A weed identification guide for Ethiopia

Food and Agriculture Organization of the United Nations
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prepared by
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Food and Agriculture Organization of the United Nations
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Introduction

This book has been a long-felt need by agriculturalists in Ethiopia. It is one of the products from the FAO Weed Management Project (TCP/ETH/4532), operating from mid-1986 through 1987.

In order for extensionists, researchers, and farm managers to control weeds, they must first be able to identify them, particularly when using herbicides. This book covers 107 main species and gives descriptions of an additional 56 related species. It was a difficult job choosing which species to include, as Ethiopia is a large and diverse country. The species were chosen on the basis of their frequency of occurrence (in surveys, reports, observations, herbarium collections, etc.), their seriousness as pests, and their family representativeness for Ethiopian conditions.

The information on distribution for each species was obtained from various reports and herbarium collections. It is by no means complete, but should give a general idea and can be augmented in the future. The distribution codes refer to the map in the front of the book.

The local names were taken from numerous sources, including interviews with farmers (see reference section). This is also not complete and may, in some cases, be in error as the names are varied and difficult to verify. There are certainly many more names which are not included due to the extreme diversity from area to area, even within one given language. Where no heading occurs, the information was not found by the authors.

It is hoped that this book shall assist those in the field in plant and weed identification.
Acknowledgements

The format of the book was adopted from several other authors in the East and Southern African region, namely R. Vernon, P. J. Terry and R. W. Michieka, and R. B. Drummond. Weed descriptions were after G. W. Ivens, P. J. Terry and the East African Flora, among others, listed in the reference section.

All the photographs in the book are originals. The drawings are both original and copied from the following major sources: Common Weeds of East Africa, Ciba-Geigy’s series on monocotyledons, How to Identify Plants, Taxonomy of Flowering Plants. The electron microscope photographs of Avena species seeds were arranged by Dr. R. Pring of the Long Ashton Research Station, Bristol, UK. Special acknowledgement is extended to the artist, Ato Mandefro Haile Giorgis who did the line drawings in the text.

Special thanks go to Sue Edwards, botanist of Addis Ababa University in Asmara and John Moore, who had a past FAO consultancy when he collected much species distribution data. Their information, although not yet in published form, was useful indeed. Thanks also to Dr. Mesfin Tadesse of the Addis Ababa University whose assistance and herbarium were of much use to us. Wt. Haimonot Abebe of the Weed Unit, Crop Protection and Regulatory Department translated the text into Amharic. Printing the combined Amharic and English text was facilitated by the National Computer Center of the Science and Technology Commission of Ethiopia, with assistance from Ato Daniel Admasse. The maps were adapted from those produced by Mr. Eddie De Paw for the FAO Land Use Planning project. The Crop Protection and Regulatory Department, Ministry of Agriculture has given full cooperation to make this publication possible. To all individuals, unnamed who have assisted and offered support, we extend our sincere thanks.
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Abbreviations

Languages:  
E = English  
A = Amharic  
T = Tigrinia  
G = Gurage  
O = Orominia (Gallinia)  
S = Sidamo  
Arb = Arabic  
K = Konso

Locations:  
ABH = Arsi/Bale Highlands  
C = Chercher Highlands  
CH = Central Highlands  
G = Gorge areas  
NE = Northeast  
NH = Northern Highlands  
SR = Southern Rift Valley  
T = Tana Basin  
WH = Western Highlands  
WL = Western Lowlands  
WT = Western Tana
Maps and Weed Distribution

The zones depicted on Map 1 have the following characteristics:

Arsi/Bale Highlands (ABH)

All areas have two growing seasons which vary from being reliable and separate, to only one reliable, or merged into one long season. Altitude ranges from 1400 to 4000 meters with the majority of the area between 1800 to 3300 meters. The temperature ranges from 7.5-21 degrees C with the majority of areas between 11 to 21 degrees C. In the higher altitude areas, there is a risk of frost and the presence of shallow soils. In gorge areas, there is erosion risk. On plateaus there may be drainage problems causing delayed planting. Generally, there are good soils on the lower slopes.

Chercher Highlands (C)

All agricultural areas have two seasons; however, the first may be unreliable in some areas and in other higher rainfall areas the two seasons may merge into a longer one. The altitude ranges from 800 to 3000 meters, but the more productive areas are in the middle altitude range. At higher altitudes there may be a risk of frost. The temperatures range from 16 to 27.5 degrees C. Generally there are good soils but there may be some erosive areas.

Central Highlands (CH)

Most of the area has a single growing season of variable length. There are some areas which have a double season and of these, only one may be adequate. Generally, there are good soils which tend to be shallow. The black clay soils have poor drainage. Frost is a problem at higher altitudes affecting crops later in the season. Temperatures may be too low for crop growth at very high altitudes. Altitudes range from 1500 to 4000 meters with the majority of the area in the 1800 to 3300 meter range. Temperatures range from 7.5 to 16 degrees C with the majority of the area having 11 to 16 degrees C.

Gorge Areas (G)

These areas have a single season which may be short, medium or medium-long. The soils are shallow and soil and water conservation practices are needed. The altitude ranges from 1000 to 2500 meters. The temperatures are from 16 to 27.5 degrees C.
Northeast (NE)

This area is marginally agricultural as some parts do not have adequate rainfall to support crop production. There is a double season in other areas but only one is adequate for growing crops. Frost can be a hazard at high altitudes. On the flood plains, flooding may be a hazard. Erosive, shallow soils are present except in the flood plain areas. Altitudes range from 800 to 4000 meters, with gorges in some of the areas. Temperatures range from 11 to 27.5 degrees C.

Northern Highlands (NH)

There is a single, short season. In many areas there is a risk of drought either at the end of the season or throughout. In some areas the soils are good and in others they are erosive and shallow. The altitude ranges from 700 to 3000 meters, the average being 1500 to 2200. Temperatures are warm, 16 to 27.5 degrees C.

Southern Rift Valley (SR)

The growing season can be single or double depending on the area. All seasons are short and the double may have only one season which is adequate for crops. Some areas do not have adequate rainfall for crops. There is drought risk and high rainfall variability. The soils are good, with a volcanic ash origin. Some soils may be shallow. The altitude ranges from 800 to 200 meters, with the majority of areas between 1500 to 2200. The temperatures are warm, 16 to 27.5 degrees C.

Tana Basin (T)

There is a single season. At higher altitudes there may be frost and a longer growing season is needed because of low temperatures causing some drought risk at the end of the season. At lower altitudes, there are better soils but there may be a risk of waterlogging. Generally, the soils are fair, some having a problem of acidity and erosivity. The altitude ranges from 100 to 4400 meters. The temperature is from 11 to 21 degrees C.

Western Highlands (WH)

There is a single season which is medium to very long in duration. At higher altitudes there is a risk of frost. In some areas there is poor external drainage making the area only suitable for rice production or grazing. The soils are fair with the problem of acidity and erosivity particularly in high rainfall areas. Perennials grow well here. In some areas there is limited ripening for annual crops due to high rainfall. The altitude varies from 800 to 3000 meters. The
temperatures have a wide range from 11 at high altitudes to 26.5 at lower altitudes.

Western Lowlands (WL)

There is a single rainy season which is short to long in duration. Drought is possible. In some areas flood recession areas are planted to crops. In these areas both floods and drought are threats. The soil is good. The altitude ranges from <500 to 1800 meters, but the majority of the area is lowland. Temperatures are hot, 21 to >27.5 degrees C.

