to 2000 m, but it is especially important in the southwestern highlands. *Sorghum bicolor* originated in Africa and it is cultivated throughout the tropics and subtropics of the Old World, but introduced to the Americas with the slave trade. Sorghum grows in a wide variety of soils and is drought resistant, but it does better if the soil is enriched with compost or fertilizers prior to planting. Different cultivars are found in different regions depending on the climate. Like maize, sorghum pollen is also collected by honeybees for brood rearing.



Figure 310 *Sorghum bicolor*

***Sporobolus consimilis* Fresen.**

KACHA (Kam).

A perennial grass from a short rhizome, growing up to 0.3-0.50 m high and branched. Leaves sheathed and hairy. Flowers yellow, hairy.

Growing in salt and flood plains, forming tall belts around hot springs and soda lakes in saline grassland, at attitudes between 600 and 1500 m, in Afar, Shewa (Awash valley) and Harerge floristic reions. It is also found in Sudan, Chad, Somalia and southwards to South Africa.

Flowering in September and October, the flowers provide abundant pollen for honeybees. According to beekeepers, during the flowering period of this plant, honeybees build more brood because of sufficient supply of pollen. It is an excellent source of livestock feed in mid-altitude areas of the Rift Valley.



Figure 311 *Sporobolus consimilis*

***Zea mays* L.**

Corn (Am Eng); Indian corm, Indian meal, maize (Eng); BEDALA, BEDELA, TEEA (Gam); BAROO, DIKO (Kaf); BAHR MASHILA, BEQOLO (Amh); BADALLA (Kon); BADALIA, BOQOLO (Oro); IFUN, ILBO, MSHELA BAHIRI (Tig).

An annual cultivated crop, varying greatly in size according to land race and growth conditions. Leaves expanded, usually green, but may be variegated white and yellow. Flowers with male spikelets (tassels) at the stem/culm tip and one or more female spikelets (ears) in the axils of leaves.

In Ethiopia, maize is widely grown up to 2400 m in all floristic regions.

It is a major pollen source plant for brood rearing before the main honey flow period. The flowers supply surplus pollen for colony building in September in most maize growing areas, as a result of which honeybees are more populous to collect nectar for honey production.

Few plants are grown more extensively or put to more diversified use than maize (corn). It is becoming increasingly important as a fodder. Maize is a staple cereal for human food in Central and South America, and in many parts of Africa. In the US and Europe, it is used almost entirely for animal feeding, as grain or fodder. Maize is also converted into various substances which have a wide range of usage, as starch, syrup,

corn, dextrin, corn oil and in the making of whisky and other alcoholic products.



Figure 312 *Zea mays*

POLYGONACEAE

The family is composed of herbs or sometimes shrubs, stems often with thickened nodes. Leaves alternate and simple, entire to pinnately lobed. Inflorescences usually racemose. Flowers unisexual or bisexual, regular and small; tepals four or six, in one or two distinct whorls; stamens 4-9, often in two whorls. Fruit a nut, often angled or winged.

A cosmopolitan family with about 1,050 species in 50 genera, largely concentrated in temperate areas of the northern hemisphere, and tropical and subtropical mountains. There are eight genera and 22 species in Ethiopia.

Some species of this family are known world-wide as important honey sources, for instance, *Fagopyrum esculentum*, which is also growing in Ethiopia.

***Fagopyrum esculentum* Moench.**

Back wheat (Eng).

An annual herb, with weak stem. Leaves reddish, opposite and succulent. Flowers white, borne in leaf axils, bisexual and usually capable of self pollination. Cultivated in Dembidolo area of Welega floristic region, and used as a grain crop at an altitude of about 1500 m and probably originating in China, now cultivated in both the Old and the New Worlds.

The herb flowers all year round, depending on the availability of water or moisture. The flowers secrete much nectar early in the morning which attracts honey bees, and honey from this plant is golden-brown and highly demanded in international markets. The flour from the seeds of this herb is used for poultry and animal feed.



Figure 313 *Fagopyrum esculentum*

***Rumex nervosus* Vahl**

EMBACH, EMBACHO (Amh); SIROB (Ge'e); ARAB SARI (HAR); GORECHO (Kaf); DANGAGO, SETA (Oro); ASOT, HEH'OT (Tig).

A much-branched shrub, reaching a height of 2- 3 m. Leaves often crowded on short striate lateral branchlets, distinctly petioled, oblong, or the upper lanceolate, sub-acute at the apex and narrowed to the base, glabrous. Flowers red, forming dense terminal panicles.

Growing frequently in open rocky areas and lava flows, roadsides, grassland and waste ground, at altitudes between 400 and 3500 m, in most floristic regions of Ethiopia, and also in upland Eritrea, and also widespread in the Mediterranean area and Yemen. Flowering throughout the year but profusely after the main rainy season, and honeybees collect abundant pollen for brood rearing. The young shoots are sour and eaten by children during dry period. It also improves soil fertility because of its high leafy biomass.



Figure 314 *Rumex nervosus*

PONTADERIACEAE

The family is composed of herbs, floating on or growing in fresh water and rooted in the soil beneath the water surface. Leaves alternate, opposite, or whorled, usually in two opposite ranks, simple and entire, cordate at the base; stipules absent or a clasping single stipule-like or ligule-like structure present. Inflorescence subtended by a spathe-like bract. Flowers bisexual and usually somewhat irregular; stamens 6, 3 or rarely 1, opposite the perianth parts.

A family of about nine small genera and 25 species, with six genera confined to the New World and one, *Eichhornia*, widely distributed in the Old World, including Ethiopia (two species). Some species are occasionally cultivated as ornamentals. *Eichhornia crassipes* is an important honeybee plant and honeybees collect abundant pollen and some nectar from the flowers. But the species is regarded as one of the most noxious aquatic weeds.

Eichhornia crassipes (Mart.) Solms

Water hyacinth (Eng).

An aquatic floating or creeping herb, rooting from the nodes. Leaves in basal clusters, broadly ovate-rhomboid, with swollen inflated petioles. Flowers pale blue or lilac-blue and arranged in a spike.

It is found in both the Baro and Awash river systems, growing in still or gently moving fresh water, at altitudes up to 1800 m. It is problematic at Koka Dam and along the major rivers in Gambella, as it is capable of reproducing vegetatively and by seed. It has recently been seen growing in Lake Tana. It is one of the invasive alien species in Ethiopia.

Honeybees forage for nectar and pollen from the showy flowers.



Figure 315 *Eichhornia crassipes*

PROTEACEAE

The family is composed of trees, shrubs, subshrubs, or rarely perennial herbs. Leaves alternate, rarely opposite or whorled, mostly very leathery, entire or variously divided; stipules absent. Flowers regular or irregular, with one series of four valvate, partly united perianth segments, and arranged usually in compound spikes; stamens four, opposite the perianth segments and usually inserted on them, rarely free. Fruit a \pm dehiscent leathery capsule, or an indehiscent nut.

A family with 35 genera and about 800 species in Australia, and 14 genera and about 350 species in south and tropical Africa, and also in South America. In Ethiopia, three genera and four species have been recorded.

Several members of Proteaceae are known as important honey sources, and *Faurea saligna* and *F. speciosa* are the most important honey source species native to Africa.

Grevillea robusta A. Cunningham ex R. Br.

Grevillea, silky oak, silver oak (Eng.)

A deciduous tree up to 20 m or more with a straight trunk and angular branches; bark dark grey, rough and vertically grooved. Leaves compound, very much divided and fern-like. Flowers golden-orange and arranged in one-sided very dense spikes.

An introduced tree used as an ornamental in many towns and also widely grown in re-afforested areas in both wetter and drier parts of the country, at altitudes between 1700 and 2400 m, in Tigray, Shewa, Kefa and Harege floristic regions, and most likely also cultivated elsewhere. It is widely planted in warm temperate, subtropical or tropical regions for shade or agroforestry.

Flowering from September to November, the flowers produce much nectar which attracts honeybees and sunbirds. The plant is a world wide known honey source and it produces a spoonful nectar in a single flower. The sugar concentration is high (15-79%) and pollen yield is heavy. Honey is reddish-black with pronounced flavour and granulation is rapid. It is recommended for planting to increase honey production. The plant is a good source of firewood, charcoal, poles and timber and also good for soil conservation, as an ornamental and a wind break.



Figure 316 *Grevillea robusta*

Pappea capensis Eckl. & Zeyh.

BIQA (Oro); ADADAK (Som); AREGAGUT (Tig).

A tree to 12 m high; bark rough, dark grey to blackish; branchlets yellowish tomentellous. Leaves simple, elliptic or oblong with entire to crenate or serrate margins. Flowers white to yellowish green and tomentellous.

Growing in *Combretum-Terminalia* and *Combretum-Piliostigma* woodland, at altitudes between 1200 and 2300 m, in Shewa, Arsi, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also in upland Eritrea and south through eastern Africa to South Africa.

Flowering in September and October, the flowers are sources of nectar and pollen for honeybees. The tree contributes for honey production in association with other plant species.



Figure 317 *Pappia capensis*

RANUNCULACEAE

Members of this family are aquatic or terrestrial herbs or woody climbers. Leaves simple, deeply divided, compound or divided into segments, sometimes with sheathing bases, alternate or opposite; stipules present. Inflorescence generally terminal and many-flowered, more rarely with one or few flowers. Flowers regular or irregular, uni- or bi-sexual; perianth segments various in number, free, either of one type when they are often referred to as tepals, or differentiated into 'sepals' and 'petals'; stamens numerous, spirally arranged. Fruit achenes, follicles or capsules.

A large family of about 50 genera and over 1,800 species distributed throughout the world with centres in temperate and cold regions of the Northern and Southern Hemispheres. In Ethiopia, there are six genera and 22 species.

In general, all members of the Ranunculaceae are prolific pollen suppliers. Some species do not have nectaries while others are wind pollinated. But several members of the family are important for early development of bee colonies, flowering profusely during rains and many are flowering during times where other bee forages are scarce. Some of the species like *Clematis hirsuta* and *C. simensis* are suspected to be poisonous for honeybees.

Clematis hirsuta Perr. & Guill.

AZO, AZOHAREG, HASO, NECHYEZO HAREG (Amh); JIPAR (Mej); FEETI, HIDDA, HIDDA FEETI (Oro); QEMIDA (Tig).

A climbing shrubby plant (liana), 5 m tall or more; stems sometimes producing long flexible runners or stolons and longitudinally ribbed and furrowed, pubescent to tomentose-villose. Leaves opposite, pinnate, rarely bipinnate; leaflets ovate to broadly ovate, crenate-serrate with mucronulate apex. Flowers white with yellow anthers.

Growing at edges and in remnants of montane forest and bushland, wooded grassland, often covering other bushes and rocks on open slopes, and roadsides and paths, at altitudes between 850 and 3200 m, in most floristic regions, and also widespread in many parts of tropical Africa and Arabia.

Flowering from September to December, the liana is a potential nectar and pollen source for honeybees, but beekeepers have reported that the plant is poisonous to honeybees.



Figure 318 *Clematis hirsuta*

Clematis simensis Fresen.

AZO, YEAZOHAREG (Amh); ELAYA, ILYADISA (HAR); FEETI, FLAYADIMA, HIDDA, HIDDA FEETI, XIRROO, YIDDA TELO (Oro); HAREG, QEMIDA (Tig).

A woody climber (liana) to 10 m or more, sometimes with long branches lying on the

ground; stem pubescent, longitudinally ribbed and furrowed. Leaves pinnate; leaflets ovate to ovate-lanceolate. Flowers pale yellow to white.

Growing mostly in ecotones and disturbed habitats, particularly along forest edges and in bushland, rocky hillsides and old lava beds with shrubby vegetation and along paths, at altitudes between 1500 and 3400 m, through the Ethiopian Highlands (Ethiopia and Eritrea), and also widespread in many parts of tropical Africa and Arabia. Flowering from September to December, the climber is a potential nectar and pollen source for honeybees, but beekeepers reported that the plant is poisonous to honeybees.

The very acidic juice has been recorded as being used for making tattoos, and possibly also for engraving iron. The leaves are used to dress wound and the sap against bloat in animals. The seeds are used against rheumatic pain. There are also reports of the plant being eaten as a cooked vegetable.



Figure 319 *Clematis simensis*

RESEDACEAE

The family is composed of annual, biennial or perennial herbs, or small shrubs, rarely straggling. Leaves alternate, herbaceous, simple, though usually some or all lobed, and then midrib always winged, margins entire or toothed; stipules absent or with minute basal teeth. Flowers small, solitary or arranged in a simple, rarely branching, raceme of many flowers, white, yellow or cream, sometimes sweet smelling; stamens 8-many, usually deciduous, nodding when young. Fruit a brittle or membranous capsule, open or closed at the top, cylindrical to depressed-globose or ovoid, bearing small, kidney- or bean-shaped seeds, often covered in a dense pattern of minute papillae, black or nearly so.

A family of the northern hemisphere with six genera and about 70 species and represented by three genera and seven species in Ethiopia.

Members of the Resedaceae are attractive to bees and the cultivated garden ornamental *Reseda odorata* is a well known honey plant. In Ethiopia, *Caylusea abyssinica* is an important supplier of nectar and pollen, especially during times when other bee feed is scarce.

Caylusea abyssinica (Fresen.) Fisch. & Mey.

RECH, YEAROGIT MEFAKEYA (Amh); YAMMO (Kaf); REENCHII, YERENJI (Oro).

An erect annual herb, growing up to 150 cm tall; stems glabrous to sparsely pilose. Leaves sessile, lanceolate, margins entire or sometimes undulate, often rough or toothed. Flowers white and arranged in dense spikes.

Growing in open grassland, cultivated fields and rocky areas, at altitudes between 1700 and 2800 m, in most floristic regions, and also in upland Eritrea, Kenya, Tanzania and Uganda. It can be propagated from seeds.

It has a long flowering period, but mostly flowering during dry period from November to January. Honeybees collect pollen and nectar from the flowers. The leaves are boiled and eaten during famine time and the roots are used for tooth brush.



Figure 320 *Caylusea abyssinica*

RHAMNACEAE

Members of the family are composed of trees, shrubs or lianas, often spiny. Leaves simple, alternate to opposite; stipules present. Flowers regular, bisexual, solitary or in fascicles, cymes or umbels; petals 4-5, small and clasping the stamens and hooded, or absent; stamens 4-5, alternate with sepals. Fruit a capsule, schizocarp or drupe with one seed per locule.

The family is composed of about 45 genera and 900 species, which are widely distributed in all tropical, subtropical and temperate regions. In Ethiopia, 15 species in eight genera have been recorded.

This family provides beekeepers world-wide with many valuable honey sources like *Gouania* species, *Rhamnidium glabrum* and the widespread tropical *Ziziphus jujuba*, *Z. mauritiana*, *Z. nummularia*, *Z. oxyphylla* and *Z. spina-christi*, among which *Gouania longispicata*, *Z. mauritiana* and *Z. spina-christi* are also valuable sources of honey in Ethiopia.

***Gouania longispicata* Engl.**

A scandent shrub or woody climber to 8(-12) m; stems reddish brown with fine hairs. Leaves alternate, ovate, lower parts of the leaves persistently greyish tinged, orange and covered with fine hairs. Flowers white-green or creamy white scented and borne in long spike.

Growing abundantly in lowland and upland forests and riverine forest, secondary forest and scrub as well as in coffee plantations, at altitudes between 1000 and 2400 m, in most floristic regions, and also in Nigeria and from Sudan to Zimbabwe. Flowering from September to November, the plant provides nectar and pollen for the honeybees. Honey from this plant has light colour and harvested in Hareenna Forest in Bale Floristic Region, and also in western and southwestern parts of the country.



Figure 321 *Gouania longispicata*

***Helinus mystacinus* (Ait.) E.Mey. ex. Steud.**

GALIMA (Amh); XERO (Oro); QEMIDA (Tig).

A woody climber to 6 m high; stems much branched; branchlets glabrous with scattered hairs and covering all parts of the supporting plant. Leaves ovate, grey and subglabrous or rarely covered with silky hairs. Flowers light green or yellowish green, numerous and arranged in heads.

Growing along forest margins and in forest clearings, secondary forest and scrub,

wooded grassland and bushland and abandoned cultivations, at altitudes between 1200 and 2200 m, throughout Ethiopia and also from Ethiopia, Uganda and Somalia through east Africa to Natal in South Africa.

It has extended flowering period from September to December and is a potential source of pollen and nectar for honeybees. The flowers are frequently visited by honeybees during active and dry season. Honey from this plant is light green and produced in association with other plants.



Figure 322 *Helinus mystacinus*

***Rhamnus prinoides* L'Herit.**

GEBHO (Age); GESHO (Amh, Gam, Had, Har & Sah); dogwood (Eng); SIEWA (Ge'e); GISHE (Gur); GESHO, RAHA, TADO (Oro); gesha (Kem & Sah); GESHO, GIESO (Tig); GESHWA, TANDO (Wol).

An evergreen shrub or small tree growing up to 6 m high; bark grey-brown and clearly dotted with breathing pores. Leaves alternate, glabrous, and ovate to elliptic or oblong. Flowers inconspicuous, greenish-yellow, and solitary in small clusters in the axils of the leaves.

Growing in grasslands, rainforests and on the margins of evergreen forests, on stream banks, frequently among rocks and also locally cultivated, at altitudes between 1000 and 3200 m, in nearly all floristic regions of Ethiopia, and also in Eritrea, Sudan through to Cameroon and east Africa to South Africa and Angola and also in Arabia. It is prop-

agated from seedlings.

Flowering between November and January, honeybees vigorously forage for pollen and the shrub is one of the best feed sources to strengthen honeybee colonies before the main honeyflow season. Honeybees also contribute for the pollination of the plant for more seed production.

The plant is also used for firewood, flavouring (leaves) and medicine (roots). The roots contain ingredients said to “purify” the blood. The leaves are used to flavour the local alcoholic drink TELLA, which is brewed from fermented barley, sorghum or finger millet and also to flavour TEJ. It is also used to treat pneumonia, rheumatism, sprain, and stomachache and as a gargle. It is also used in the treatment of skin complaints and respiratory infections.



Figure 323 *Rhamnus prinoides*

***Ziziphus mauritiana* Lam.**

QURQURA (Amh & Oro); GABITE, GARBILE (Das); GAB, GABA, GABI (Mur); GOB (Som); GEVA (Tig).

A much branched spiny shrub, or tree to 10 m high with drooping angular branches; bark grey-black, with pairs of dark brown spines, both straight and re-curved. Leaves rusty tomentose, ovate to elliptic. Flowers yellowish-green, scented. Fruit a drupe, globose to ovoid, up to 2 cm, yellowish to reddish or blackish, edible and subacid to sweet.

Growing in riverine thickets and riverbanks, *Acacia* woodland and *Acacia* wooded

grassland on alluvial soils, at altitudes between 400 and 1600 m, in Ilubabor, Gamo Gofa, Sidamo, Bale and Harerege floristic regions, and also widespread in the drier parts of tropical Africa, Asia (native in parts) and in America where it is an introduction.

The tree is a hardy plant that copes with extreme temperatures and thrives under rather dry conditions. It is known for its ability to withstand adverse conditions, such as salinity, drought and water logging. It can be propagated from seeds but pretreatment is essential.

Flowering in December and January, honeybees forage for the nectar and pollen. Nectar secretion is reduced by drought. Honey is yellow brown with slow granulation and extra sweet.

The tree produces excellent firewood and good charcoal. The wood is used for general construction, furniture and cabinet work, tool handles and agricultural implements. The fruit is eaten fresh or dried and can be made into a floury meal, butter, or a cheese like paste, used as a condiment. Leaves are used as nutritious fodder for sheep and goats. It is a suitable species to aid in fixation of coastal dune sand, shade or shelter. The tree has been planted for shade and wind breaks. The tree is also useful as a living fence; its spiny stems and branches deter livestock.



Figure 324 *Ziziphus mauritiana*

***Ziziphus spina-christi* (L.) Desf.**

GABA, GEBA (Age); GABA, GEBA, QURQURQ (Amh); christ's thorn, crown of thorns (Eng); GABA, Qurqura (Oro); GEB, GOB, KRENASI (Som); GEBA, GEVA (Tig). An evergreen shrub or small tree up to 10 m high; bark dark grey or dull black and irregularly fissured. Leaves alternate, crenate to serrate, usually 3-nerved from base, oblong-elliptic, with tip rounded and slightly notched at symmetric base. Flowers greenish-yellow, fragrant and arranged in many flowered axillary cymes. It can be propagated from seeds.

Growing in wooded grassland on limestone slopes, *Acacia* bushland on alluvial soils, in and along dry riverbeds, edges of cultivations and gardens, at altitudes from sea level to 1900(-2400) m, in most floristic regions, and also widespread in Eritrea, in the dry parts of North Africa, the Near and Middle East arid areas and introduced and naturalized in east Africa. It is known for its ability to withstand adverse conditions, such as salinity, drought and waterlogging.

Flowering from April to June, honeybees forage for the nectar and pollen from the flowers all year round. Nectar secretion is reduced by drought. Honey is yellow-brown with slow granulation and it is extra sweet. Honey fetches higher price in Saudi Arabia and Yemen, and it is recommended to plant this species in the lowlands for honey production and stabilizing the environment.

The tree also produces excellent firewood and good charcoal. The fruit is eaten fresh or dried and can be made into a floury meal, butter, or a cheese-like paste, used as a condiment. The leaves are used as nutritious fodder for sheep and goats. It is a suitable species to aid in fixation of coastal sand dune. The tree is planted for shade and as a windbreak.



Figure 325 *Ziziphus spina-christi*

ROSACEAE

Members of the family are composed of trees, shrubs and herbs, usually perennials. Leaves alternate, simple or compound, often with toothed margins; stipules present. Flowers very variable; petals five or absent and stamens 1-many. Fruit various, dry or fleshy.

A cosmopolitan family with about 2,000 species, largely concentrated in temperate regions, and containing economic value, both for food and as ornamentals. It is represented by 12 genera and 30 species in Ethiopia.

Hagenia abssynica is the most important honey and pollen source in higher altitudes. In addition, several *Rubus* species also supply honeybees with abundant pollen and nectar, especially in forest clearings, and in some areas *Prunus africana* has been reported as a valuable source of honey.

***Hagenia abyssinica* (Bruce) J.F. Gmel.**

GORA-GORA (Age); KOSO (Amh); WENQOQO (Gam); SOBERT, SOSEN (ge'e); KEBSE (Gur); SUTO (Had); KOSHO (Kaf); TIEMA (Kam); DUCCA, FETO, FICHO, HEXXO (Oro); HETOT (Sid); HABBI, SONSO (Tig); JOLIYA-MITA, KOSUWA, TALIIYA (Wol).

A tree up to 20 m with a short trunk and thick branches; young branches pubescent with stiff hairs and branchlets covered in silky brown hairs; bark red-brown, thick and flaking irregularly. Leaves compound, to 40 cm long bearing 5-8 narrowly oblong leaflets on each side. Flowers in large conspicuous drooping panicles up to 60 cm long; female inflorescences pink-red; male inflorescences orange-white and the sexes are on different trees.

Growing in montane forest and wooded grassland, at altitudes between 2400 and 3300 m, in nearly all floristic regions, and also in upland Eritrea, Sudan, Uganda, Kenya, Tanzania, Central African Republic, Zimbabwe and Malawi. *Hagenia abyssinica* may have been one of the dominant trees in the upper part of the montane forest belt in Ethiopia but now only scattered trees remain in most highland areas.

Honeybees collect a large quantity of pollen from male flowers for brood rearing and it is recommended to plant the tree for strengthening honeybee colonies during early honey flow period.

The tree also provides firewood, poles, timber (furniture), wind break, fodder for livestock and a strong anthelmintic medicine named KOSSO is obtained from the female inflorescences. The extracts of the female inflorescences have been reported as being able to kill freshwater snails, the intermediate host of schistosomiasis parasites, schistosomes.



Figure 326 *Hagenia abyssinica*

***Malus sylvestris* Miller**

POM (Amh); apple (Eng); TUFAH (Ge'e & Tig).

A tree to 3-6 m high; stems, tomentose or heavily pubescent when young. Leaves clustered on pubescent and spur branches, ovate, elliptic to obovate or suborbicular, crenate or serrate along the margins. Flowers white or pink, arranged on spurs in clusters along the fruiting section of the branch.

Cultivated in gardens, experimental sites and also recently in plantations, at altitudes between 1700 and 3000 m, in Shewa, Arsi, Gamo Gofa, Sidamo, Bale and Harerge floristic regions. It is native of southwest Asia now cultivated throughout the world for its edible fruits.

Honeybees bring about 90% of pollen transfer in the orchard. Apple trees would bloom over a number of weeks but mostly the first 9–10 days result in effective pollination. Honey bees show a strong fidelity to forage on the flowers for nectar and pollen. Honey from the plant is light in colour and it granulates rapidly.



Figure 327 *Malus sylvestris*

Prunus africana (Hook.f.) Kalkm.(syn. *Pygeum africanum*)

AQOMA, TIKUR INCHET (Amh); red stinkwood (Eng); BERU (Gam); ARARA (Had); KARO (Mao); BURAYU, GARBI, GURAYU, HOMI, MUKORAJA, OMI, SOSHE, SUQQE (Oro); BERU (She); MRCHIKO (Sid); GARBE, ONSA (Wol).

A medium to large evergreen tree with a spreading crown, up to 25-35 m; bark rough, dark-brown, scaling irregularly, branches corky and dotted with breathing pores. Leaves smooth, shiny dark-green above, paler beneath, with prominent mid-ribs, with shallowly serrate margins and pinkish petioles, and when crushed having a faint smell. Flowers greenish-white, fragrant and borne on stalks of about 8 cm long. Fruit rounded, about 1 cm in diameter and dark red. The tree is easily propagated from seeds.

Growing in montane and riverine forests, at altitudes between 1700 and 2500 m, in most floristic regions, and also in East Africa, Angola, Zambia, Malawi, Zimbabwe, South Africa, Madagascar and the Comoros.

It flowers from September to November and the white flowers are scented, small and very attractive to honeybees and honeybees collect nectar and pollen. The honey from this plant appears in mixed form with that of other trees like *Ekebergia capensis*, *Apodytes dimidata* and *Cordia africana*. The honey is reported to be white and it is highly recommended to grow the species around apiary for strengthening honeybee colonies and for honey production.

The stem bark provides a popular medicine against urinary disorders. The bark is exploited in Africa on a large scale for its medicinal value. In South Africa, the bark is used to treat chest pains. The bark extracts have become popular in Europe for the treatment of prostate hypertrophy. It is also used as firewood, for charcoal, poles and utensils (mortars). The wood makes good timber with many uses.



Figure 128 *Prunus africana*

***Prunus x domestica* L.**

PRUGN (Amh); plum (Eng); pflaume (Ger).

A small deciduous tree, growing to 12 m tall but mostly much smaller, unarmed or with small spines. Leaves elliptic to oblong, pubescent when young, up to 10 cm long. Flowers white and borne in clusters. Fruit fleshy, ovoid to subglobose, mostly red to violet, sometimes yellow or green, with light green, yellow or red flesh, sweet and very delicious; the stone is rough to smooth.

The tree is cultivated in and around Addis Ababa in Shewa Floristic Region, and with good potential for other highland areas over 1900 m, which is also long cultivated in Europe, West Asia and North Africa. It is propagated from seeds and cuttings.

Flowering from October to December, honeybees collect pollen and nectar from the flowers frequently and are the primary pollinators. Honeybees are essential for this tree to set fruit through pollination. Plum is grown for its fruit and is now a very valuable crop in and around Addis Ababa and other major towns. The fruiting season is around January.



Figure 329 *Prunus x domestica*

***Prunus persica* (L.) Batsch.**

KOK (Amh, Ge'e, Gur, & Tig); peach (Eng); Pfirsich (Ger); KOKI (Oro).

A deciduous tree to 6 m high but normally pruned in cultivation; bark grey brown, splitting; young twigs angular. Leaves oblong-lanceolate. Flowers subsessile, mostly solitary, deep pink, usually borne on one side of branches, which later take the weight of the trees in fruit.

It is widely planted in the highlands for fruit production, at altitudes between 1800 and 2400 m. It is propagated from seeds and wildings.