Western Tana (WT)

There is a single medium growing period. There are generally good soils but black soils have drainage problems. Perennial crops can grow here. In some areas soils are acid and only fair. The altitude ranges from 500 to 1500 meters. The temperature is between 21 to 27.5 degrees C.
Thermal Zones

<table>
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<th>Altitude (m)</th>
<th>Temperature range</th>
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<tr>
<td>500/1000 - 1500/1800</td>
<td>21 - 25/27.5 °C</td>
<td>Kofa</td>
</tr>
<tr>
<td>1500/1800 - 2300/2500</td>
<td>18 - 21 °C</td>
<td>Weyne Dego</td>
</tr>
<tr>
<td>2300/2500 - 3000/3200</td>
<td>11/12 - 15 °C</td>
<td>Ege</td>
</tr>
<tr>
<td>3000/3200 - &gt;3600</td>
<td>&lt;7.5 - 11/12 °C</td>
<td>Munch and High Munch</td>
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Growing Periods

- Rain fall inadequate for crop production agriculture
- Single short season (duration 2.5 - 4.5 months)
- Single season or double season with 1 completely inadequate (duration 4.5 - 6.5 months)
- Double season both adequate (duration 3 and 3-4 months)
- Double season but only 1 adequate (duration 2.5 - 4 months and 5 - 9 weeks)
- Single long season (duration 5.5 - 9 months)
- Single very long season or double season merged at higher altitudes or 2 shorter seasons at lower altitudes (duration 7 - 11 months)

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Hygrophila auriculata (Schum) Heine
(= Asteracantha longifolia [L.] Nees)

Annual weed of swampland or poorly drained areas, often found on black soils. It grows erect to a height of 15-50 cm. The stem can be woody and is unbranched; however, there may be several stems arising from the same root. The simple, somewhat hairy leaves are arranged in whorls with the apical leaves extending upward. Flowers are pinkish to purplish and can be up to 3 cm long. Spines, 1-2 cm long, occur in whorls at each node. Cattle eat it despite the spines. Seeds can produce a semi-drying oil.

DISTRIBUTION: CH, T, WH; 1800-2260 m

NAMES: ameykela, yeset-milas (A); essoch-guassa (T); gorattisare (O)

ILLUSTRATIONS: Photograph - H. auriculata; Drawing - leaf
Zaleya pentandra (L.) Jeffery
(=Trianthema pentandra L.)

Annual fleshy weed occurring in irrigated crops. More common on sandy, alluvial soils and can tolerate alkaline conditions. Stems are branched, 8-60 cm long, and lying flat on the ground. Leaves are in opposite pairs, simple, entire and rounded at the top. The petiole base is expanded into white, papery wings. Flowers are clustered in the leaf axils, small (2-3 mm), and usually green, but can be pinkish or red. The fruit is a dry capsule held in 5 spiny sepals.

DISTRIBUTION: SR, NE; 0-2000 m

NAMES: auwud-guilla, gurre, gurre-dschemmai, gurre-gemmai (T); raba-a, rokama (Arabic)

RELATED SPECIES: Trianthema portulacastrum L. differing in leaf shape (broadly obovate) and pale pink flowers, 4-5 mm, solitary in the leaf axils. Occurs at low elevations e.g. WL; 600 m.

Achvranthes aspera L.

Annual or perennial herb occurring in hedges, thickets and shaded habitats and occasionally as a weed. It has an erect stem which can be much branched (0.5-2.0 m), sometimes woody at the base. Leaves are opposite, simple and on short petioles. They are ovate, sparsely hairy, and somewhat greyish underneath. The inflorescence is a terminal spike (up to 30 cm), and on paired side branches. Flowers are small and crowded, greenish or whitish to purple in color, and about 7 mm long. The older, lower flowers are deflexed against the stem. The fruit is a one-seeded capsule with the spiny bracts sticking it to the coats of animals. Leaves have been used to relieve irritation caused by insect bites.

DISTRIBUTION: NE, WH, C, SR, C; 1100–3000 m

NAMES: Devil's horsewhip (E); attuch, talang, talengi (A); tellendesch (A,T); dodet, matchello, mutchulo rodut, (T); mateneh (G-Sid, Ill)

ILLUSTRATION: A. aspera
AMARANTHACEAE

Alternanthera pungens (L.) R. Br.
(=Alternanthera repens [L.] Link)

A low-growing, prostrate perennial with a tap root, usually occurring in waste places or on field edges, but sometimes a weed. It can root at the nodes. It has hairy, greenish or reddish stems. Leaves are simple, entire in opposite pairs of unequal size. Flowers are clustered in conspicuous, dense, sessile heads, about 1 cm diameter located at the nodes, and are without petals. Whitish perianths and spiny, short bracts are associated with each flower. The spiny fruits adhere to the skin of man and animals.

DISTRIBUTION: CH, C; 1400 m

RELATED SPECIES: Alternanthera sessilis (L.) DC. is a comparable weed but leaves are oblong, rounded, usually smooth and glossy, prostrate or semi-erect. Flower clusters look similar, are white, but are not spiny. A plant of very wet soils.

ILLUSTRATION: A. pungens.
AMARANTHACEAE

Amaranthus graecizans L.
(=A. angustifolius Lam.)

A common annual weed found mostly on lighter soils, at middle and low altitudes. It has a tap root, is erect or prostrate, and has more or less hairless branches (up to 90 cm tall). Leaves are often variable in shape (elliptical to obovate) with a wavy margin tapering into a long petiole. Small, green flower clusters are in the leaf axils, having very short perianths with pointed tips associated with each flower. Differs from other common species by having no terminal inflorescence as leaves or bracts occur up to the stem apex.

DISTRIBUTION: C, ABH, NH, NE, SR, CH; 800-1900 m

NAMES: Pigweed (E); alma, aluma, amedimado (A); hamli-titilan, bernhayo-adjit, hammele, hamlet (T); aiyu-guri (S); orome (O); lamoi (G)

RELATED SPECIES: A. lividis L., a somewhat less common species, is usually prostrate, differing by having a distinct terminal inflorescence and leaves with a very marked indentation at the tip. CH, 2600 m; WH, 1500 m.

AMARANTHACEAE

Amaranthus hybridus L.
(includes A. hypochondriacus L.)

A common annual weed found both on light and heavy soils, most often at medium and higher altitudes. It can grow vigorously on fertile soils. May be used as a vegetable. It has a deep tap root and an erect stem (up to 140 cm tall), with many branches which are smooth, ribbed, often green but may be fully or partly red. The leaves are alternate, lanceolate to ovate, tapering at the base where the blade joins the petiole. The inflorescence of spike-like racemes is usually slender, 1 cm diameter and up to 15 cm long, both terminal and axillary. The flowers are in dense clusters, surrounded by bracteoles and perianths which are sharply pointed, up to 5 mm long. Distinguished from other species by the bristly inflorescence which feels prickly to soft skin (e.g., back of fingers).

DISTRIBUTION: CH, C, ABH, NH, NE, T, SR, WH, WL; 900-2380 m

NAMES: aluma (A); assema, hamutalian (T)

RELATED SPECIES: Amaranthus caudatus L. is a very large species with long, soft, dangling terminal inflorescences, often bright red, grown for seed or as an ornamental. Occasionally occurs as a weed up to 1700 m.

Amaranthus viridis L. is a less robust plant with a slender, delicate inflorescence 0.5 cm wide, (terminal and axillary) of small rounded flowers 1-2 mm across in separate clusters leaving the stem visible between. A weed of low elevation up to 1200 m, e.g., WL, 600 m; SR, 1200 m; C.

ILLUSTRATION: A. hybridus.
Amaranthus caudatus

Amaranthus viridis
Amaranthaceae

Amaranthus spinosus L.

An annual weed of lower elevations, also found on roadsides and waste places. It has a tap root, a branched, erect stem (up to 100 cm) which can be green or reddish. The leaves are alternate, lanceolate, dark green above and paler below with a pair of spines 1-2 cm long in the leaf axils. The inflorescence has both long, tapering terminal and tight, axillary clusters about 1 cm in diameter. The flowers are small, clustered and yellowish-green. The perianth and bracteoles are 2-3 mm long, not bristly as in A. hybridus. The inflorescence is generally soft but with some scattered sharp spines.

DISTRIBUTION: NE, NH, T, SR, CH, C; 0-1850 m

NAMES: Spiney pigweed (E); aluma (A)

RELATED SPECIES: Amaranthus dubius Thell. also at low altitudes up to 1800 m and differs by having the long terminal and axillary inflorescences, 1 cm in diameter, which are completely soft and free of spines. Leaves are broadly triangular at the base. Awash, C, G, NE, WL; 600-1800 m; lamoyi (G).

AMARANTHACEAE

**Celosia trigyna** L.

An annual with a tap root and an erect or limp, smooth stem which is branched (up to 120 cm tall). The leaves are alternate, ovate to lanceolate. Where the petiole joins the main stem there may be 2 roundish leaflets lying around the stem. Inflorescences are 5-20 cm long, terminal and axillary spikes which are 0.5-1.0 cm in diameter. Flowers are small (2 mm), in clusters with white perianth and pink stamens.