Flowering in September and October, honeybees collect abundant pollen and nectar from the flowers through frequent visits. In dense stands, the species contributes to strengthening honeybee colonies and improving honey production. It produces large quantities of fruit which are eaten fresh.



Figure 330 *Prunus persica*

***Rosa abyssinica* Lindley**

QEGA (Amh); abyssinian rose (Eng); ARBEQ, MIERSENS, MIRSENS, MIRSANS (Ge'e); INGOCHA (Gur); SEGO (Had); MAWORDI (HAR); GORA, INQOXXO, QAQAWA (Oro); DAYERO (Som); QAQA (Tig); TSIGE-REDA-CHISA (Wol).

A shrub that can grow up to 7 m high and produces many stems from the base, usually some of the stems are climbing or growing between other shrubs; the stems and branches are provided with curved prickles. Leaves compound, leathery, with three pairs of leaflets plus one at the tip, each narrowly ovate, margins toothed. Flowers white or pale yellow with central mass of anthers, sweet-scented, and arranged in dense heads.

Growing in thickets in upland dry evergreen forest and margins, clearings, upland bushland, rocky places, dry grassland, riparian formations and also in different types of man-made habitats, at altitudes between 1900 and 3300 m, in the Ethiopian Highlands (Ethiopia and Eritrea), and also in Sudan, Somalia and Yemen.

Flowering from September to December, it is a potential pollen source plant and honeybees collect an abundant pollen load from the flowers during dry period and it is highly recommended to plant it around an apiary. It is also used for firewood, food (fruit), medicine and as live fence.



Figure 331 *Rosa abyssinica*

***Rosa x richardii* Rehd.**

TSIGIE-REDA (Amh); rose (Eng).

A perennial ornamental prickly shrub, growing up to 3 m high. Leaves broadly elliptic or ovate. Flowers variable in colour, white, red or pink and arranged in solitary heads. Cultivated since ancient times, particularly around churches and occasionally escaped into dry forests, around villages and on way-sides, at altitudes between 1000 and 2400 m, in Shewa Floristic Region, and certainly throughout the Christian highlands, and also in Eritrea and Egypt.

Flowering all year round, it is a pollen source plant for honeybees.



Figure 332 *Rosa x richardii*

Rubus steudneri Schweinf.

ENJORI (Amh);ARGI, MELLITANO (Gam); ENJORE (Gur); HINJARO (Had); HAMA-ROO (Kam); GODA, GORCHO, GORA, GUMERE, HALTUFA (Oro); KWESHESHELLA (Tig); HENJORIYA (Wol).

A scandent shrub with deeply furrowed stems up to 4 m high. Leaves simple or 3-5-foliolate with leaflets obovate-elliptic in shape with toothed margins. Flowers pink or orange to dark red and in large panicles.

Growing at forest fringes and secondary scrub, at altitudes between 2300 and 3000 m, in most floristic regions Ethiopia, and also on a few mountains in Kenya, Uganda, Tanzania and Dem. Rep. Congo.

Flowering from August to January, honeybees collect nectar and pollen from the flowers frequently. The fruit is edible.



Figure 333 *Rubus steudneri*

RUBIACEAE

Members of the family are composed of trees, shrubs and herbs. Leaves decussate or sometimes in whorls of 3(4) or more, with entire margins; stipules inter- or intra-petiolar, rarely leafy. Inflorescences terminal or axillary, basically a panicle or thyrses, but often variously modified. Flowers (3)4-5(12)-merous, bisexual, seldom unisexual, actinomorphic, occasionally slightly zygomorphic, rather frequently heterostylous. Corolla tubular to campanulate; stamens as many as and alternating with the corolla lobes. Fruit either indehiscent and dry or fleshy (berries, drupes), dehiscent into mericarps or capsules.

A large, predominantly tropical and subtropical family of more than 600 genera and over 10,000 species. In Ethiopia, the family is represented by 55 genera and 116 species (including subspecies).

Numerous species of this family are attractive to honeybees for pollen and nectar supplies. Several species are known world-wide as important honey sources while *Coffea arabica* is the major honey source plant in Ethiopia.

***Coffea arabica* L.**

BUNA (Afa, Amh, Gur, Oro, Sid and Tig); arabica coffee (Eng); affeebaum (Ger).

An evergreen shrub or a small tree that grows up to 5 m high. Leaves simple, opposite, broadly ovate, glabrous, shiny and dark green when mature. Flowers white, fragrant, borne in leaf axils and last only a few days.

An understory tree growing in moist montane forests, at altitudes between (1000-)1400 and 2100 m, with a rainfall range of about 2000 mm per year. It is presumably wild in Welega, Ilubabor, Kefa and Bale floristic regions of Ethiopia, southeastern part of South Sudan, North Kenya and widely cultivated throughout the tropics. Formerly presumed endemic of western and south-western forests of Ethiopia and it has now spread through trade first into southern Arabia and from there it was taken to the East Indies by Dutch traders late in the 17th century. Planted throughout the tropics, but particularly in East and West Africa and Central and South America and the West Indies. It can be propagated from seedlings.

Flowering profusely after rains but some coffee trees are found with flowers at any time of the year. Arabica coffee is a very important nectar source and provides moderate amounts of pollen. The nectar flow is very intensive and only reduced by drought. The sugar concentration is medium and the pollen is heavy and sticky. Honeybees were observed foraging all day round. It seems that bees can play some important role in increasing coffee berry yields and seed weight, and it is suggested that coffee growers in Ethiopia should keep honeybee colonies in their plantations. The honey has a characteristic flavour and its colour varies from brownish to black. In the western and southwestern parts of the country, it also usually contributes to mixed honey with *Albizia* species and *Croton macrostachyus* in which its flavour predominates. *Coffea arabica* is a major honey source of the western and southwestern parts of Ethiopia.

Arabica coffee is grown for its beans (the seeds), which are washed, dried, roasted and ground to make coffee for drinking. In production, Ethiopia stands seventh worldwide. The residues from coffee processing are used as fertilizer and mulch elsewhere. The leaves can also be used as fuel and animal fodder. In Ethiopia, drinks

are prepared from dried leaves and dried and roasted whole berries as well as the green beans. Tea is also made from green leaves elsewhere.



Figure 334 *Coffea arabica*

***Galiniera saxifraga* (Hochst.) Bridson**

BUNA-MESAY, SOLIYE, TOTA-QULA, YETOTA BUNA (Amh); BURT (Ber); DIDO, SIMARARU, DEBO, DIBO, DIDO, DIDU (Kaf); ABBAYYII-GURRAA, ADAMO, DIDU, KUDHMI, MIXOO, QORAALAA-QORALAA, QUDHUMII, SARBANDAI SOLIE, SIGDEE (Oro); DAUJICHO, SEGHEDE (Sid).

A shrub or tree to 12 m high; branches grow out in whorls from the trunk, hanging down with regular rows of large opposite leaves. Leaves shiny, ovate, the tip clearly pointed with a hairy stalk. Flowers small, white and fragrant like coffee flowers. Fruit a green berry, which is ripening red. The species can be propagated from seeds and seedlings.

A very common species growing in a wide range of habitats, commonly growing in upland forest but sometimes also in secondary montane scrub, often near streams, at altitudes between 1500 and 3000 m, in most floristic regions of Ethiopia, and also in Eritrea and south to Zambia and Malawi.

The fragrance of the flowers attracts honeybees for nectar and pollen and the shrub is one of the major honey source plants during September, October and November.

It contributes for honey production in association with other plants.

The plant is also used for firewood, farm tools and the fruit is used as shot by children to make the sound of gun.



Figure 335 *Galiniera saxifraga*

***Pavetta abyssinica* Fresen.**

DINGAYSEBER, KAMADUA, YETOTA BUNA (Amh); TUSHIMO (Kaf; AYINOMAYY-EE, BUNUTII, MUKA-BUNNA, QAQESSAA (Oro); SHAMELEHO (Sid); GERBIS (Som)

A shrub or small tree to 4 m with hairy branches. Leaves opposite, covered with dots and the leafy stipules at each node are joined and have a sharp tip with hairs. Leaves ovate, grey-green and hairy, especially below. Flowers greenish-white and arranged in dense terminal racemes. Fruit a berry, dark green, ripening black, globose. The species is propagated from seeds and seedlings.

Growing in dry evergreen montane *Podocarpus* or *Juniperus* forest, bush clumps, riverine vegetation, open deciduous woodland and rocky outcrops, at altitudes between (1300-) 1800 and 2800 m, in most floristic regions, and also from Eritrea in the north to Tanzania in the south.

Flowering during the rainy season in July and August, honeybees collect nectar and

pollen from the tubular flowers during extraordinary conditions. The plant is also used for firewood and mulch.



Figure 336 *Pavetta abyssinica*

Pavetta gardeniifolia A. Rich.

KAMADUWA, YETOTA BUNA (Amh); GALO (Oro); AINO-MAYE-I, DHULQADI-IDH, HARAAGE-TAAGYAR, ILCAS (Som).

A scandent shrub or small tree growing up to 2-3 m high with hairy young branches. Leaves simple, lanceolate to elliptic. Flowers creamy white or whitish green, borne in dense head-like corymbs, fragrant. Fruit deep green and turning black at maturity. Growing in *Combretum* -*Terminalia* and other woodlands, evergreen bushland, in bush clumps in much disturbed sites, often associated with rocky places, at altitudes between 800 and 2100 m in Tigray, Shewa, Kefa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also in Eritrea, Somalia, south to South Africa and west to Togo. Flowering in September and October, the plant provides nectar and pollen for honeybees and contributes for honey production in association with other plants.



Figure 137 *Pavetta gardeniifolia*

Pentas schimperiana (A. Rich.) Vatke

WOYINAGIFIT (Amh); MOSA-ABRI (Gur); QAASII (Oro).

A shrub or woody herb 0.5-3 m tall, soft-wooded and densely pubescent. Leaves ovate to narrow ovate, mostly acuminate at the apex. Flowers white and tinged pink on the outside, or entirely pinkish and borne in many-flowered, branched corymbose inflorescence.

Growing in montane scrub, bushland, edge of montane rainforest and in open places in more or less disturbed forest, at altitudes between (1800-)2000 and 3000(-3200) m, in nearly all floristic regions and also south to Malawi and Zambia.

Flowering from September to November, honeybees collect a large quantity of nectar from the tubular flowers.



Figure 338 *Pentas schimperiana*

RUTACEAE

Members of the family include shrubs and trees, occasionally herbs or climbers, sometimes with spines or prickles, and aromatic oils present. Leaves simple or compound, alternate or opposite. Flowers usually radially symmetrical, perfect or unisexual; petals free or united; stamens inserted at base of disc, as many or twice as many as sepals, rarely numerous and in bundles, absent or reduced to staminodes in female flowers. Fruit various, mostly fleshy and few-seeded in Ethiopian genera.

The family comprises about 150 genera and 900 species, which are widely distributed in the tropical and warm temperate areas of both hemispheres but most numerous in South Africa and Australia. In Ethiopia, there are ten genera and 26 species.

Clausena anisata (Willd.) Benth.

LIMICH (Amh); GAMCHLE, GAEJA (Gam); SNFKO (Gur); IMBRICCO (Kaf); ULUMAY, URMAYA, ADESSA, WALAYA (Oro); CIKOTE (Som); DASHLOME (Wol).

A medium-sized tree or deciduous shrub growing up to 7-10 m high; bark grey or green. Leaves with leaflets broadly to narrowly ovate to elliptic and strongly aromatic. Flowers cream to white, arranged in axillary panicles. It is propagated from seeds

and cuttings.

Growing at montane forest margins, sometimes forming dense thickets, as understorey tree in tall moist forests but also common in secondary bushland, at altitudes between 1500 and 2300 m, in most floristic regions, and also west to Sierra Leone and Guinea, and south to Cape Province of South Africa.

Flowering from November to May, honeybees forage frequently for the abundant nectar and pollen from the flowers.

The leaves are used to reduce bee sting. The plant is also used for firewood, as teeth brush and in traditional medicine, it is used as a disinfectant and the roots are used against ascariasis.



Figure 339 *Clausena anisata*

***Ruta chalepensis* L.**

TENA-ADAM (Amh); CADIIRAMO (Kaf); CHILATAMA (Oro); CENNA-ADAM (Tig).

An erect, blue green perennial herb, up to 1 m high. Leaves divided into several narrow segments. Flowers yellow. All parts of the plant have a distinctive spicy smell.

This spice plant is widely cultivated throughout the highlands above 1500 m, as a culinary herb, to flavour milk, cottage cheese, coffee and tea and it is also used in the preparation of BERBERE. It is native of the Mediterranean or Middle East.

It can be found in flower most times of the year after the rains. Honeybees collect nectar and pollen from the flowers.



Figure 340 *Ruta chalepensis*

Vepris dainellii Pic.Serm.

ADESSE, HEDHESSA, KULASA (Oro).

An evergreen small tree or shrub 2–15 m high; bark smooth and grey. Leaves opposite to subopposite, compound with three similar leaflets, which are leathery, long and narrow, with pointed tip. Flowers whitish grey, male and female flowers are found in large conical heads. Fruit bilobed, soft, bearing glands and borne on branched stalks. An endemic species growing in understory of moist montane forest, often with *Podocarpus falcatus* or *Pouteria adolf-friederici*, less often at forest margins or in secondary growth, extending into lowland *Celtis-Pouteria altissima* forest, at altitudes between (1050-)1700 and 2000(-2500) m, in Gojam, Shewa, Welega, Ilubabor, Kefa, Sidamo and Bale floristic regions. It is propagated from seedlings and wildings.

Flowering in December and January, it is a pollen source for honeybees. It is also used for firewood and timber (local furniture and farm tools).



Figure 341 *Vepris dainellii*

SALVADORACEAE

Members of the family are composed of trees or shrubs, unarmed or with axillary spines. Leaves mostly leathery, opposite, simple and entire; stipules minute or absent. Flowers regular bisexual or unisexual, in dense axillary or terminal fascicles or panicles; petals 4(-5), free or partially united; stamens 4(-5), epipetalous or inserted near base of petals and alternate with them. Fruit a berry or drupe.