**DISTRIBUTION:** CH, WL, SR, G, NE; 1100-1900 m

**NAMES:** belbila, belbelto (A); bilbilla, shilobai (T); danab el kalib (Arb)

**RELATED SPECIES:** *Digera muricate* (L.) Mart. (= *D. alternifolia* L.) has similar form and foliage but the flowers are attached individually to the stem and are longer (3 mm) and pink. SR; 0-1500 m.

**Celosia argentea** L. is more robust than *C. trigyna* with narrower leaves and a wider (2 cm), dense inflorescence beginning pink, becoming shining white. SR, C, WL; 500-1600 m.

**ILLUSTRATIONS:** Photographs: Top left - *C. trigyna*; top right - *C. trigyna* seedling; bottom left - *C. trigyna*; Leaf drawing - *C. argentea*. 

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"Celosia argentea" is also known by the names belbila, belbelto (A), bilbilla, shilobai (T), danab el kalib (Arb). It is related to *Digera muricate* (= *D. alternifolia*) and is more robust than *C. trigyna* with narrower leaves and a wider (2 cm), dense inflorescence beginning pink, becoming shining white. SR, C, WL; 500-1600 m.

*Celosia argentea* is illustrated with photographs and a leaf drawing.
**Cynoglossum lanceolatum** Forsk.

This occasional annual weed is erect, branched, roughly hairy, growing to 70 cm tall. Leaves are alternate, simple, lanceolate, sessile near the stem apex, and larger and stalked near the base. The flowers are 0.5 cm across, on very short stalks, usually pale blue or white, and borne in loose, terminal racemes. The inflorescence branches bear up to 20 flowers. Fruits are 4-lobed, 0.5 cm across and uniformly covered with bristles.

**DISTRIBUTION:** CH, NE, SR; 1650-1900 m

**NAMES:** kercha (A); bageh, dannak, daanag-bageh, tanag, tannag-bageh (T); mat-anni (O-H)

**ILLUSTRATIONS:** Top and bottom photograph - *C. lanceolatum*; Drawing - fruit.
**Heliotropium cinerascens** D. C.

A small shrub usually occurring in fallow areas, roadsides and occasionally in crops in drier areas. All parts are covered with fine white hairs. Leaves are alternate, simple with entire margins. Flowers are small (2-3 mm), white and arranged along one side of the inflorescence curling under at the end.

**DISTRIBUTION:** SR, C, NE, NH; 800-2000 m

**NAMES:** baganapsi (Harer); aho-gadma, amangemel (T); jebaga-bui(?); sheko (A-Welo)

**RELATED SPECIES:** H. steudneri Vatke, H. ovalifolium Forsk., and H. aegyptiacum Leh. (=H. palleus Del) are generally similar to H. cinerascens and the relative importance of each is not yet established.

**ILLUSTRATION:** H. cinerascens
BORAGINACEAE

**Trichodesma zeylanicum** (L.) R. Br.

This annual herb is locally common, usually seen at the end of the growing season on light soils in dry areas. It has an erect stem (up to 1 m tall) covered with hairs which become stiff and bristly as the plant matures. Leaves are simple, opposite near the base of the plant, becoming alternate near the top, lanceolate and up to 10 cm long, tapered at the base with little or no petiole. Leaf veins are prominent on the underside. Fused bell-shaped flowers, hang down with 5 petals and are pale blue or white. The calyx is 5-lobed and continues to grow larger as the fruit matures.

**DISTRIBUTION:** WH, C, SR, CH, NE; 1500-1790 m

**NAMES:** Late weed (E); koskus (A); aremu laezab (O)

**ILLUSTRATIONS:** *T. zeylanicum*; Drawing - leaf
CAPPARIDACEAE

**Cleome monophylla** L.

An erect annual (50 cm tall) with finely ridged, hairy stems. Leaves are alternate, simple and narrowly oblong, up to 7.5 cm long with a 1 cm petiole. The 4-petalled, pink flowers are borne singly on stalks arising from terminal leaf axils and form a few-flowered raceme. Stamens are inserted normally in the base of the flower. The fruit is a long (10 cm), narrow, many-seeded capsule opening from below by 2 valves.

**DISTRIBUTION:** C, SR, WH, NE; 1500-2100 m

**NAME:** Spindlepod (E)

**RELATED SPECIES:** Other species occurring occasionally as weeds at low elevations include *C. schimperi* Pax with trifoliate leaves and pink flowers, *C. hanburyana* Penzig. with 5-foliate leaves and pink flowers, and *C. viscosa* L. with palmate leaves (3-5 foliate) and yellow flowers.

**ILLUSTRATION:** *C. monophylla.*
More common on irrigated land, this annual also occurs occasionally in other areas. Its leaves can be used as a vegetable. The stem is erect, branched, fast growing (up to 1 m) and covered with sticky hairs. The palmate compound, alternately arranged leaves are divided into 5 (rarely 3-4) sessile leaflets, with entire or finely-toothed margins. A terminal raceme has stalked, sweetly scented, single flowers in the axils of small leafy bracts. Flowers are pink, white or purple with 4 petals and 4 sepals, and have a distinctive central stalk (gynophore) which is as long as the petals, bearing 6 long purple filaments and the ovary. The fruit is an elongated spindle-shaped capsule (up to 12 cm long) which splits lengthwise. Seeds are black, brown and wrinkled.

**DISTRIBUTION:** C, CH, NE, SR, WH; 1200-2400 m

**NAMES:** Spider flower (E); abeteyo, aweko beke (A or (?0); boekbeha, gargamma (T); tamalaika (Arb)

**ILLUSTRATIONS:** Top - G. gynandra; bottom - inflorescence
CARYOPHYLLACEAE

*Cerastium octandrum* Hochst. ex Rich.

A weak-stemmed herb, usually occurring in shady, damp areas, covered in soft, sticky hairs, usually lying on the ground but turning upright at the ends. Opposite leaves are hairy on both sides. The flower petals are absent or if present are white and shorter than the sepals. The fruit capsule is curved, longer than the persistent sepals, shiny, light yellow with 8-10 teeth at the top opening.

**DISTRIBUTION:** CH, NE, ABH; 1900-4200 m

**NAME:** Mouse-ear chickweed (E)

**RELATED SPECIES:** *C. afromontanum* Freis. Weimarck differs by having petals longer than the calyx.

*Uebelinia abyssinica* Hochst. rarely a weed of crops but common in field edges and grassland differs by having united sepals tubular at the base and closely clustered flowers partially hidden by broad bracts at the stem apex.

**ILLUSTRATIONS:** A = *C. octandrum* plant, B = flower.
Corriquia capensis Willd.

(=C. littoralis L. ssp. africana Turrill)

In natural conditions it is a short-lived perennial but in highland crops it behaves as a prolific annual weed germinating throughout the rainy season. Stems are branched and prostrate with alternate, spirally arranged leaves. Leaves are bluish-green, nearly acute at the apex and narrowing to the base. At the junction with the stem there is a pair of small, white, membranous, winged and pointed stipules. Flowers are small and on short stalks in clusters occurring in the leaf axils mainly towards the branch ends. There are 5 white or pinkish petals and green or red sepals which turn dark red as the fruit matures. The fruit (1-seeded) is held inside persistent sepals. Often confused with Polygonum aviculare but the latter has single flowers in the axil of each leaf rather than clusters towards the branch ends.

**DISTRIBUTION:** CH, C, ABH, SR, T, WH; 1600-2400 m

**NAMES:** jimigigit, kechkech, klutch klutch (A); moka-ija (O-H), sobhi-dehl (T)

**ILLUSTRATIONS:** Top - C. capensis; bottom - seedling
CARYOPHYLLACEAE

Spergula arvensis L.

A slender, annual herb often found on acid soils. The stem is branched at the base, can be up to 70 cm long but is often bent near the lower nodes. The upper parts may be covered with sticky hairs. Leaves are linear (long, thin), grooved beneath and arranged in opposite pairs, but look whorled. A terminal inflorescence is of white, 5-petalled flowers with 5 alternating sepals which may be reddish green. The fruit is a capsule containing many black seeds. Once established large seed numbers can lead to a build-up in population.

DISTRIBUTION: CH, WH, T; 2400-2600 m

NAMES: Spurry (E); gatera, arba beltam, arba cash (?A)

ILLUSTRATION: S. arvensis
CARYOPHYLLACEAE

Stellaria media (L.) Vill.