A small palaeotropical family of three genera, two of which with one species each occur in Ethiopia, and are often important constituents of the vegetation in arid areas. The fibrous stems of *Dobera*, and particularly *Salvadora*, are used by many Africans as tooth brushes. Recent research has shown that *Salvadora persica* contains anti-bacterial compounds.

Dobera glabra (Forssk.) Poir

GARAS (Afa & Saho); GARAS, KARAS (Som); GERSA (Tig).

A much-branched evergreen shrub or tree up to 1.8-7.5 m tall, with a spreading

crown; bark green to dark grey, wood pale butter yellow when cut. Leaves olive-green, opposite, leathery, elliptic to ovate or obovate, rarely lanceolate or orbicular. Flowers white and arranged in axillary and terminal panicles.

Growing in open *Acacia* woodland with grassy clearings and *Acacia oerfota* scrub, often on rocky hillsides, at altitudes between 400 and 1300 m, in Shewa, Sidamo, Bale and Harerge floristic regions, and also throughout the dry parts of Eritrea, NE Africa, Sudan, Somalia, Uganda and Kenya, extending to Arabia and India (Bombay).

Flowering from January to March, the shrub/tree is a potential pollen and nectar source for honeybees.



Figure 342 *Dobera glabra*

SAPINDACEAE

Members of the family include trees, shrubs and woody (rarely herbaceous) climbers. Leaves alternate, simple, 3-foliolate, pinnate or bipinnate. Flowers unisexual in racemoid or paniculate terminal or axillary thyrses; petals 0-5, sometimes with scales on the inside; stamens (3-)5-12(-30), free or united at base, reduced in female flowers. Fruit a capsule, berry, drupe, samara or a schizocarp, bearing seeds, which are often

with a fleshy arillode.

The family is composed of about 150 genera and 2,000 species, which are widely distributed in all tropical and subtropical regions. In Ethiopia, the family is represented by 14 genera and 19 species.

***Allophylus abyssinicus* (Hochst.) Radlk.**

LN'MBS (Amh);TESTES (Gum);SHEO (Kaf);ABAR,ABERRA,AREJE,DRUBA,HIRKAMO, SARARA (Oro); QARNSHI (Tig);WORAFUTO (Wol).

A forest tree growing up to 20 m high; bark grey and smooth. Leaves compound with three leaflets, which are elliptic to obovate. Flowers light green or creamy-white, much branched and fragrant.

Growing in *Juniperus*, *Podocarpus*, *Pouteria-Olea* and *Albizia Croton* forest, riverine forest, forest edges and often persisting after forest clearing, at altitudes between (1450-)1600 and 2800(-3000) m, in nearly all floristic regions, and also in upland Eritrea, Sudan, Uganda, Kenya, Tanzania, Rwanda, Mozambique, Malawi and Zimbabwe.

Flowering from October to December, the scented creamy-white flowers provide abundant pollen for rearing brood. The tree is also used as a source of firewood, charcoal and for making agricultural tools.



Figure 343 *Allophylus abyssinicus*

◆ ***Dodonaea anugustifolia* L. f.**

◆ KERARA (Agew); KITKITA (Amh); ETACHA, (Oro); hopbush (Eng); ITANCHA (Sid); DEN, HAYRAMAT (Som); GEREGETWA (Wol).

A shrub or small tree growing up to 6 m high with a light crown; all parts are smooth and resinous when young. Leaves simple, up to 13 cm long, with pointed tips, young leaves light green, shiny and sticky. Flowers greenish-yellow, male and female separate. It is propagated from seeds and wildings.

It is adapted to a wide range of climate and soils, from riverine forest to rocky soils or arid marginal areas growing at edges of upland forest, *Acacia-Commiphora* bushland and wooded grassland, at altitudes between (500-)1000 and 2700(-2900) m. It has wide natural range occurring in almost all floristic regions of Ethiopia and in tropical and subtropical Africa, India and Australia.

Flowering in December and January, the species is an important source of honey, providing nectar and pollen to maintain honeybee colonies during dry periods.

It is commonly used for firewood and charcoal making. It is a useful tree for soil conservation. In traditional medicine, the leaves and roots are used against AKOSHITA and haemorrhoids. The leaves are also used as febrifuge for wound dressing and sore throats.



Figure 344 *Dodonaea anugustifolia*

Haplocoelum foliolosum (Hiern) Bullock

CHENA (Oro).

A tree to 10 m; high bark grey, smooth with circular foldings; branchlets pubescent. Leaves on short lateral dwarf shoots and on terminal long shoots, oblong to obovate in shape. Flowers yellowish or cream.

Growing in *Acacia*, *Combretum-Terminalia*, *Combretum-Piliostigma* woodland, at altitudes between 1200 and 2300 m, in Shewa, Arsi, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also in Eritrea and south through eastern Africa to South Africa.

Flowering in December and January, honeybees visit the flowers for nectar and pollen. Honey from this plant is brown in colour and it granulates easily.



Figure 345 *Haplocoelum foliolosum*

SCROPHULARIACEAE

Members of the family include annual, biennial and perennial plants, which are herbaceous or suffrutescent, or rarely climbers, shrubs or trees with erect, ascending or prostrate stems. Leaves opposite or alternate, entire, rarely divided or pinnatifid to pinnate, leaf bases often united. Inflorescence a raceme or thyrse, without

terminal flower. Flowers usually zygomorphic, with or without bracteoles. Corolla sympetalous, zygomorphic, rarely actinomorphic, the two upper petals often united, forming an upper lip opposite to the lower lip with three lobes; stamens usually inserted in corolla tube, sometimes 5, usually 4, the fifth (median) stamen reduced to staminode or absent. Fruit a capsule with septicidal, loculicidal or poricidal dehiscence, rarely indehiscent (berry or drupe).

A cosmopolitan family with 300 genera and about 5,500 species, mainly in holarctic and tropical mountains. The family is represented by 37 genera and 113 species (including subspecies) in Ethiopia.

Bartsia decurva Hochst. ex Benth.

A woody perennial herb up to 60-70 cm high. Leaves sessile, lanceolate with toothed margins. Flowers yellow and tubular.

Growing in Afroalpine vegetation, ericaceous scrub, along roadside and on hillsides, at altitudes between 2500 and 4200 m, in Gondar, Gojam, Arsi and Bale floristic regions, and also in Uganda, Kenya and Tanzania.

Flowering from September to November, the herb is a potential source of nectar and pollen for honeybees, and birds compete with honeybees for the nectar.



Figure 346 *Bartsia decurva*

***Bartsia trixago* L.**

Mediterranean linseed (Eng).

An erect annual herb often reaching up to 0.5 m high. Leaves linear-lanceolate, toothed, dotted with glands and hairs. Flowers purple or whitish-pink with red spots, arranged in dense terminal racemes.

Growing in open places, grassland and ericaceous scrub, at altitudes between 2100 and 3500 m, in Gondar, Gojam, Shewa, Kefa, Bale and Harerge floristic regions, and also a cosmopolitan weed with Mediterranean origin.

Flowering from September to February, the herb is a minor honey source and the flowers are visited by honeybees for nectar and pollen.



Figure 347 *Bartsia trixago*

***Hebenstretia angolensis* Rolfe**

GALELO (Amh).

A shrubby herb, with erect stem, growing up to 30 cm high. Leaves narrow, needle like. Flowers usually white with orange markings.

Growing in montane grassland and montane evergreen bushland, at altitudes between 2300 and 4100 m, throughout the floristic regions of the Ethiopian highlands (Ethiopia and Eritrea) and also in East Africa, Rwanda, Burundi, Zambia, Angola, Zimbabwe and Malawi.

Flowering almost all year round in wetter places, honeybees collect nectar and pollen from the flowers.



Figure 348 *Hebenstretia angolensis*

***Striga hermonthica* (Del.) Benth.**

AKNCHERA, ATQUR (Amh).

An annual herb 20-50 cm tall, with scabrous stems and leaves; stems erect, quadrangular, usually much branched. Leaves opposite, sessile, rather thick and lanceolate. Flowers bright pink, rarely white with tube 10-20 mm long, narrow and bent just above calyx teeth.

Growing in open grassland, but it is also a notorious weed in cultivations, especially of sorghum, at altitudes between 500 and 1800 m, in Tigray, Gojam, Shewa, Kefa and Harerge floristic regions, and also widespread in tropical Africa, Madagascar and Yemen.

Profusely flowering after rainy season from September to November, honeybees collect abundant nectar and pollen from the flowers for colony strengthening.



Figure 349 *Striga hermonthica*

***Verbascum sinaiticum* Benth.**

KETETINA, YEHAYA JORO (Amh); GURRA HARRE, AMBOKANA (Oro); TIRANHA (Tig).

An erect woody herb growing up to 2 m high. Leaves ovate to oblong, or lanceolate, forming a basal rosette and covered with dense, soft hairs. Flowers yellow and arranged in erect simple or branched terminal racemes.

Growing in cultivated ground and grassland, at altitudes between 1300 and 3300 m, in most floristic regions, and also in upland Eritrea, Sudan, Somalia, Kenya, Sinai, Israel, Palestine, Jordan and from Syria to Afghanistan and introduced as weed into Yemen. It flowers all year round but more profusely from August to May and the plant provides pollen and nectar for the honeybees. The leaves are used in local medicine against coughs.



Figure 350 *Verbascum sinaiticum*

SIMAROUBACEAE

Members of the family include trees and shrubs, occasionally scandent, sometimes spiny, usually containing bitter substances, hairs usually simple, sometimes glandular. Leaves alternate, pinnate or simple; stipules absent. Flowers bisexual, unisexual or polygamous and arranged in panicles, racemes or cymes; stamens 4-10, inserted at base of disc, free. Fruit a berry or composed of drupaceous mericarps or dry mericarps. A medium-sized family of about 25 genera and 120 species, which are widely distributed in the tropics and subtropics, the main centers being tropical America and tropical West Africa. In Ethiopia, there are 3 genera and 4 species.

Brucea antidysenterica Lam.

ABALO, WAGNOS (Amh); WAGONS (Ge'e); SHUSHUDIE (Gam); NUQESHO (Kaf); ABALO, HADAWAY, QOMOGNO, TAMICHAA (Oro); MELITA (Tig); SHURU-SHUTTIE (Wol); TOLLO (Yem).

A shrub or a small tree, growing up to 10-15 m; young stems covered with hairs.

Leaves 10–65 cm long, pubescent, oblong to ovate. Flowers light green, arranged in 5–36 cm long, spiciform inflorescences.

Growing in montane forest, evergreen forest, forest margins, secondary growth in deforested areas, river banks and grassland, at altitudes between 1600 and 2800 m, in Shewa, Welega, Ilubabor, Kefa, Sidamo and Bale floristic regions, and also in Eritrea and other tropical African countries.

Flowering in September and October, honeybees collect nectar and pollen during the dry season and the plant supports brood rearing and the maintenance of honeybee colonies before the honey flow period.



Figure 351 *Brucea antidysenterica*

SOLANACEAE

Members of the family include herbs, climbers, shrubs and small trees, which are unarmed or armed with straight or curved prickles. Leaves alternate, sometimes paired, but not opposite or clustered toward the end of branches and sometimes heterophyllous. Flowers single in leaf axils, extra-axillary, or in various forms of cymose inflorescences which may sometimes appear to be racemose or umbellate, bisexual

or gynodioecious, 4- or 5-merous, regular or irregular; corolla 4- or 5-merous, rarely with a different number of parts, united, with very variable corolla-forms, from long tubular to open stellate; stamens with the same number as the corolla lobes, some stamens may be enlarged or reduced to staminodes. Fruit a berry or drupe.

The Solanaceae consists of 2,600 species in 90 genera, which are nearly cosmopolitan in distribution, especially common in South America. In Ethiopia, the family is represented by 16 genera and 68 species.

Several species of this family are cultivated as ornamentals, vegetables, spices, stimulants and as starch plants. Several species of the Solanaceae are visited by honeybees occasionally and then for pollen only. In times where other bee feed sources are scarce they contribute to maintain bee colonies by providing protein, and some species provide even good amounts of nectar, like *Brugmansia suaveolens*, *Datura innoxia* and *Discopodium penninervium*) which are well known honey source plants in Ethiopia.

***Brugmansia suaveolens* (Humb. & Banpl. ex Willd.) Bercht. & Presl.**

YETRUNBA ABEBA (Amh); angel's trumpet (Eng).

A shrub or medium-sized tree growing up to 4 m high. Leaves simple, opposite, ovate-lanceolate and acuminate at the apex. Flowers solitary, axillary, whitish-yellow, long funnel shaped and sterile.

Growing in forest margin and cultivated in parks and gardens, especially in the gardens of public buildings or hotels or in homegardens, at altitudes between 1500 and 2800 m, in Shewa, Kefa and Sidamo floristic regions, and perhaps in other areas. It is indigenous in the coastal rainforest of SE Brazil, but now widely cultivated in the mountains of the tropics, sometimes becoming naturalized.

Flowering in September and October, the flowers are highly visited by honeybees for both pollen and nectar. It was observed that about 100 bees were foraging on a single funnel shaped flower. The plant is suspected to be poisonous for honeybees, which needs further confirmation. It has strong medicinal properties against arthritis, ulcer and skin diseases.



Figure 352 *Brugmansia suaveolens*

***Capsicum annuum* L.**

BERBERE, MITMITA, KARIA (Amh); ADIMEETI (Anu); bell-pepper, birds eye peper, cherry pepper, green pepper (Eng); BERBERE (Gur, Had & Tig); ASU, KUNDEBERBER (HAR); OULULO (Kaf); BERBERI (Kam); MERRMET (Mej); BARBAREE, CHORQA (Oro); BARBARIYA (Wol).

An annual herb growing up to 0.5 m high. Leaves ovate with acuminate apex and very variable in size. Flowers white, solitary or in pairs and terminal or apparently axillary. The herb is cultivated at altitudes between 250 and 2400 m, in many floristic regions of Ethiopia and also in lowland Eritrea. It is indigenous in Mexico and South America, but now cultivated and naturalized in almost all tropical countries.

Honeybees collect pollen and nectar from the flowers and pollination increases fruit and seed set. It is a major condiment in flavouring food.



Figure 353 *Capsicum annum*

***Datura innoxia* Mill.**

YEMOGN ABEBA; YETRUNBA ABEBA (Amh); angel's trumpet (Eng).

A shrubby annual herb up to 2 m tall. Leaves glabrescent or with few, straight, non-glandular hairs, simple, opposite, lanceolate. Flowers yellow, funnel shaped.

A weedy plant that occurs frequently in waste places and often also in dry river beds, at altitudes from sea level to 1600 m in Welo, Afar, Shewa, Sidamo, Bale and Harerge floristic regions, and also locally naturalized in many places in the warm regions throughout the world.

Flowering all year round, the species is a potential pollen and nectar source for honeybees during dearth period (both during rainy and dry periods). It is also used for firewood and as live fence in southwestern Ethiopia, in Illubabor and Kefa (Jimma, Masha and Benchi Maji zones) floristic regions.



Figure 354 *Datura innoxia*

***Datura stramonium* L.**

ETSE FARS, ASTENAGER (Am); ASANGIRA (Oro); WESEBERA, THRIFRA (Tig).

An annual herb, glabrous or sparsely pubescent with non-glandular hairs, up to 1.2 m high. Leaves dark shiny green, large with irregular sharply toothed margins. Flowers erect, large, white and tubular.

Growing in disturbed places, waste ground, roadsides, frequent near water holes or in areas of impeded drainage and in rural homestead areas, at altitudes between 600 and 2800 m, in nearly all floristic regions, and also in Eritrea, Sudan, Somalia, throughout tropical and South Africa, Europe and parts of Asia and America.

Flowering from August to February, honeybees collect nectar and pollen from the flowers.

In local medicine, the leaves are used against headache and for wound dressing for animals. Boiled seeds are used against toothache. This introduced weed has been reported to be poisonous to livestock.



Figure 355 *Datura stramonium*

***Discopodium penninervium* Hochst.**

ALUMA, AMARARO (Amh); AGAYA, AJAYA, MARARO (Oro); ALEHM, ASEHEM, GUA'TA (Tig).

A shrub or small tree growing up to 6 m high; stems with fleshy branchlets, which are brown and hairy; bark smooth, pale to dark brown. Leaves very large and ovate. Flowers greenish-white or greenish-yellow, very small and borne in bunches in leaf axils.

Growing at the margins of montane forest, often in clearings, most frequent in the *Hagenia abyssinica-Arundinaria alpina* vegetation, ericaceous bushland and montane grassland, at altitudes between 1500 and 3500 m, in the Ethiopian Highlands (Ethiopia and Eritrea), and also widely distributed in the montane parts of tropical Africa from Nigeria, Cameroon and Sudan, south to Malawi and Mozambique.

Flowering in September and October, it provides an abundant nectar and pollen for honeybees. In local medicine, the dried stem is burnt as a fumigant during child birth. The plant is also used for firewood, farm tools and live fence.



Figure 356 *Discopodium penninervium*

***Nicandra physaloides* (L.) Gaertn.**

MOGNE ASTENAGER (Amh); apple of Peru (Eng).

A much branched erect annual herb growing to 1.2 m. Leaves alternate with regularly deeply toothed margins. Flowers pale blue to purplish with white centre.

Growing in disturbed ground, waste places, along dry river beds and also as a weed of maize and sorghum, at altitudes between 600 and 2100 m, in most floristic regions, and also in Eritrea. It is indigenous in South America (Peru), but now escaped and widely naturalized in warm regions throughout the world.

Flowering almost all year round, honeybees collect abundant nectar and pollen from the flowers.



Figure 357 *Nicandra physaloides*

***Solanum anguivi* Lam.**

YEWUSHA QARIYA, ZERECH EMBWAY (Amh); BORONUUY (Mej).

A herb or shrub growing up to 2 m high, with spreading branches; most parts usually armed with straight straw-coloured spines. Leaves alternate, ovate to elliptic, upper surface dark-greener than lower. Flowers white or sometimes tinged violet and borne in racemose inflorescences. Fruit yellow, orange or red with reflexed pedicel/stalk.

Growing in evergreen bushland and semi-deciduous woodland, along trails in or at edges of lowland and montane forest, usually a weedy plant of waste places, at altitudes between 500 and 2800 m, in most floristic regions, and also widespread in tropical Africa from Senegal to Somalia, south to Angola and Mozambique, also in tropical Asia from India to China and the Philippines.

Flowering in September and October, the herb is a pollen source for honeybees.



Figure 358 *Solanum anguivi*

***Solanum incanum* L.**

KODADAHE, KOHOSS-ADA (Afa); EMBWA'Y (Amh); DOCHOK, UCHOCK (Anu); TURKETT (Bod); sodom apple (Eng); KIMBIBIA (GUR); MAHE (Kam); GAARANTO (Koe); BONTAY (Mej); HIDDII (Oro); KARIIR, XUNBOOX, XUUBOO (Som); NGULEE (Tig); BUWO (Tse).

A perennial woody herb or shrub about 40-80 cm high with hairy and light green stems, equipped with short spines. Leaves opposite, ovate, toothed along the margins and hairy. Flowers pink with yellow stamens.

Growing in heavily grazed areas and waste places, at altitudes between sea level and 2400 m, in Tigray, Afar, Shewa, Gamo Gofa, Sidamo, Bale and Harerge floristic regions, and also widespread in tropical Africa, the Middle East and India.

Flowering from September to January, honeybees visit the flowers frequently for pollen and nectar.



Figure 359 *Solanum incanum*

***Solanum marginatum* L.f.**

EMBWA'Y (Amh); QUMBAFFO (Kaf); HIDDI (Oro); CAG-WARAABAALE, CAND-UURO-SHUGUX (Som); GEBERENBUYEH (Tig).

A shrub growing up to 2-3 m high, much branched; stems covered with short triangular prickles. Leaves oblanceolate, entire, or with wavy margins. Flowers white or lilac, arranged in dense corymbs. Fruit large, green with grey strips.

Growing along trails and edges of montane forest and evergreen bushland and also in waste places, at altitudes between 2000 and 3100 m, in most floristic regions in the Ethiopian Highlands (Ethiopia and Eritrea where it is endemic in the wild) but frequently cultivated and sometimes naturalized in other tropical montane countries. Flowering from September to February, honeybees collect pollen and nectar from the flowers.



Figure 360 *Solanum marginatum*

***Solanum nigrum* L.**

TIKUR AWUT, YEABESHA AWUT (Amh); ACHO (Kaf); TUNAYE (Kam); MUIULO (Orom); KIRIIR, MUJULI (Som).

An erect annual herb growing up to 60 cm high. Leaves simple, elliptic with entire margins. Flowers white, small and arranged in clusters. Fruit red when ripe.

Growing as a weed of cultivation and ruderal areas, on roadsides, river or stream-sides and in bushland, at altitudes between 700 and 2350 m, in Gondar, Shewa, Kefa, Sidamo, Bale and Harerge floristic regions, and also in Eritrea with possible origin in Eurasia, but now widespread in virtually all parts of the world.

Flowering all year-round, honeybees collect nectar and pollen from the flowers. Its fruit is edible.



Figure 361 *Solanum nigrum*

***Solanum somalense* Franch.**

ARBAHADOU (Afa); CUNDUURO, KIRIIR (Som).

A shrub usually 1-2 m high, with the stem usually completely covered with grey, minute stellate hairs on younger parts, gradually wearing off and replaced with brown bark on older parts. Leaves alternate, elliptic, base cuneate, margins entire and apex acute, acuminate or rounded, covered with dense stellate hairs. Flowers often borne in the leaf axils, whitish-pink and the corolla campanulate. Fruit globose, green and turning light orange at maturity.

Growing in *Acacia-Commiphora* bushland, at altitudes between 200 and 1800 m in Welo, Afar, Shewa, Gamo Gofa, Sidamo and Harge floristic regions, and also in Djibouti, Somalia and Kenya.

Flowering in September and October, the shrub is a potential pollen source plant in arid and semiarid agro ecologies of the country.



Figure 362 *Solanum somalense*

***Withania somnifera* (L.) Dunal**

OUBAOULTO (Afa); GIZAWA (Amh); DAKILDA KATUKU (Koe); HIDDY FEROFU, KUMO (Oro); GURYO-FAN (Som); AGOLL, ATHMAI (Tig); DHEMITTE (Zay).

A shrub, subshrub or woody-based herb that reaches 2 m high. Leaves grey, ovate to obovate or oblong with cuneate base, entire margins and acute to obtuse apex. Flowers whitish-green and arranged in up to 6-flowered axillary clusters. Fruit a globose berry.

Growing in cultivations, disturbed places in the highlands, on lake shores, along temporary streams, on river banks and in disturbed places in open woodland and in *Acacia-Commiphora* bushland, at altitudes between 600 and 2700 m, in most floristic regions, and also in Eritrea, Djibouti, Somalia and widespread in tropical and South Africa and also widespread in the Mediterranean area, Asia and Australia.

Flowering in September and October, it is a pollen and nectar source for honeybees. It is also a medicinal plant used to treat various diseases or disorders. This herb contains the alkaloids withanine and somniferine, which are used to treat nervous disorders, intestinal infections and leprosy. All plant parts are used including the roots, bark, leaves, fruit and seed.



Figure 363 *Withania somnifera*

STERCULIACEAE

A family composed of trees, shrubs or herbs, with stellate indumentum (more rarely simple). Leaves alternate, simple (rarely compound); stipules present. Flowers in cymes or panicles or solitary, regular, bi- or uni-sexual, bearing (2-)5(-6)-lobed calyx or free sepals and petals 5 (or absent), free or adhering to staminal tube; stamens 5-many, with filaments united into a basal tube or at apex of androphore (rarely free), sometimes alternating with staminodes or in fascicles. Fruit a loculicidal capsule (rarely indehiscent) or of woody follicles bearing 1-many seeds.

The Sterculiaceae is a family with 60 genera and 1,100 species, which are widely distributed in tropical and subtropical regions. In Ethiopia, they are represented by nine genera and 44 species.

Several species of this family are valuable beeforages. In Ethiopia, *Dombeya torrida* is known as fast growing and a major honey source of the evergreen woodlands in central and southwest Ethiopia.

The genus *Cola* with about 60 species is found in tropical Africa. The seeds of the edible species are chewed as a stimulating narcotic and a drink is made by boiling powdered seeds in water. This genus has given its name to the famous soft drinks Pepsi-cola and Coca-cola.

***Dombeya aethiopia* Gilli**

YEQOLLA WANZA (Amh); DANISSA (Oro).

A tree growing up to 8 m; all parts pallid-tomentellous with long simple hairs; branchlets, petiole and peduncle sulcate. Leaves cordiform, margins irregularly crenate to dentate, apex subacuminate to subacute. Flowers pale to deep pink or rarely white and arranged in umbellate, subumbellate or paniculate umbels.

An endemic species growing in dry *Juniperus* forest, forest margins, secondary forest, *Combretum* woodland derived from forest, at altitudes between 1700 and 2200 m, in Gojam, Shewa, Kefa, Gamo Gofa and Sidamo floristic regions only. It is propagated from seeds.

The flowers are scented and honeybees collect abundant nectar and pollen from the flowers. The honey from this plant is white with mild aroma and low moisture.



Figure 364 *Dombeya aethiopia*

***Dombeya kirkii* Mast.**

A shrub or tree to 4 m, sometimes scandent; branchlets pubescent to tomentellous. Leaves glabrous to sparsely pubescent, ovate or obovate to orbicular, margins crenate to grossly dentate. Flowers white and turning yellow at maturity and arranged in 1-3 times bifurcate inflorescences.

Growing in *Acacia-Commiphora* and *Combretum-Terminalia* woodlands and bushlands,

on limestone ridges and rocky slopes with basement rocks, at altitudes between 1250 and 1600 m, in Gamo Gofa, Sidamo and Bale floristic regions, and also in north-east Dem. Rep. Congo and Uganda through eastern Africa to Transvaal.

Flowering from November to January, the species is an important source of nectar and pollen for honeybees.



Figure 365 *Dombeya kirkii*

Dombeya torrida (G.F. Gmel.) P. Bamps

WULKEFA (Amh); BOYYO (Kaf); DANISSA (Oro); WELKAFA (Sid); SELIM BWAK, SNQUYA (Tig).

A much-branched tree or shrub 12–15 m, with a shady umbrella crown and a trunk diameter about 50 cm; bark grey and smooth, with clear breathing pores. Leaves large, hairy, ovate or ovate-oblong, apex acuminate or obtuse and margins crenate or subentire. Flowers pale pink or white, borne in axillary corymbose cymes in showy clusters. It is propagated from seedlings.

Growing in montane *Pouteria-Albizia-Croton* and *Juniperus-Podocarpus* forests, montane scrub, surviving after forest clearing in secondary bushland and grassland and in cultivated areas, at altitudes between 1600 and 3100 m, in all floristic regions except Afar, and also in upland Eritrea, Sudan, Djibouti, Uganda, Kenya, Tanzania, Dem. Rep. Congo,



Rwanda, Burundi and Yemen.

It is an excellent source of nectar and pollen. Dense population of the trees will provide a surplus of honey. Honey from the flowers of this plant is white in colour with strong flavour. It is recommended for planting to increase honey production since the tree is fast growing reaching flowering stage within three years.



Figure 366 *Dombeya torrida*

TAMARICACEAE

A family of shrubs or small trees with slender branches and branchlets, halophytes, xerophytes or rheophytes. Leaves simple, scale-like or ericoid, alternate, with salt-secreting glands; stipules present. Flowers small, bracteate, solitary, or in racemes or spikes; regular, hypogynous, monoecious or dioecious; perianth 4-5-merous, imbricate, free; stamens as many as the petals and alternating with them, or twice as many as petals in two alternating whorls. Fruit a septicidal or loculicidal capsule bearing numerous seeds with long unicellular hairs.

A family with five genera and about 87 species, widespread in Eurasia and North Africa, especially common in the Mediterranean region and Central Asia. One genus

and three species have been recorded in Ethiopia.

Tamarix nilotica is a common bee plant reported from the Rift Valley of Ethiopia.

Tamarix nilotica (Ehrenb.) Bunge

SAGAN (Amh); UBEL (Tig).

A tree or shrub up to 8-10 m high; bark bright to pale brown black, covered with white spots. Leaves sessile, narrowly lanceolate, green, needle like and divided into many leaflets. Flowers white and arranged in spike, and easily withered or dusted. It is propagated from seeds.