An occasional weed of highland crops. A weak-stemmed, semi-prostrate annual with opposite leaves. Stems have 2 lines of hairs. Deeply lobed petals (4 or 5) are shorter than the 5 sepals (4-5 mm long) with 3 styles. Capsules about equaling calyx in size. Tubercled seeds are about 1 mm.

 DISTRIBUTION: CH; 2400 m

RELATED SPECIES: S. sennii Chiov. closely similar but with 4 smaller (2-3 mm) sepals and 2 styles. A frequent weed of coffee. WH; 1500 m.

Drymaria cordata (L.) Roem. & Schultes is a similar straggling herb differing in broadly ovate leaves and flowers clustered on leafless cymes. Sepals are sticky and 4-5 mm. Petals are white and 3 mm. Also a weed of coffee. WH; 1500 m.

ILLUSTRATION: S. media.
CHENOPODIACEAE

Chenopodium fasciculatum Aellen

A coarse, leafy annual up to 1 m high, grey/mealy when young but becoming green and glabrous later. Leaves are ovate, usually with a slightly cordate and sometimes wedge-shaped base (i.e., with rounded lobes), coarsely toothed to the pointed apex. Flowers are terminal or on short axillary branches in tight, rounded clusters. Very similar to C. murale. Only distinguished by the seeds with rounded edges and coarser pitting. Occurring at high elevations. Neither species is strongly aromatic when crushed.

DISTRIBUTION: CH, C, ABH; 2350-2900 m

NAMES: amedmado (A); adala (G)

RELATED SPECIES: C. murale L. differs by having broad wedge-shaped leaves. Also the seeds have a sharply-keeled edge and finer pitting. A weed of middle and lower elevations. Names: hamli-gewo, hammat-mado (T).

ILLUSTRATIONS: Photographs: Top left - C. fasciculatum; top right - inflorescence; bottom left - C. murale; Leaf drawing - A = C. fasciculatum, B = C. murale.
CHENOPODIACEAE

Chenopodium opulifolium Koch.

One of the more common Chenopodium species. The stem is loosely branched, ridged, all parts more or less densely mealy. Leaves are only slightly longer than broad with basal lobes often distinct and several teeth towards the leaf tip. Small dense flower clusters are crowded on the branches. Seeds are black. Not aromatic when crushed.

**DISTRIBUTION:** CH, SR, ABH; 1700-2400 m

**NAMES:** hamli-kubo (T); adala, bukana (G); darandara (Konso)

**ILLUSTRATIONS:** Top – C. opulifolium, middle – seedling; Drawing – leaf

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Chenopodium opulifolium Koch.
CHENOPODIACEAE

Chenopodium procerum (Hochst ex.) Moq.

Perhaps the commonest of the non-mealy, but highly aromatic Chenopodium species covered in small yellow glands. Mainly a weed of waste places but sometimes found in crops. Tall (to 2 m), erect, not much branched with a distinctly lobed leaf with a pointed apex. Terminal inflorescence may be long (to 50 cm), cylindrical, tapering from 6 cm diameter at the base to a pointed tip. Greenish flowers are small (1.0-1.5 mm).

**DISTRIBUTION:** NE, NH; 1300-2400 m

**NAMES:** amedimado (A); shuhnehat, senachnach (T)

**RELATED SPECIES:** C. schraderanum Schult. is also aromatic with yellow glandular hairs, but leaves are obtuse, with 3-5 coarse lobes, the one nearest the stalk almost reaching the midrib. The upper lobes are shallow. NH, WH, NE, CH, C, T; 1300-2400 m. Names: sining, senehnoit (A); senachnach, shuhnehat (T). C. ambrosiodes L. is an occasional weed at high elevations with a sweeter smell than the above. Leaves are long, narrow and relatively undivided. The inflorescences are mainly axillary, hence a leafy shoot almost to the apex. Name: gimi; CH (2400).

**ILLUSTRATIONS:** Top left C. procerum plant; top right C. procerum seedling; middle drawing - A = C. procerum, B = C. schraderanum, C = C. ambrosiodes; bottom left - C. ambrosiodes; bottom right - C. schraderanum.
Commelina benghalensis L.

An annual or perennial with underground stems having cleistogamous (non-opening) flowers which produce viable seeds. These flowers are often different in size and germination behavior from the normal above-ground flowers. Leaves are broadly ovate (length 1.5-2.0 times width) with leaf sheaths fringed with brown or brown-tipped hairs. Flowers emerge from a broadened, flattened, sessile spathe which is sealed for about 10 mm along its vertical edge. The flowers have 3 blue petals, the lower one being smaller. Seeds are oblong, wrinkled or smoothly ridged.

**DISTRIBUTION:** WH, NE, NH, C, CH, T, ABH; 750-2260 m

**NAMES:** Wandering jew (E); dilisha, holegebis, labunche (O), yewhaankur, wofankur (A); shato (Kefa); ambaceio, laluntye (G); maschill (T).

**RELATED SPECIES:** Commelina forskalaei Vahl. is the only other common weedy species having underground stems. It differs from *C. benghalensis* in having longer, narrower leaves (length 4-5 times width) often with wavy edges; in the spathes having only 2-3 mm of the vertical edge sealed; and in having 2 of its blue filaments conspicuously broad and flattened. Mainly found at lower altitudes. WL, SR (600-1100 m). gorla-gabis (O); wodgallit (T).

**ILLUSTRATIONS:** Top - *C. benghalensis* underground stolons; right - *C. benghalensis* (left) compared to *C. latifolia* (right); bottom - *C. forskalaei*.
**Commelina latifolia** A. Rich.

One of the most widespread *Commelina* species. Leaves have a broad base and slightly clasp the stem (length 3-4 times width). Flowers are distinguished by having two upper blue petals and one white or very pale lower petal. There are no underground stems. Seeds are smooth, round, and in clusters of 4.

**DISTRIBUTION:** C, ABH, CH, WL; 1200-1900 m.

**NAMES:** water maker (E); yeweha ankur (A); lalumincha (G-Ill); ganaiia (O)

**RELATED SPECIES:** *C. diffusa* Burm. f. and *C. forskalaei* have similar but slightly smaller leaves compared to *C. latifolia* (length 3-4 times width). Flower petals are all blue. *C. diffusa* is distinguished by having a spathe which is completely open along the vertical edge and oblong, shallowly dimpled seeds. *C. imberbis* Hassk. differs in having slightly elongated seeds and a yellow middle anther.

**ILLUSTRATIONS:** Top left - *C. latifolia*; top right *C. diffusa*; bottom left - Commelina seedling; bottom right *C. diffusa* seedling.
Commelina subulata Rott.

Leaves are very narrow (length at least 10 times width). Flowers are dull orange or mauve. There are no underground stems. This is a widespread species at all elevations but rarely dominant.

**DISTRIBUTION:** SR, CH, WL; 1200-2400 m

**NAMES:** degik-maschill, ghecif (T); hamleskoi (A)

**RELATED SPECIES:** *C. africana* L. has broadly ovate leaves (length 1.5-2.0 times width), has no underground stems, and has bright yellow flowers. Usually found at higher elevations in grassland rather than cultivated areas. WH, CH; lalumincha (C); off-gola, off-angoon (Shoa, ?O)

**ILLUSTRATION:** *C. subulata.*
Cyanotis barbata D. Don.

A frequent, often abundant perennial weed of grassland at high altitudes, occasionally persisting in cultivated land. Leaves linear up to 8 cm long, similar to C. subulata. Flowers occur in spathes as Commelina species, but each flower within the spathe also has a leafy bract giving the flower head a congested appearance. Flowers are blue to purple, with bearded filaments.

DISTRIBUTION: CH, ABH, C, T; 1650-2800 m

NAMES: yewotkolo, yejibdinich (A); burko (T)

ILLUSTRATION: C. barbata
COMPOSITAE

Acanthospermum hispidum DC.

Annual herb commonly on light sandy soils, with an erect, coarsely hairy, stem with dicotomous branching. Leaves are simple, opposite, up to 8 cm long, narrowing gradually to the sessile base. The portion near the leaf tip is shallowly toothed and hairy. Flower heads are solitary, sessile in the upper leaf axils, and pale green-yellow. The fruits (achenes) are triangular, hard, single seeded with numerous hooked spines (2 longer spines at the apex). They are grouped into star-shaped clusters of 5-10.