Growing along riverbank, in *Acacia* woodland and as a hedge plant around homegardens, at altitudes between 300 and 1750 m. It is also found in Egypt, Sudan, Somalia, Djibouti, Kenya, Tanzania, Yemen, Saudi Arabia, Jordan, Israel and Palestine.

Flowering in September and October, the tree is a potential pollen source and honey bees collect a large quantity of pollen from the flowers. It is recommended to plant around the apiary for honey production.



Figure 367 *Tamarix nilotica*

THYMELAEACEAE

Perennial herbs or small shrubs with numerous, erect, slender, simple or branched, stems, especially above, from a thick, woody rhizomes. Leaves alternate or opposite, simple, entire, needle-like to flat; stipules absent. Flowers bisexual, polygamous or dioecious, 4-5-merous, sweetly scented at night and arranged in racemose inflorescences (spikes, fascicles, umbels or heads), flowers rarely solitary, often with deciduous or persistent bracts; petals (also called petaloid appendages or scales) generally inserted in the throat of the calyx-tube, often reduced to small fleshy glands, or lacking; stamens as many or twice as many as the calyx-lobes, rarely reduced to two or one. Fruit often a berry, sometimes a nut, drupe or loculicidal capsule, bearing usually seed with a caruncle-like appendage.

The family comprises about 50 genera and 600 species, widespread in tropical and subtropical regions, particularly South Africa, Australia and the Mediterranean, also in temperate regions. Two genera and seven species have been recorded from Ethiopia. *Gnidia glauca* is an important beeforage plant in the country.

Gnidia glauca (Fresen.) Gilg.

AWRA, AWRA ZAY, BOTO (Amh); KUZA (Gam); DIDDIKSAA, QAQARRO (Oro). A large, much-branched shrub or tree up to 10 m or even taller; branches densely leafy in the upper part; branchlets glabrous or finely pubescent when young, later nearly hairless; bark grey-green, brown or black, smooth to rough. Leaves alternate, usually sessile, sometimes with short petiole. Flowers orange or golden-yellow, fading to brown and arranged in dense terminal heads.

Growing in woodland, grassland, rocky grassy slopes, *Hagenia-Hypericum* forest and *Syzygium-Protea-Erica* scrub and roadsides, at altitudes between 900 and 3200 m, in most floristic regions, and also west to Nigeria, Cameroon, Dem. Rep. Congo, south to Zambia and Malawi, and also in India and Sri Lanka.

It flowers from September to November and the flowers provide pollen and nectar for honeybees. Honeybees were often seen collecting yellow pollen loads for brood rearing during peak flowering period, contributing for honey production in association with other plants. The bark is used to light fires and to make rope.



Figure 368 *Gnidia glauca*

TILIACEAE

Members of this family are herbs, shrubs or trees which often have star shaped or branched hairs. Leaves alternate, simple to deeply digitately lobed; stipules present. Flowers solitary or in axillary or leaf-opposed fascicles, umbels or panicles, bisexual, regular; petals (0-)4-5(-7), free, often with a glandular appendage or claw at base; stamens 4-many, free or united at base into five or ten groups, often on a torus or androgynophore, all fertile, or outer ones sterile. Fruit a capsule, drupe, berry or nut, 2-10-locular or 1-locular by abortion; seeds 1-many.

The Tiliaceae possesses about 65 genera and 1,500 species which are widespread in tropical, subtropical and temperate regions. In Ethiopia, the family is represented by four genera and 47 species.

Many species are known world-wide as important honey sources, like the *Tilia* species, which are very widespread in the northern hemisphere. In Ethiopia, *Grewia bicolor* and *Triumfetta* species as well as several other *Grewia* species are important bee plants.

***Grewia bicolor* Juss.**

SEFA, SOMAYA, TEYE (Amh); BARIE (Gam); ARAARSAA, HARORESA (Oro); CO-BESC, COMESC, DEBBA, DEBI,

MEDU (Som); ABA, DAWA, HABENE, HOBA, MESEQWA, SENQWAY (Tig).

A densely branched shrub or small tree growing up to 6 m high; bark smooth when young and dotted with breathing pores. Leaves ovate to oblong, pointed at tip, 1–8 cm, the margins finely toothed, shiny-green above but pale grey white below, drooping in heat. Flowers bright golden-yellow, sweet scented with small petals bent back over larger sepals. Fruit 2-lobed or unlobed due to abortion. It is propagated from seeds and seedlings.

Growing in *Acacia* woodland, wooded grassland, along rivers and streams, on sandy soils and rocky land, at altitudes between 500 and 1800 m, in nearly all floristic regions, and also in Eritrea and the drier parts of tropical Africa and also Arabia to India. Flowering in September and October, the golden-yellow flowers attract numerous foraging bees for pollen from exposed anthers. The nectary is found at the base of the sepals and it was observed that honeybees collect nectar and yellow pollen loads from the flowers. It is one of the major bee plants in semiarid and arid agro-ecologies of the country and recommended to plant it around apiary for honey production. This shrub or tree is used for firewood, timber, poles, farm tools, walking sticks, food (fruit), medicine (roots, bark) and fodder.



Figure 369 *Grewia bicolor*

Grewia ferruginea Hochst. ex A. Rich.

ALENQOZA, LENKOATA (Amh); BURURI, DOKENU, LANQISA, LENSEA, OGOMDI (Oro); LATO (Som); SANKWAH, TSIMKUYA (Tig).

A straggling shrub or tree up to 5 m; young shoots, leaf and flower stalks covered with reddish brown hairs. Leaves long, ovate, the tip pointed or rounded, margins crenate to serrate. Flowers white, in solitary leaf-opposed cymes with mass of anthers. It is propagated from seeds and seedlings.

Growing in riverine forest, near lakes and along rivers in open *Acacia-Combretum* woodland, at altitudes between 1300 and 2700 m, in arid and semiarid agroecologies of Ethiopia in almost all floristic regions, and also in Eritrea and the Red Sea hills of the Sudan.

Flowering in September and October, the plant is a major source of bee forage, providing pollen and nectar. It was observed that honeybees collect loads of pollen from the exposed anthers during dry period. The plant is also used for firewood, timber, farm tools, food (fruit), fodder (leaves) and rope.



Figure 370 *Grewia ferruginea*

Grewia kakothamnus K. Schumach.

ARAARSAA (Oro).

A deciduous shrub or climber, growing up to 3 m high. Leaves simple, ovate or obovate. Flowers whitish-pink, scented, sessile.

Growing in *Acacia-Commiphora* woodland, on limestone and sandy soils, at altitudes between (400-) 600 and 1900 m, in Sidamo and Bale floristic regions, and also in Somalia, Kenya, Uganda and Tanzania.

Flowering in December and January, it is a nectar and pollen source plant for honeybees.



Figure 371 *Grewia kakothamnus*

Grewia mollis Juss.

MAJITIE (Amh); BAR'IE (Gam); UFFO (Kaf); QAAWAA (Oro); DEBBI, DEBIAD (Som); BETREMUSIE, HAWAWTI (Tig); TEMA (Wol).

A tree or shrub 8-12 m high, sometimes with hanging branches; stem grey and dotted with breathing spores. Leaves simple, alternate, elliptic or lanceolate with acute apex. Flowers yellow and arranged in terminal panicle. It is propagated from seeds and wildings.

Growing in or at the forest margins, at altitudes between 1800 and 2500 m, in Tigray, Gondar, Gojam, Shewa, Welega, Ilubabor, Kefa and Bale floristic regions, and also in

Somalia, Kenya and west to Senegal, and also in Yemen.

Flowering from March to June, the species is a pollen and nectar source for honeybees for brood rearing and honey production.

Other uses of the species include firewood, farm tool and various agro-forestry uses.



Figure 372 *Grewia mollis*

Grewia trichocarpa Hochst. ex A. Rich.

ARAARSAA (Oro); DAKUB (Tig).

A shrub or tree up to 5-10 m high; branches cylindrical, purplish with pale lenticels, glabrous to puberulous on young parts. Leaves pale green, glabrous above or with a few scattered hairs below, elliptic to ovate. Flowers yellow, with nectar-producing claws, borne 2-3 together in 1-2 bundles. It is propagated from seeds.

Grows in *Acacia* woodland, wooded grassland, along river beds and streams, on sandy soils and rocky areas, at altitudes between 500 and 1800 m, in nearly all floristic regions and also widespread in the drier parts of tropical Africa and Arabia to India. Flowering from December to January, honeybees collect a large quantity of yellow

pollen loads from the flowers.

Other uses of the tree include fuelwood, as agro-forestry tree on farmland and fodder.



Figure 373 *Grewia trichocarpa*

***Grewia velutina* (Forssk.) Vahl**

A spreading shrub up to 8 m high; young branches cylindrical, purple to grey, pubescent and with numerous lenticels. Leaves whitish-grey with soft tomentellous hairs on both sides, elliptic or obovate. Flowers yellow, borne in 2-3 in each leaf axil.

Growing in open *Acacia*-woodland on gravely granite soil, at altitudes between 550 and 2450 m, in almost all floristic regions, and also in Somalia, Kenya, Uganda, Tanzania and Yemen.

The flowers are attractive to bees and honey bees collect creamy pollen loads from the flowers, which stimulate brood rearing.



Figure 374 *Grewia velutina*

Sparrmannia ricinocarpa (Eckl. & Zeyh.) O. Ktze
WULKFA (AMH); MOGECCO (Kaf).

A stiffly erect shrub up to 2.5 m tall; indumentum tomentellous, without long simple hairs. Leaves broadly cordiform in outline, hairy. Flowers yellow, with mass of anthers. Growing along forest margins, in clearings in montane forest, secondary forest and scrub, montane grassland with bush-clumps and persisting in hedges, at altitudes between 2400 and 3300 m, throughout most floristic regions, and also in upland Eritrea, from Sudan through eastern Africa to South Africa and Angola.

It is a potential pollen source plant for honeybees. It is also browsed by small ruminants.



Figure 375 *Sparrmannia ricinocarpa*

URTICACEAE

The family is composed of annual and perennial herbs, shrubs and lianas, which are monoecious or dioecious (rarely polygamous), sometimes with stinging hairs, and usually with dot-like or linear cystoliths. Leaves alternate or opposite, petiolate or sessile, lamina simple to deeply lobed, penninerved or sometimes triplinerved, with entire, serrate or dentate margins; stipules usually present, lateral, or sometimes intrapetiolar, paired or \pm fused. Flowers minute, mostly wind-pollinated, unisexual, regular or (especially the female flowers) irregular, with one whorl of tepals (rarely the female naked), sessile or pedicellate, often with an articulation just below the perianth, cymose inflorescence, often with densely clustered flowers and subtended with involucre bracts; male flowers with (1-)3-5 tepals and stamens equal in number and placed opposite tepals or solitary, and female flowers with 3-5 tepals, free or united, often very unequal, rarely naked; staminodes when present scale like, inflexed. Fruit an achene, often enclosed by the persistent perianth, bearing seeds with thin testa.

The family is composed of about 50 genera and 1,000 species, which are almost cos-

mopolitan, but most numerous in the tropics. The family is represented by 16 genera and 32 species (including subspecies) in Ethiopia.

***Urera hypselodendron* (A. Rich.) Wedd.**

LANQSH (Agew & Amh); LANGUSTO, LANQISSA, HALILA, TOKONU (Oro); ALGE (Tig).

A woody climber to 20 m or more, with stinging hairs on the younger parts. Leaves ovate to obovate, usually glabrous on both sides, base rounded to subcordate, margins firmly serrate. Flowers greenish, borne in lax cymes, usually with numerous stinging hairs.

Growing in clearings of upland rainforest and upland dry evergreen forest, along forest edges, in riverine forest and sometimes on isolated trees left in farmlands, at altitudes between 1700 and 2800 m, in most floristic regions, and also in Kenya, Uganda, Tanzania, and Malawi.

Flowering in September and October, the climber is a major pollen source plant for honeybees. The live climber is used by children for swinging ("JIWAJIWE")



Figure 376 *Urera hypselodendron*



***Urtica simensis* Steud.**

SAMMA, YECHEWA MIGB (Amh); nettle (Eng); SOMEN (Ge'e); DOBBI (Gur); DOBBI, GULGULBA, SAMMA (Oro); HANSA (Tig).

An erect, pale green, dioecious, unbranched perennial herb to 1 m tall, pubescent to glabrescent, with numerous, up to 2.5 mm long stinging hairs. Leaves ovate, base rounded to subcordate, margin coarsely serrate, apex broadly acute or acuminate. Flowers with male and female flowers c 1.5 mm long and white in color.

An endemic species growing in upland grassland, but most common in disturbed places, often in large quantities near houses and along roadsides, at altitudes between 1500 and 4000 m, in Tigray, Gondar, Gojam, Shewa, Arsi, Sidamo and Bale floristic regions.

Flowering all year round, it is frequently visited by honeybees for pollen only.

The leaves of *Urtica simensis* are boiled and eaten as a leafy vegetable in some parts of the country.



Figure 377 *Urtica simensis*

VERBENACEAE

Members of the family include herbs, shrubs and trees; branches and branchlets often quadrangular. Leaves mostly opposite, subopposite, sometimes whorled, simple; stipules absent. Inflorescence axillary or terminal, spike or raceme. Flowers bisexual, rarely unisexual, usually bilaterally symmetrical; petals united, tubular, 4-5-lobed, sometimes more or less 2-lipped; stamens mostly four and didynamous, sometimes two or five, inserted in the corolla tube; staminodes sometimes present. Fruit a schizocarp or a drupe.

A large family with about 70-80 genera and more than 3,000 species; distributed mainly in the tropics and temperate regions but throughout the world. The family is represented by nine genera and 31 species in Ethiopia.

Duranta erecta L.

HARRNULA (Agew); KOMBOLCHA, MITISH, MUATISH (Amh); golden dewdrop, pigeon-berry, sky-flowers (Eng); KOMBOLCHA, SIDAMU (Oro).

An erect or scandent shrub up to 4 m tall. Leaves opposite, elliptic or ovate to obovate. Flowers blue or lilac to purple and borne in racemes. Fruits orange to yellow when ripe.