DISTRIBUTION: C, CH, SR; 1650 m

NAMES: Starbur (E)

ILLUSTRATIONS: Photograph - A. hispidum; Drawing - seed.
COMPOSITAE

Ageratum conyzoides L.

A weed of wetter areas and common in perennial crops. An erect, branching, softly hairy annual with opposite (usually), ovate leaves with a regularly serrated, blunt-toothed margin. The terminal inflorescence has several branches, each with a number of pale blue, purplish or whitish flower heads arranged in a flat-topped cluster. The flower head is surrounded by 2-3 rows of narrow, pointed bracts. The fruit (achene) is black, ribbed and has a pappus of 5 white bristles.

DISTRIBUTION: WH, SR, C, CH, NE; 1650-2100 m

NAMES: Goatweed (E); arema (A); gunyato (G); adda, tefo (O)

ILLUSTRATIONS: A. conyzoides and seedling
Anthemis tigreensis A. Rich.

A prostrate to semi-erect weed of crops at high elevations which can become dominant locally. Its height is about 30 cm. Leaves are alternate, greatly divided into rounded segments. Flower heads are on long peduncles with an involucre of distinctive pale green bracts with black borders. Ray florets are white, 1-2 cm long. Disc florets are yellow. Fruiting head becomes almost conical.

**DISTRIBUTION:** CH, WH, T, NE; 2400-2800 m

**RELATED SPECIES:** Cotula abyssinica Sch. Bip. ex A. Rich. is a smaller species (up to 15 cm) which has slightly less divided leaves with flat segments. Flower heads are without ray florets, about 1 cm across, and are pale yellow. Bracts of the involucre are bordered pale brown, not black. Also a weed of higher elevations, common but rarely dominant. C, ABH, CH; 2400-2800 m. Name: araman.

**ILLUSTRATIONS:** Top - A. tigreensis; bottom - C. abyssinica.
Bidens pachyloma (Oliv. & Hiern.) Cuf.  
(=Coreopsis pachyloma Oliv. & Hiern.)

An erect annual up to 75 cm, conspicuous and sometimes dominant on roadsides and fallow areas, sometimes a weed of crops. The stem is yellow-green with moderately dense short hairs, especially on peduncles. Leaves are pinnately divided. Flower heads have an involucre of spathe-like bracts (broadest near the tip). Ray florets are yellow, 1-2 cm in diameter, and obtuse with orange spots at the tip and base. Flower heads remain erect when in fruit.

DISTRIBUTION: CH; 2400-2600 m

NAMES: Meskel flower, meskel daisy (E); adeyabeba (A)

RELATED SPECIES: B. prestinaria (Sch. Bip.) Cuf. (=Coreopsis prestinaria Sch. Bip.) is the more common of the two species especially at higher elevations and more robust up to 2 m. Leaf shape is variable, sometimes finely divided as above but usually less divided. Otherwise, distinguished by almost smooth stems and peduncles (only scattered hairs). Bracts of flower heads are more or less parallel-sided. Ray florets are longer, usually acute, and fruiting heads are drooping. CH (2400-2600 m). Names: adey abeba (A); kello (G); gelligelle-maskel, adde, embodahgade, sakota-talha-schaba (T).

ILLUSTRATIONS: Photographs: top - B. pachyloma, bottom - B. pachyloma (left), B. prestinaria (right); Drawing - A = B. prestinaria, B = B. pachyloma leaves.
Bidens pilosa L.

An erect, branched annual herb with a 4-sided, hairless stem. Can be associated with all crops and found on poor and exhausted soils. Leaves are opposite, divided into 3 (rarely 5) stalked, ovate leaflets with sharply serrated margins. The terminal leaflets are larger than the others. Flower heads are 1 cm across, on long stalks and arranged in a branched, loose terminal inflorescence. Flower heads have 5 white ray florets (or may be absent) which are 3-lobed at the tip. The fruit (achene), rarely exceeding 1 cm long, is narrow, black, ribbed, with 2-3 hooked bristles which cling to clothes and fur.

DISTRIBUTION: WH, NE, NH, SR, CH, C; 1640-1800 m

NAMES: Blackjack (E); chigogot, chigotit, chibu, yeseitan mierfe (A); jugogid, samie, abare (O); zagogo, gattato (T).

RELATED SPECIES: B. biternata L. has a few yellow ray florets. The compound leaves have 5-9 pinnately arranged leaflets, the lower ones often divided into 3. The outer bracts are not broadened at the tip. The fruits tend to be longer, 1.0-1.5 cm in diameter, and have 3-5 hooked bristles. CH, C (1800) Name: Yellow flowered blackjack (E); gellgelle-maskel, hanzek, zellim-tannag (T); kolpi (O).

ILLUSTRATIONS: Top - B. pilosa; right - B. biternata; bottom - seedling.
III

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COMPOSITAE

**Coryza bonariensis** (L.) Cronq.

(=*Eriogerona bonariensis* L.; =*E. linifolius* Willd.)

An annual weed mainly of perennial crops and fallow areas, having a tough, ribbed, hairy stem, woody at the base (up to 1.3 m), and arising from a basal rosette of leaves. Leaves are narrow, long, alternate, sessile with smooth, undulating margins. Flower heads are on 1.5 cm stalks in a terminal, elongated inflorescence. The flower head is yellowish white, 0.5 cm across, with many narrow, tubular florets (no ray florets) with numerous hairs arising from the ovary. The hairs attached to the fruit (achene) are white or pinkish.

**DISTRIBUTION:** CH, SR, ABH; 1600-2400 m

**NAME:** Fleabane (E)

**ILLUSTRATION:** *C. bonariensis*
COMPOSITAE

Crassocephalum rubens (Jacq.) S. Moore

An occasional annual weed which is branched and more or less erect. Leaves are spirally arranged, entire or dentate especially near the top of the plant. Magenta flowers are solitary on long peduncles, about 1.5 cm in diameter and 1-2 cm long.

DISTRIBUTION: WH, CH

RELATED SPECIES: C. crepidoides (Benth.) S. Moore and other species occur with yellow or orange flowers.

ILLUSTRATION: C. rubens.
Flaveria trinervia (Spreng.) C. Mohr.

An erect, annual weed up to 0.5 m tall, common on roadsides at middle and lower elevations, spreading increasingly into cropped areas, especially on lighter soils and under irrigation. Can become completely dominant locally. Much branched with opposite leaves, distinctly 3-nerved. Flowers are very small, yellow and in dense axillary clusters 1-2 cm across. Seedlings have characteristic white 'blisters'.

**DISTRIBUTION:** NE, NH, SR, CH, C, G, T; 800-2100 m

**NAMES:** goroseza (0); dehu-nekel (?T)

**ILLUSTRATIONS:** Top - *F. trinervia* plant; bottom - seedling.
Galinsoga parviflora Cav.
(includes G. ciliata [Ratn.] Blake)

A very common annual, with a branched, soft, slightly hairy stem, and a shallow root system which easily re-establishes after weeding if not completely removed from the soil. Leaves are opposite, simple, ovate, slightly hairy with a short petiole. The leaf margin is slightly toothed; leaf veins are three, converging at the leaf base. A regularly branched, loose inflorescence arises from the stem apex and upper leaf axils. Flower heads have many yellow tubular florets and 5 small, 2- to 3-lobed, white ray florets surrounded by membranous bracts. Fruits (achene) are angled or flat, slightly hairy with a pappus of silvery, fringed scales. Prolific seeder producing a generation in about 50 days.

**DISTRIBUTION:** CH, C, ABH, WH, NE, NH, SR, T; 1600-2260 m

**NAMES:** Gallant soldier (E); balcha, gorositu, abatabo (O); dehanekaye, nkelkegne, yemder berheru (berbere), abadabo, yeshewa-arem (A); akshet (G); dekla nekel (T).

**ILLUSTRATIONS:** Photograph - G. parviflora plant; Drawing - seedling
COMPOSITAE

Gnaphalium unionis Sch. Bip.
and G. declinatum L. f.

These two closely related species are not easily distinguished. Both are short (10-20 cm tall) with characteristically grey or white foliage and stems densely covered in hairs. Leaves are narrow, linear and 2-4 cm long. The inflorescence is a terminal cluster of whitish flowers surrounded by a darker grey-brown involucre of bracts. A weed of damp, highland situations, occasionally dominant in wet areas.

DISTRIBUTION: CH; 2900 m

NAME: coddo-ciacca (O)

ILLUSTRATION: G. unionis
Guizotia scabra (Vis.) Chiov.

Probably the most important of all broadleaved weeds in Ethiopia, almost universally distributed at middle and higher elevations. Erect, fast-growing to 1-2 m (even to 4 m in some localities), but may mature and seed profusely when only 30 cm high in poor soils. Stems are usually covered in short glandular hairs. Opposite leaves, 3-15 cm long, are lanceolate, toothed and softly sticky to the touch. (The related crop G. abyssinica, noug, has rigid, smooth leaves). Flower heads, 2-5 cm across, have an involucre of broad, obtuse bracts; yellow ray florets, 1-2 cm long (without the orange spots of some Bidens spp.), and yellow, tubular disc florets.

DISTRIBUTION: CH, C, ABH, WH, NE, NH, SR, T; 1400-2800 m

NAMES: mech (metch), mechi (A); hada, (udda) (G); nehukas (T).

ILLUSTRATIONS: Top left - G. scabra adult, top right - same; bottom left - older seedling, bottom right - young seedling.
COMPOSITAE

Launaea cornuta (Oliv. & Hiern.) C. Jeffrey
(=Lactuca taraxacifolia [Willd.] Hornemann);
(=Sonchus exauriculatus [Oliv. & Hiern] O. Hoffm.)

This glabrous, tall (up to 1.2 m) perennial often found on
black soils, has an extensive creeping rhizome system which
can send up shoots from deep in the soil, thus making it very
difficult to control. All parts have milky latex (sap) and a
bad smell. Leaves first forming a basal rosette, are narrow,
lanceolate, with 2-4 sharply pointed lobes on small stalks;
later on the stem arising from the rosette, has alternate and
sessile leaves. The leaf margin has finely-cut teeth which
are pointing towards the petiole. The much-branched
inflorescence is a terminal panicle with widely separated
flower heads, 1-2 cm across on short stalks which have pale
yellow florets in a narrow, cylindrical involucre. One-seeded
fruits (achene) are spindle-shaped with a pappus of long,
white hairs.

DISTRIBUTION: NE, NH, SR, CH, C; 1000-1850 m

NAMES: Wild lettuce (E); seyetan gomen; watate (T);

RELATED SPECIES: Lactuca serriola Torn. is distinguished by a
row of soft spines along the undersides of the leaf’s midrib.
An annual or biennial without a creeping root system.

Launaea interbacea (Jacq.) Beauv. also an annual with rather
more deeply-divided leaves than L. cornuta. Names:
hola-gabbisa (O); tekkat-nabul (T)

ILLUSTRATIONS: Top - L. cornuta inflorescence, top right -
seedlings, bottom - L. serriola plant (note soft spines).
Launaea intybacea ή L. cornuta მაშინ როდეი გამჭვირვალე გამჭვირვალ და თავშე გამჭვირვალ. ეს მათი ორგანიზმებში გამოიყურება.
Parthenium hysterophorus L.

This is not yet a serious weed of crops and occurs mainly on roadsides and waste areas in lighter soils. It has the potential to become a serious weed as it is in India and other parts of the world where it causes serious allergies. An erect herb up to 1 m tall. Leaves are nearly pinnate. Flower heads are small, 3-4 mm, creamy white. It is resistant to some herbicides including paraquat.

**DISTRIBUTION:** C, CH, SR; 1100-1900 m

**NAME:** Congress weed (E)

**ILLUSTRATION:** P. hysterophorus
Sonchus asper (L.) Hill

This erect, bluish-green annual (up to 120 cm), has soft hollow stems which have milky latex when cut. Leaves are spirally arranged, pinnately lobed, with an irregular, serrated, prickly margin, and a pointed apex. The lower leaves have a basal pair of rounded lobes which are flat against and project past the stem. The loosely branched, terminal inflorescence has stalked flowers (up to 2.5 cm), yellow florets, and two rows of overlapping bracts. Fruits are flattened with a squarish tip, and have a pappus of long white hairs.

DISTRIBUTION: CH, SR, C; 1800-2100 m

NAMES: Spiny sow thistle (E); fosi-moskojeh (T)

RELATED SPECIES: Sonchus oleraceus L. has more deeply-divided leaves which are not prickly. Basal lobes are pointed and spread away from the stem. Name: arama (O)

ILLUSTRATIONS: Photograph - S. asper; Drawing - A = S. asper, B = S. oleraceus seedlings.
COMPOSITAE

**Spilanthes mauritiana** (Rich. ex Pers.) D.C.

A creeping, semi-prostrate weed of middle and higher elevations, especially under the shady conditions of perennial crops, roots readily at the nodes. Leaves are opposite. Flower heads are about 1 cm across with very short, yellow ray florets (2-3 mm), and a dome-shaped mass of deep yellow disc florets, becoming conical in fruit.

**DISTRIBUTION:** T, SR, ABH; 1800-2260 m

**NAMES:** berberi-abakta (T); yemder-berberi, dame (A).

**ILLUSTRATION:** *S. mauritiana*
Tagetes minuta L.

This common annual weed can grow up to 2 m tall, has a strong aromatic smell, and a furrowed stem. Opposite, sometimes alternate leaves are compound, divided into 1 terminal and several lateral leaflets. Leaflets are long and narrow with sharply serrated margins. The flowers are in erect clusters at the end of the branches. Each flower head has 2 yellow tubular florets and 2 creamy colored strap-shaped florets surrounded by 3 bracts which are closed to near the top and have distinct orange-brown glandular patches. Fruit (achene) is spindle-shaped, flattened, black, covered with short hairs and has 4 pointed scales at the apex.

DISTRIBUTION: C, ABH, NE, NH, CH, SR, T; 1650-1900 m

NAMES: Mexican marigold (E); gemma, hashish, yahiyashito (A)

ILLUSTRATION: Photograph - T. minuta; Drawing - seedlings.
Xanthium spinosum L.

Most prevalent along roadsides or paths but can also be found as an arable weed. Stems can have many branches. Leaves are alternate, simple, lanceolate with an entire margin, 2-lobed, slightly hairy with a prominent, whitish midvein. Three stiff sharp spines about 2 cm long, are located at the base of each leaf. Flower heads are very similar to those of X. strumarium but fruits have fewer hooks and are arranged singly in leaf axils. Fruits are 2-seeded, bur-like, covered with stiff hooks, and have a terminal spine which can attach to clothes and fur.

**DISTRIBUTION:** NE, NH, CH, SR, C; 1600-2300 m.

**NAMES:** Spiny cocklebur (E); kore buse (O); torserawit, kosheshele, yeset milas (A).

**ILLUSTRATIONS:** Drawing - A = X. spinosum seed, B = X. strumarium seed.
COMPOSITAE

**Xanthium strumarium L.**

(=*X. abyssinicum* Wallroth.)

Found along roadsides and in seasonally flooded depressions but can also be a major weed of crops, especially under irrigation. An annual herb with branched stems (up to 60 cm tall). Leaves are alternate, broadly ovate with 3-5 shallow lobes, and a long petiole. The inflorescence is in axillary branches. Flowers are monoecious, with separate male and female flower heads on the same plant. The male heads are roundish, 0.5 cm diameter. Female heads are covered with hook-like spines, with 2 curved beaks at the apex. Fruits are up to 1.5 cm long, bur-like, broadly cylindrical with stout, hooked spines.

**DISTRIBUTION:** NE, NH, C, CH, SR, T; 750-1900 m

**NAMES:** Cocklebur (E); yemoyne fikur (O); banda (A); adro gobez (Welo).

**ILLUSTRATIONS:** Top - *X. strumarium* plant; bottom - seedlings.
**Convolvulaceae**

*Convolvulus arvensis* L.

This difficult to control perennial can produce vines up to 190 cm long that run on the ground or climb up plants or other objects and may cause lodging of the crop. It has deep, penetrating roots and shallower, horizontal lateral roots capable of producing new plants and making it extremely difficult to destroy by normal tillage. Leaves are alternate, somewhat ovate, pointed or rounded at the tip, and have a base with two spreading lobes. Flowers are pink or white, funnel-shaped on short stems in the leaf axil. A round, pointed pod has 4 dark brown, rough seeds.