It is widely cultivated at altitudes between 1600 and 2500 m, in Shewa, Welega, Kefa and Harerge floristic regions, and also throughout the subtropical parts of the world, and in some places it has escaped cultivation and is naturalized in degraded savanna, deciduous woodland and margins of disturbed forests.

The plant flowers throughout the year but profusely from May to August and is a potential pollen source plant for honeybees.



Figure 378 *Duranta erecta*

***Lantana camara* L.**

YEWOF KOLO (Amh); lantana, prickly lantana (Eng); HAMARESSA, RATE KATE, SHIMBERO (Orom); BURKAATI, QARFA-WEYN (Som).

A subscandent, vigorous shrub or fast spreading weed along roadsides and growing up to 6-8 m high with recurved prickles. Leaves ovate or ovate-oblong and dark green. Flowers usually orange, sometimes varying from white to red and composed of small sessile tubular flowers.

Growing commonly in evergreen scrub and forest margins, at altitudes between 1800 and 2100 m, in Gojam, Shewa, Kefa, Sidamo, Bale and Harerge floristic regions, and also in many parts of tropical Africa, Asia and South America. It was introduced to Ethiopia from South America and grown as live fence or an oramental, which is now naturalised growing in many degraded areas. The shrub is one of the most noxious alien invasive species in Ethiopia and elsewhere. It has been rated as one of the "100 World's Worst Invasive Alien Species". It has already invaded several places in Ethiopia including Lake Zway area, along Harer-Babile Road, etc.

Honeybees visit the flowers only in dry period. The flowers are adapted to butterfly pollination.



Figure 379 *Lantana camara*

***Lantana trifolia* L.**

YERENGNA QOLO, YEWOFKOLo (Amh); WOLARIBI (Ari); KUSHINO (Kaf); KASE, KASEH, KUSAYE, MIDANA-BERA, SUKE (Oro).

A low shrub growing up to 3 m high, with slender branches. Leaves simple, dark greenish above and arranged in whorls or clusters. Flowers lilac or pink to red, sessile but the inflorescence is borne on a long peduncle.

Growing in evergreen forest and scrub in forest re-growth and on margins of dry scrubland, at altitudes between 1600 and 2400 m, in Gojam, Shewa, Kefa, Sidamo and Harerge floristic regions, and also in many parts of tropical Africa, Asia and South America.

Flowering all year round profusely after rains, the shrub is a pollen and nectar source for honeybees.

In local medicine, it is used for the treatment of udder inflammation and against ring worm.



Figure 380 *Lantana trifolia*

***Verbena bonariensis* L.**

ATUCH (Amh).

A stiffly erect, branched and mostly annual herb, growing to 0.6-1.8 m tall; stems scabrid to hispid or hairy. Leaves sessile, ovate, obovate, or ovate-lanceolate, or on the lower part of stems oblong to elliptic. Flowers purple, or magenta, borne in numerous cymosely arranged spikes.

It is cultivated at altitudes between 2400 and 2600 m, in Shewa Floristic Region, and also widely cultivated and naturalised in many parts of the world, which is native to South America.

Flowering profusely after the main rainy season, honeybees collect pollen and nectar from the flowers.



Figure 381 *Verbena bonariensis*

VITACEAE

Members of this family are erect, trailing or climbing perennial herbs (often tuberous) or woody climbers; tendrils often present, arising opposite the leaves or from peduncles. Leaves alternate, simple to digitately or pedately lobed or compound; stipules present. Flowers regular, usually bisexual, borne in terminal inflorescence, arising opposite the leaves or from the axils; petals 4-5 (-6); stamens 4-5(-6), opposite the petals. Fruit fleshy, 1-4-seeded berry.

A family with 12 genera and about 900 species, which are widely distributed in all tropical, subtropical and warm temperate regions. In Ethiopia, six genera and 41 species have been recorded.

Cissus quadrangularis L.

SURUGA (Afa); DEMGEZAN, SIETIE-YESEYTAN-MUQECA, YEZHON-ANJET (Amh); TUROY (Mur); ARMEDIN, ARMO, GAD, LAMAGOIYA, WASILI (Som); ALAL, ALGE, ALQE (Tig).

A succulent climber, growing up to 4 m and frequently leafless; young stems 4-angled; all parts glabrous to sparsely pubescent. Leaves broadly ovate to cordiform, dentate with acute to rounded apex, with attenuate to deeply cordate base. Flowers yellowish, borne in 2-5 cm long inflorescences.

Growing in dry *Acacia* woodland and bushland, riverine forest and scrub, semidesert scrub, often on rocky slopes and outcrops, at altitudes from sea level to 2300 m, in nearly all floristic regions, and also widespread in tropical Africa and Asia.

Flowering in September and October, the flowers are occasionally visited by honeybees.



Figure 382 *Cissus quadrangularis*

Cissus rotundifolia (Forssk.) Vahl

CHAMBIE (Amh); CHOBII, CHOBII-QAURA (Oro); QALQALLO (Gam); KALI (Mur); ARMO, GAD (Som).

A trailing or climbing perennial succulent herb, growing up to 3-6 m high, with all parts glabrous to sparsely pubescent. Leaves thick and fleshy, broadly ovate to orbicular. Flowers light green, borne in 3-15-flowered racemes that appear with the leaves. It grows in dry woodland and bushland, usually on rocky outcrops and rocky slopes and in dry riverine forest, at altitudes between 550 and 1900 m, in Afar, Welo, Shewa, Kefa, Gamo Gofa, Sidamo, Bale and Harege floristic regions, and also in lowland Eritrea, Somalia and Sudan through east Africa to Natal and also in Arabia.

Flowering in December and January, the herb is a nectar and pollen source plant for honeybees in semiarid and arid agro-ecologies.



Figure 383 *Cissus rotundifolia*

Cyphostemma cyphopetalum (Fresen.) Descoings ex Wild & Drummond

GNDOSH (Amh); QALQALLO (Gof & Oro); HALENGI-TEMEN (Tig).

An herbaceous climber or a scrambler to 6 m high, from a beet-shaped fleshy root-stock; all parts puberulous to tomentose and occasionally with stalked glands. Leaves 3-5-foliolate; petiole 0.3-6.5 cm; leaflets ovate to elliptic or obovate to suborbicular, crenate to dentate (rarely serrate) with usually large and triangular teeth. Flowers sessile, greenish white.

Growing at edges of evergreen forest, in upland bushland and scrub, riverine forest, *Juniperus* forest and scrub, *Acacia-Commiphora*, *Acacia-Combretum* and *Acacia-Balanites* woodlands, wooded grassland and bushland and persisting in cultivated areas and along roadsides, at altitudes between (250-)700 and 2800 m, in almost in all floristic regions. It is also widespread occurring in Sudan, Uganda, Kenya, Tanzania, Rwanda, E Dem. Rep. Congo and Zambia.

The plant flowers for longer duration and honeybees visit the flowers for nectar and pollen during dry period.



Figure 384 *Cyphostemma cyphopetalum*

ZINGIBERACEAE

Members of this family are herbs, sometimes large, with upright leafy shoots arising from underground rhizomes or corms and all parts aromatic when crushed. Leaves distichous, alternate, simple, entire, and often ligulate. Inflorescence arising at the base of the leafy shoots, sometimes below ground level, or from the centre of a rosette of leaves and sometimes appearing before the leaves. Flowers zygomorphic, bisexual; petals three, the posterior often larger than the laterals, coloured; stamen single, with two longitudinally dehiscent subterminal anthers, and a sterile entire or three-lobed apex; staminode petaloid, forming a large entire or three-lobed coloured labellum. Fruit a fleshy 3-locular berry, often large and sometimes subterranean.

A family of about 50 genera and 1,300 species, pan-tropical, but most abundant and diverse in SE Asia while there are three indigenous genera and about 60-80 species in Africa. In Ethiopia, five genera with seven species have been recorded, of which three genera with one species each are introductions.

***Aframomum corrorima* (Braun) Jansen**

KORORIMA (Amh, Gur & Tig); OFIYO, OGIYO (Kef & Oro).

A perennial herb upto 2 m tall with unbranched leafy stem. Leaves sheathed, elliptic with acuminate apex. Flowers mauve-pink and borne in inflorescences arising singly or two together at the base of a leafy shoot. Fruit shiny red and smooth, indehiscent. An endemic species growing in moist montane forests, usually in open places and/or in valleys, at altitudes between 1300 and 2000 m, in Welega, Ilubabor, Kefa and Gamo Gofa floristic regions. It is also reportedly cultivated in the above floristic regions and in Gondar, Gojam and Harerge floristic regions of Ethiopia, and also in Eritrea. The plant is a pollen and nectar source for honeybees. Honeybees may contribute for the seed set of the crop. The seeds (CORRORIMA) are widely used as a spice in preparing BERBERE (hot red pepper flour), and also to flavour coffee. The seeds also have medicinal uses. The dried fruits are traded throughout Ethiopia and also in NE Africa, Arabia and India.



Figure 385 *Aframomum corrorima*

GLOSSARY OF BOTANICAL TERMS

abortion - expulsion within the first three months of pregnancy

achene - a small dry fruit, not opening when ripe, with only one seed; for example the fruit of *Urtica* and *Rumex*

actinomorphic - used for flowers which are radially symmetrical (at least in the perianth) and can, therefore, be divided along two or more longitudinal sections into halves which are mirror images of each other; the term applies mainly to the perianth and used as synonymous with radially symmetric

acuminate - with a tip that becomes gradually becomes narrower to a slender point

acute - with a tip that comes to a sharp point with straight-sided edges that form an angle of less than 45°

adaxial - the side or part facing the main stem; the upper surface of a leaf (= ventral)

adnate - when an organ or part is united to a different organ or part; for example the androecium (stamens) with the gynoecium (pistil) in Asclepiadaceae and Orchidaceae

afro-alpine - a distinct vegetation zone found above (3200-)3500 m on African mountains

alternate - used for leaves that are attached, one at each node, at different levels along the stem.

androecium - the male structures of a flower; stamens and accessories

androgynophore - an elongated part of the receptacle carrying both androecium and gynoecium between the perianth and stamens in a bisexual flower

androphore - an elongated part of the receptacle above the perianth which bears only the stamens as in Malvaceae

annual - a plant which completes its life cycle in one growing season and then dies: where there are two or more growing seasons in a year, an annual species can have two or more generations in a year

anthelmintic - destroys or causes expulsion of worms

anthesis - the time when the pollen is shed and the stigma is receptive to pollen;

from the opening of the flower bud to the setting of the seed

anthraquinone - a yellow crystalline chemical

apex - the tip or end-point of a surface

apocarpous - with the carpels free from one another

arborescent - attaining the size of a tree (bamboos)

areole - a space marked out on a surface; used to describe the raised area on the surface of the seeds of the Fabaceae (Leguminosae) subfamily Mimosoideae; also used to denote the area where spines and glochids arise on the stems of Cactaceae; the open area (cell) formed by anastomosing veins

aril - an outer covering or appendage, often fleshy and/or brightly coloured, that encloses the seed or part of the seed and develops from the stalk of the seed

ascending - a plant where the shoots start lying on the ground and then turn to grow mainly upright; usually used for herbs

axil - the upper angle made between a leaf attachment and a stem

axillary - in or arising from an axil

baccate - like a berry with fleshy and pulpy tissue

berry - a fleshy or juicy fruit with a soft outer portion and the seeds immersed in the fleshy or pulpy tissue, the seeds are not surrounded by a woody or stony endocarp, for example tomato Compare drupe

biennial - living for two growing seasons; usually producing only vegetative growth in the first season, and flowering and fruiting in the second

bipinnate - twice pinnate, when the first divisions of a leaf are themselves pinnate

bisexual - having both sexes and producing both male and female gametes. Bisexual flowers have both functional stamens and pistils

blade - the flat broad part of a leaf or petal; synonymous with lamina

bloom - the flower or process of flowering (as in the flowers blooming); also used for a whitish waxy powder covering a surface

bole - the unbranched stem or trunk of a tree

bract - a small leaf-like structure usually associated with a flower and/or inflorescence and found at the base of the pedicel or peduncle

bracteole - a small bract on the pedicel, or close under the flower, between the



bract and the flower

branch - a portion of a stem system which is attached to the main stem; often used for a stem from a woody plant

branchlet - the smallest part of a branch; the growth of the current or the last growing season (a twig)

bud - an undeveloped shoot that may give rise to a branch or a flower

bulb - an undeveloped shoot that may give rise to a branch or a flower

calyx - the outer whorl or envelope of most flowers, made up of the free or united sepals

capitulum - a dense head-like inflorescence of usually sessile flowers

carpel - the basic unit of the female part of the flower

capsule - a dry fruit produced by an ovary composed of 2 or more united carpels and opening by slits or pores or breaking into pieces when ripe

caruncle - an outgrowth on the surface of a seed near the hilum

cauliflorous - producing flowers directly from the older stems

cauline - borne on or arising from the stem

circumcissile - opening as if cut circularly and the upper part coming off like a cap or lid

cladode - a leaf-like structure formed by a modified stem

clasping - used for leaf-bases that partly or completely enclose the stem

cleistogamous - flowers that fertilize themselves before they open, or which do not open at all even after fertilization; they are usually small and near the ground

climbing - used to describe plants that use other plants or objects as a means of support but have their roots in the ground

compound - composed of two or more similar parts; the opposite of simple

cordate - when the base of the leaf is deeply notched

corm - a short thick underground stem which grows vertically, for example, in many Iridaceae

corolla - the inner whorl or inner envelope of sterile appendages in the flower, made up of the free or united petals which are usually colourful to attract insect

corymb - a panicle-like inflorescence in which the branches or flower-stalks start

from different places on the stem but all the flowers are born at about the same level

crenate - the margin notched with rounded or broad and blunt teeth or projections

cyathium - a flower-like inflorescence characteristic of the genus *Euphorbia*; it is made up of naked, unisexual flowers that are grouped together within fused, perianth-like bracts

cyme - an inflorescence in which the central axis is terminated by a flower which opens first, this flower is subtended by two opposite branches each of which ends in a flower, these open next and are likewise subtended by two opposite branches; this branching-pattern may continue

deciduous - falling off at the end of the growing season; the opposite of evergreen

decumbent - lying on the ground but with the ends growing upwards

decussate - when each pair of opposite leaves is inserted on the stem at right angles (90°) or perpendicular to pairs of leaves both above and below