**DISTRIBUTION:** NE, NH, CH, WH; 2300 m

**NAMES:** Bindweed (E); gashanekaye; filatut (A); wanta bukusi (O); balersf (?O); gama-harestei, ja-gurberi-gammi (T)

**ILLUSTRATION:** *C. arvensis*
CONVOLVULACEAE

Cuscuta campestris Yuncker

A total, stem parasite occurring on a wide range of hosts, but in Ethiopia primarily on noug, and also on onion, citrus, coffee and others. It is an introduced weed, still spreading, often through contaminated crop seed, and causes severe weakening of its host and almost complete loss of yield in infested plants. The stems are 1-2 mm, bright orange/yellow having the appearance of string. Flowers found in clusters, are 2-3 mm with corolla lobes having incurved tips. Seed capsules, which do not split in half, are round with two styles with knobs on the top.

DISTRIBUTION: WH, CH, NE, C, T; 1500-2400 m
Names: Dodder, ‘cholera’ (E); yenoug anbessa (A)

RELATED SPECIES: C. epilinum Weike occurs primarily on linseed. It is also spread through contaminated seed but can be separated from linseed by sieving. It has larger flowers (3.0-3.5 mm) in dense clusters 5-10 mm across. The stem has few branches. Fruits have two styles but no knobs on the top. Found: ABH, NE, CH, 2000-2420 m.

NAMES: same as above.

ILLUSTRATIONS: Photographs: Top - C. campestris on noug, bottom - C. epilinum on linseed; Drawing comparing styles - A= C. campestris, B= C. epilinum.
Ipomea eriocarpa R. Br.

A twining weed like Convolvulus arvensis but annual and commoner at low altitudes. Alternate leaves are broadly cordate. Small tubular flowers in the axils (often not seen until late in the season), are 1.5 cm across, pale mauve with a deeper purple center. Capsules are 5 mm diameter, pubescent, and glabrous seeds.

**DISTRIBUTION:** T; 1200 m

**RELATED SPECIES:** *I. sinensis* (Desr.) Choisy is very similar in foliage and flowers but the capsule is larger (6-10 mm) and glabrous. The seeds are velvety pubescent. SR; afaful (T).

*I. cordofana* Choisy has similar foliage but flowers are larger (3-4 cm across) and may be pure white. Capsules about 10 mm diameter and glabrous. Common on the Sudan border at Humera. Several other species occur as weeds varying in leaf shape, flower color, and size.

**ILLUSTRATIONS:** Top - *I. eriocarpa*, middle - *I. cordofana*, bottom - Ipomea seedling.
CRUCIFERAE

Erucastrum arabicum Fisch. & Mey

A common annual weed of highland areas with an erect, branched stem (up to 1 m) sparsely covered with stiff hairs. Alternate, lower leaves have petioles and deeply-divided pinnate lobes (almost to the midrib) with a larger lobe at the apex. Upper leaves are without petioles and are irregularly toothed. The 4-petaled, pale yellow flowers are borne on long stalks in a branched terminal inflorescence. Upper flowers are without bracts. The fruit is a long capsule, 4-angled, with a terminal pointed beak containing round, brown seeds.

DISTRIBUTION: CH, ABH, NH; 1700-2650 m

NAMES: sonko, yewef zer, gomen zer (A); tateh (T); salaleh (O-Arsi)

RELATED SPECIES: Erucastrum pachypodium (Choiv.) Jonsell differs in having bracts to the top of the inflorescence, common in N. Ethiopia.

Brassica napus L. if often collected as a weed but in most cases is cultivated, left as a food crop by farmers, or is misnamed and should be E. arabicum.

ILLUSTRATION: E. arabicum.
Cyperus assimilis Steud.

A small, tufted annual sedge, up to 15-20 cm, with relatively short basal leaves but long involucre bracts (up to 15 cm) from the short-stemmed inflorescence which is thus surrounded and over-topped by the foliage. Inflorescence is an umbel with clusters of flattened, golden-yellow spikelets on stalks of varying length. Common on heavy, wet soils at middle and higher altitudes.

**DISTRIBUTION:** WH, CH; 1600-2600 m

**NAME:** gussa-mai (T)

**ILLUSTRATION:** C. assimilis
Cyperus esculentus L.

A perennial sedge particularly prevalent in, but not restricted to, irrigated areas. The stem is erect (up to 60 cm), 3-sided, has a slender shoot base, and terminates in a yellowish inflorescence. The original plant arises from a sprouted tuber. Numerous subsequent rhizomes from the original plant can produce 'daughter plants' or terminal tubers which are roundish, pea-sized, and edible. Leaves are 3-ranked, linear, grass-like, have a pointed tip, and emerge from the shoot base. The umbel-like inflorescence usually has 3 leafy bracts below a number of slender inflorescence branches of unequal length radiating from a central point. Each has clusters of blunt-pointed spikelets which, when mature, are almost at right angles to the rachis. Seeds (not always produced) are triangular-shaped but reproduction is primarily by the underground tubers.

**DISTRIBUTION:** SR, NE, T, WH; 1500-2260 m

**NAMES:** Yellow nutsedge (nutgrass) (E); engicha (O,A); alader, alado simiga (O)

**ILLUSTRATION:** Photograph - C. esculentus; Drawing comparing tubers and leaf tips - A= C. rotundus, B= C. esculentus.
Cyperus rotundus L.

A perennial sedge, similar to C. esculentus with the following differences: Stems have a more swollen base and terminate in a darker, brown or purplish inflorescence. Rhizomes produced are less numerous, only 1-3 from each stem base, darker, and tougher. Tubers are formed in chains, (rather than being terminal), are larger, more irregularly shaped, and are not edible. The leaf tip is less finely pointed. Spikelets are more pointed, longer, usually at a more narrow angle to the stem than C. esculentus. Propagation is by seed and tubers. This is known as the world’s worst weed.

DISTRIBUTION: C, CH, NE; 1200-2100 m

NAMES: purple nutsedge (nutgrass) (E); engicha (O,A); mecequa, mutschuqua, biduggo (T).

RELATED SPECIES: C. rigidifolius Steud. has more densely clustered, brown to blackish spikelets, and spreads by rhizomes. Leaves are whitish below, and are very tough. Abundant in high rainfall, high altitude areas, but occurs mainly in grassland. Very rare in crops. Names: gichia, ghijjia (?T); ketemma (A); koogi (O); matrass-antoschoa (T).

ILLUSTRATIONS: Top - C. rotundus inflorescence; bottom - C. rigidifolius.
A perennial sedge up to 30 cm high with a swollen stem base from which up to 10 slender, white rhizomes grow out and form offset shoots or dormant bulbs. Leaves are pale green and have a distinct aromatic smell. The inflorescence is a compact head, simple or with 2-3 lobes, 1-2 cm across, subtended by an involucre of 3-5 bracts about 10 cm long. Common as a weed of coffee in S.W. Ethiopia.
EUPHORBIACEAE

**Acalypha crenata** Horchst. ex A. Rich.

An erect-stalked annual having alternate, ovate leaves with a slightly toothed margin. Leafy bracts, occurring in the leaf axils, are folded to enclose short flower stalks. The flowers have a greenish appearance. Female flowers are small at the stalk base, and the even smaller male flowers are on the upper part of the stalk and may stick out beyond the bract. Bracts around the female flowers are distinctly crenate (regularly toothed).

**DISTRIBUTION:** C, CH, WH, NE, G; 1400-1700 m

**NAMES:** orome (O); um imairat (Arb)

**ILLUSTRATION:** Photograph - *A. crenata*; Drawing - bract surrounding flower.
EUPHORBIACEAE

Euphorbia hirta L.

An annual (sometimes perennial) herb with milky sap, prostrate when young, becoming upright later. It is most common in perennial crops. Several stems arise from a tap root. Leaves are simple, opposite, have almost no petiole, have a finely serrated margin, are sometimes purplish, and have yellow hairs. Flowers are very small, without petals, and form sessile, dense clusters in the leaf axils. The yellowish fruit is a 1 mm capsule with 3 brown seeds.