dehiscence (dehiscent) - the method or process of opening; as in anthers and fruits

dentate - with a toothed margin, the teeth pointing outwards, not forward

dichasium - a cymose inflorescence in which the main axis and branches end in flowers that are subtended by two opposite branches (see cyme); an inflorescence which consists of dichasia

didynamous - in two pairs of unequal length; as four stamens with two long and two short ones; common in *Commiphora* and *Lamiaceae* (*Labiatae*)

digitate - where the parts are attached to the same point, as in a palmately compound leaf

dioecious - plants with unisexual flowers in which the male and female flowers are not found on the same plant, as if the plants are either male or female, but not both

distichous - arranged in two opposing rows along the opposite sides of the stem; neither decussate nor spiral

drupe - a fruit with a fleshy exterior and with the seed or seeds enclosed in a hard covering formed by the inner part (the endocarp) of the ovary wall, which forms a hard "stone" in the interior of the fruit

dysentery - inflammation of the large intestine accompanied by diarrhoea



elephantiasis - a persistent enlargement of the tissue immediately beneath the skin caused by worms or deposits of silica; the legs and arms become enormous and in the male, the scrotum may enlarge to the size of a papaya

endemic - only found in the specified area - not found elsewhere

endocarp - the innermost layer of the ovary wall in a fruit which may be hard or leathery as in a drupe or pyrene, or fleshy as in Cucurbitaceae

endosperm - the food material formed by the female gametophyte that initially surrounds the embryo and is often also found in the seed

entire - with an even and continuous margin without lobes, teeth, etc

epigynous - borne upon or above the inferior ovary (not perigynous); the perianth or stamens may be epigynous but this term is not used for the ovary itself

epiphyte - a plant which grows on other plants for support and does not have its roots in the ground but is not a parasite

epigynous - born upon or above the inferior ovary (not perigynous); the perianth or stamens may be epigynous but this term is not used for the ovary itself

evergreen - retaining green leaves through the dormant or dry season, as in most true rainforest trees

fascicle - a close cluster of structures arising from about the same point but lacking a distinctive arrangement of parts

fibrous - composed of separable threads or fibres

filament - a thread-like structure; the slender stalk that supports the anther

flabellate - fan-shaped or broadly wedge-shaped

floret - often applied to small flowers, e.g. the individual flowers in an Asteraceae capitulum or a grass flower

flower - the reproductive organ in the angiosperms

follicle - a fruit developed from a single carpel (a simple pistil), dry and breaking open along one line, usually opening along the inner (adaxial or ventral) suture to which the seeds are attached

fruit - a true fruit is the product of a ripened ovary and its adnate parts; the seed containing structure

fusiform - spindle-shaped, thick in the middle and narrowing at both ends



glabrous - without hairs

globose - a spherical structure

glutinous - covered with a sticky or glue-like substance

gynodioecious – used for a species with 2 sex forms; plants with only female flowers and others with only bisexual flowers

gynoecium - the female part of the flower

habit - the overall appearance of a plant

habitat - the environment or plant-community in which the plant occurs

halophytes - a plant growing in and tolerating high concentrations of salt in the soil or in the air

herb - a plant with no persisting stem above ground; if a stem is formed it lives for only one growing season or one year, without forming woody parts

herbaceous - like a herb; with a stem that dies back to the ground each year

hermaphrodite - with stamens and pistil in the same flower; the same as bisexual

heterostyly - when the styles and stamens vary in relation to each other by length or position within the flowers of the same plant or plants of the same species or plants of the same species

hirsute - with rather coarse stiff hairs

hyaline - very thin and almost transparent.

hypanthium - the often cup-like part of the flower between the sepal-lobes and the base of the ovary, produced by the union of the base of the sepals, petals, and filaments; often used interchangeably with calyx-tube or floral-tube

hypogynous - attached below the level of the gynoecium or ovary, as sepals, petals, or stamens attached near the base of the ovary or below the base of the superior ovary

imbricate - overlapping like the tiles of a roof; in a flower-bud when the petals or the sepals overlap with usually two petals (or sepals) with both edges outside the other petals (or sepals), one with one edge outside, the other within, and one with both edges covered

indehiscent - remaining closed and not opening when ripe or mature



inflexed - bent inward, turned abruptly inward, as in the stamens of many species in Urticaceae

inflorescence - the flowering portion of a plant

injera - a large pancake made from fermented dough with the flour from *Eragrostis tef* and/or other cereals

involucel - a whorl of bracteoles

involucre - a number of bracts that surround the base of an umbel or the base of a flower-head

irregular flowers - usually used to denote bilaterally symmetrical flowers (flowers that can be divided into two equal halves along only one plane), in this sense it is synonymous with zygomorphic; sometimes used to denote that the flower is asymmetrical or without a plane of symmetry: compare with regular/aetinomorphic

labellum - a lip-like petal; the usually lower or abaxial petal of the flowers of the Orchidaceae

Lanceolata - with the shape of the end of a lance or spear, tapering to both ends from a broader middle, as in a lanceolate leaf; usually used to indicate a shape which is widest below the middle, but occasionally also at the middle

lateral - on the side or along the margin

latex - a liquid substance that is often white and sometimes contains rubber, or is fragrant, found in special, often much elongated, cells or ducts called laticifers

leaf - an organ originating from and attached to a stem, usually with a short stalk attached to a flat blade, the most usual site for photosynthesis

leaflet - a leaf-like part or one of the individual blades, of a compound leaf

liana - a woody climbing plant

ligulate - with the shape of a tongue or strap; flowers of the Compositae that have a strap-shaped corolla

locule (loculus) - a chamber or compartment, mostly of an ovary or fruit

loculicidal - opening into the locule

mericarp - a part of a dry fruit which splits off and is spread individually

merous - having a particular number or kind of parts



mesocarp - the middle layer when three layers are present in the wall (pericarp) of a fruit, often fleshy

mishiro - an unspecified disease

monocarpic - dying after the production of flowers and fruit

monoecious - when the male and female flowers are borne on the same plant; the flowers are unisexual but the plant is bisexual

nectar - a sugary liquid produced by flowers or other plant parts, the liquid on which insects and birds that visit the flower feed

nectary - a glandular structure which secretes a sugary liquid, the nectar; either associated with a flower (floral nectary) or elsewhere on the plant (extrafloral nectary)

nekera - a growth often thought of as cancer; tuberculosis is also considered NEKERSA

node - the place on a stem where a leaf or bud is formed; a thickened area on a stem-like organ where other parts are attached

nut - a fruit with a hard outer covering that does not split open when ripe, mostly comparatively large and with one or two seeds; see also nutlet and achene

nutlet - a small nut

oblanceolate - with the shape of the end of a lance or spear but with the narrow end towards the base; the inverse of lanceolate

oblong - a plane shape longer than broad with nearly parallel sides, almost rectangular in outline but with rounded ends and with the length two or three times the width

obovate - a plane shape with an egg-shaped outline but with the broadest part near the apex and the narrow side near the base

opposite - a term used for two leaves or two branches that arise from the same node on the opposite sides of the stem; a term also used for organs that arise opposite each other or when one arises at the base of another, as stamens opposite a petal or sepal

ovate - a flat structure which is egg-shaped in outline with the broadest part near the base and the narrow part near the apex



palmate - with three or more parts attached to a single point and radiating outward, as the fingers of an open hand radiating outwards from the palm of the hand; as in palmate venation, or in palmately compound leaves

panicle - an inflorescence with an indeterminate axis (that continues to grow and does not end in a flower) and many side branches each of which bears two or more flowers. This term is often used for a branched inflorescence which is difficult to classify into any of the other more precise types such as raceme, cyme, etc

pedicel- the stalk of a single flower within an inflorescence or group of flowers (also used for the stalk of a solitary flower)

peduncle - the stalk that bears an inflorescence

peltate - with the stalk attached near the centre of a more or less rounded shape and not at the edge, as in a peltate leaf

penninerved - with pinnate nervation

perennial - living for three or more growing seasons

perianth- the outer sterile whorls or envelopes of a flower, made up of identical perianth segments, or by two different kinds of perianth segments; sepals (calyx) or petals

pericarp - the wall of the ripened ovary or fruit (between the locules and the outer surface); it may be of one or as many as three layers (see exocarp, mesocarp, and endocarp)

perigynous - arising from a cup-like or tubular structure around the ovary, surrounding the ovary but not at its base nor united to it

phylloclade - a flattened leaf-stalk (petiole) or leaf-rachis with the form and function of a leaf, as in some of the species of *Acacia* introduced from Australia, compare with cladode

pinnate - when a compound leaf has its leaflets borne at an extension (the rachis) of the leaf-stalk

pinnately - in pinnate fashion

pinnatifid - with the margin divided more than halfway to the midvein or centre and forming pinnate lobes

pod - a dry fruit that opens when ripe; often used as synonymous with legume

pollen - the powder-like grains produced in the anthers that will produce the male gametes necessary in fertilization

polygamous - when a plant or different plants of the same species have both bisexual and unisexual flowers

poricidal - applied to anthers which open by pores

prickle - a small sharp outgrowth from the bark or surface

prostrate - lying flat on the ground

pungent- ending in a sharp stiff point; with a strong smell or taste

pyrene - a nutlet or kernel; the "stone" of a drupe or similar fruit

raceme - an indeterminate inflorescence in which the flowers are borne along a single axis with the uppermost the youngest, each flower with a stalk of about the same length, (see fig.); compare with cyme

radical leaves - leaves that arise so close to the base of the stem that they appear to come from the top of the root

receptacle - the axis or the central body of the flower on which the flower parts (sepals, petals, stamens, and pistil) are borne

regular - (of flowers) radially symmetrical or actinomorphic, a flower that can be divided into two equal halves by two or more vertical sections; compare with irregular, asymmetric, zygomorphic.

resin - a solid or semisolid substance produced by plants from special canals or ducts found within the plant, not soluble in water and often sticky and aromatic

reticulate - with many interconnections as in a net; applied to a surface being marked by a network of fine lines or ridges

rheophyte - plant growing in flowing water

rhizome - a root-like stem on or beneath the ground with roots growing downwards and leaves and shoots upwards

rosette - a cluster of parts in a circular form; often used for leaves produced at ground level

rotate - a calyx or corolla, or other organ, with a very short tube and spreading lobes

samara - a one-seeded nut-like fruit with a wing

scabrid (scabrous) - rough to touch, usually caused by the presence of very short stiff hairs which point backwards to the line of growth

scale - any small flat and thin structure like a flattened hair or very small leaf, often triangular in shape

scandent - a general term for climbing

schizocarp - a dry fruit breaking up into one-seeded nut-like parts (each part called a mericarp), as in many genera in the Malvaceae and in Apiaceae (Umbelliferae)

scrambler - a plant which usually climbs with the help of hooks, thorns or tendrils so that it spreads out over or through its support

septicidal - opening at or along the partition (or septum) or opening along the placenta; not opening into the locule

septum - a partition or cross-wall

serrate (serrulate) - with teeth like that of a saw, the teeth more or less regular and pointing forwards

sessile - without a stalk, meaning 'seated'

sheath (sheathing) - a tubular structure that encloses an organ or part, as in the lower tubular part of a grass leaf which encloses the stem

shoot - a stem axis together with its leaves

shrub - a woody plant with perennial woody stems, there are usually two or more stems coming from below the ground or borne just at the ground level; a term which is not very precise but differs from the term tree in not possessing a single trunk or bole between the ground and the branches

simple leaf - with only a single blade, the opposite of a compound leaf

solitary - one alone and without companions or similar structures

spadix - an inflorescence with the flowers borne on or sunken into a thick and often fleshy spike-like axis, as in the Araceae

spathe - a large bract that is sometimes leaf- or petal-like and encloses the young flower or inflorescence; subtending and at first enclosing the spadix in Araceae and the inflorescence in palms

species - the basic unit in a taxonomic classification denoting a group of organisms that are more similar to each other than to any other group

spike (spicate) - an indeterminate inflorescence with the flowers sessile (without stalks or pedicels) on a simple unbranched or undivided axis or rachis

spine - a hard sharp-pointed structure, often long and narrow

spur - a slender, usually hollow, extension of some part of the flower. a short lateral branch

staminode - a non-functional stamen, often highly modified or reduced

stellate - star-shaped, as in stellate hairs that have several arms or branches radiating outward from a central point

stem - the main axis of a plant or a branch of the main axis that (at first) produces leaves at the nodes

stipules - scale-like or bract-like appendages, usually found in pairs, at the base of the petiole; many leaves have three parts: the blade, the petiole, and two stipules

succulent - fleshy and juicy, thick and soft within

suffrutescent - like a small shrub, with a woody base near the ground that produces leafy and flowering shoots each growing season, usually less than 1 m tall

sympodial - with apparent main stem consisting of a series of usually short axillary branches

syncarpous - composed of two or more united carpels, as in a syncarpous pistil; the opposite of apocarpous

tendrill - a slender, usually coiling, part of a leaf or stem that helps support a stem

tepal - used for the parts of the perianth where the sepals and petals cannot be readily distinguished as in *Gladiolus* (Iridaceae)

testa - the outer coat of a seed

thorn - a sharp-pointed branch, sometimes used as synonymous with spine

thyse - a panicle with ultimate branches that are cymose

torus - the central axis or receptacle of a flower

tree - a woody plant with a single main stem (a trunk or a bole) and a distinct upper crown; compare with shrub

trifoliate - with three leaves; compare with trifoliate

trunk - the large single woody stem of trees, the main stem or bole



tuber - a thickened portion of a stem, usually underground, that is capable of producing new branches

tuberculate - having tubercles

umbel - an inflorescence in which the pedicels of the flowers all arise from one point and the flowers are borne at one level

unisexual - producing either male or female gametes, but not both; having either functional stamens or functional ovaries (ovules) but not both; the opposite of bisexual

valvate - opening by regular lines to leave valves between; of petals or sepals that are joined edge to edge and do not overlap in bud

whorl - when there are three or more leaves or flowers at a single node or at the same level

xerophytes - a plant that is able to live under very dry conditions and having structural adaptations for this

zygomorphic - flowers having bilateral symmetry so that the corolla can be divided equally only along one plane, used as synonymous with irregular; compare with actinomorphic

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