DISTRIBUTION: C, SR, NE; 305-750 m

NAMES: asthma weed (E); ayo (S)

RELATED SPECIES: E. indica Lam. (=E. hypericifolia L.) is similar but has a more erect elongated stem (7-45 cm tall), usually branching at the base. Leaves more rounded on distinct, short petioles, and are ovate, minutely toothed, and glabrous. Flower clusters are axillary, on short branches, and often with a pair of leaves at the apex. Bracts are 5-lobed and have 4 white minute glands. Seed capsules are 4-angled, slightly rough, whitish grey to reddish brown. An annual occurring more commonly than E. hirta in annual crops. NE, C. 750-1500 m

ILLUSTRATIONS: Top - E. hirta, bottom - E. indica.
Andropogon abyssinicus (Fresen.) R. Br.

An annual or short-lived perennial, found in grazing or fallow areas where it is good for hay and grazing but may survive inadequate land preparation to be a weed in crops. It is loosely tufted, grows to 50 cm tall. Leaves are soft, and up to 13 cm long. The racemes, usually two, are densely hairy and purplish in appearance. Spikelets are paired, one sessile and awned, the second pedicled and awnless. Sessile spikelets are up to 7 mm, awns 17-25 mm, and the upper glume of the sessile spikelet has a 6 mm long bristle.

**DISTRIBUTION:** CH, C; 2400-2900 m

**NAMES:** balami (O); cajja, beleme (?A)

**ILLUSTRATION:** A. abyssinicus
**Avena fatua L.**

A weedy annual, the most widespread and serious wild oat species in cereals in the world but fortunately still localised in Ethiopia mainly in the South and East. Seeds separate readily from the glumes, often leaving the tip of the inflorescence with conspicuous empty glumes. Neat, broad, roundish abscission scars occur on all seeds. Each spikelet has 2-3 florets and 2-3 awns per spikelet attached to the lemma. The lemma has many brownish hairs near the abscission scar.

**DISTRIBUTION:** CH, ABH, SR

**NAMES:** Wild oats (E); sinar, gene, gerema, gench (A)

**RELATED SPECIES:** A. sterilis L. is less common, occurring mainly in N. Ethiopia, resembling A. fatua with the following exceptions: abscission scars are also broad and roundish but occur on the bottom seed only; seeds drop as a cluster and are very difficult to separate; spikelets may be even larger than A. fatua; the third floret has no awn. Name: faha (T).

A. sativa L., the crop, is often recorded as a weed in other cereals but is distinguished by plump, hairless 'seeds' with no awns or one only on the lowest seed. Seeds have no abscission scar and are not readily shed from the glumes.

**ILLUSTRATIONS:** Top - A. fatua (note empty glumes); bottom - seed of A. fatua (top) compared to A. vaviloviana (bottom).
Avena vaviloviana (Malzer) Mordv.

This is by far the commonest and most widespread wild oat species in Ethiopia. An annual (up to 1.5 m tall), has broad flat leaf blades with a membranous ligule and no auricle (distinguished from wheat and barley at the seedling stage). Inflorescence is a branched panicle, with pendulous spikelets. Mature seeds separate easily from the glumes and from each other owing to an abscission scar which is characteristically narrow. Spikelets are slender and have lemmas which are usually hairless but with fine bristle points (1-3 mm long).

**DISTRIBUTION:** NE, NH, T, CH; 2800 m

**NAMES:** Oat (E); sinar, gench, gerema (A); sa-a (fa-a) (T); gerbu (Boran)

**RELATED SPECIES:** A. abyssinica A. Rich. is a crop species but commonly occurs also as a weed. It has the slender seeds and bristle tips to the lemmas, but the seeds have no abscission scar and are only separated by force leaving a rough break. Intermediates between A. vaviloviana and A. abyssinica occur and distinction between the two species is almost impossible in immature plants. Names: gaja-gascha, gencho, gerema, samareta (O); sinar (A).


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**Gramineae**

**Brachiaria eruciformis** (J. E. Sm.) Griseb.

An annual, loosely tufted, with softly hairy parts, grows to 60 cm especially on black soils. Leaf blades are linear, lanceolate with a rounded base but acute at the apex. Two to ten racemes form the inflorescence with 1.0 - 1.5 mm long hairy spikelets arranged along one side of the rachis with the lower glume on each floret reduced to a small scale on the side of the raceme’s rachis. Sometimes confused with *Echinocloa colona* but spikelets are larger (about 2 cm) in the latter.

**DISTRIBUTION:** C, NE, CH; 305-2200 m

**NAMES:** muchora (maachera) ?

**ILLUSTRATIONS:** Photograph - B. eruciformis; Drawing comparing inflorescences - A= B. eruciformis, B= E. colona.
**Bromus pectinatus** Thunb.

A tufted annual often abundant in cereals of the highlands. Stem erect up to 80 cm tall. Leaf blades 5-30 cm long, 2-8 cm wide with hairy sheaths, finely hairy leaves and membranous ligules up to 5 mm long. The panicle-type inflorescence, 5-25 cm long, has laterally flattened spikelets with 4-7 florets. Awns (9-17 mm long) arise from the 2-lobed lemma.

**DISTRIBUTION:** CH, NH, NE, C, ABH; 2100-3100 m

**NAMES:** brome grass (E); gench (A); wovillo (O)

**ILLUSTRATION:** Photograph - *B. pectinatus*; Drawing of spikelet.
Cynodon nlemfuensis Vanderyst.

A persistent perennial grass weed with slender to robust stems, often 60 cm tall and/or prostrate. Produces stolons and rooting can occur at the nodes. At least 2, usually 3 leaves occur at each node of the stem which is a very unusual feature of all Cynodon species, distinguishing them from Digitaria abyssinica. Leaf blades are flat, up to 16 mm long, 6 mm wide, with a small ligeule of scattered hairs. (D. abyssinica has a distinct membranous ligule.) Leaves can appear grey-green in dry conditions. The digitate inflorescence has 4-5 (sometimes up to 13) green or purplish spikes. Along the spikes are small sessile spikelets arranged in two rows.

**DISTRIBUTION:** SR, C, T, CH, WL, NE, WH; 305-2400 m

**NAMES:** Star grass, couch, bermuda grass (E); sardo (A); katisa (O); djerebo (S)

**RELATED SPECIES:** C. dactylon (L.) Pers. is very commonly reported but is probably uncommon in Ethiopia compared to C. nlemfuensis. It differs from the above species by having true underground rhizomes as well as stolons. Names: cinkursia, margo, sardo (O); sari-tahak (tahako) (T)

**ILLUSTRATIONS:** Top - C. nlemfuensis plant, middle - inflorescence, bottom - three leaves coming from one node.
Digitaria abyssinica (A. Rich.) Stapf
(=D. scalarum [Schweinf.] Chiov.)

A perennial with long, slender rhizomes often quite deep in the soil making it extremely resistant to shallow tillage. Perhaps the most important weed of Ethiopia, certainly the most important in coffee. Stems grow up to 1 m. Leaves are 6 cm long, 3-6 mm wide, with glabrous sheaths, and a membranous ligule. Foliage may be dark green but many forms are distinctly glaucous (bluish). The inflorescence is a panicle with 2-12 racemes, often whorl-like and pointing upward. Spikelets are numerous, glabrous, in various shades of brown, purple or grey-green.

**DISTRIBUTION:** SR, CH, NE, C, WH, NH, T; 1400-2400 m.

**NAMES:** Blue couch grass (E); ura (O); sargida, bora (?); wario (waria) (A); sari-zaba (T)

**ILLUSTRATIONS:** Top - D. abyssinica plant, middle - young plant (note bluish color), bottom - ligule comparison of C. nlemfuensis (right) to D. abyssinica (left).
An annual up to 1 m tall common in annual crops including cereals at middle elevations. Leaves are generally quite narrow with long hairs at the base of the blade but sheaths are glabrous. The peduncle is hairy just below the 2-7 sessile racemes which are 5-15 cm long and more or less digitately arranged. Spikelets, arranged in threes, are obtuse, pale grey-green, 2 mm long with distinct longitudinal ridges, and often with dense white hairs framing a dark brown or black upper lemma.

**Distribution:** NH, T, CH, NE; 1700 m

**Names:** huffeh, makwella (O); tahakh (T)

**Related Species:** *D. nuda* Schumach. is similar but has spikelets in pairs, narrower, and has a more acute and upper lemma not dark-colored. This is the commoner species at low elevations (e.g., Gambella, 600 m)

**Illustrations:** Photograph - *D. ternata*; Drawing - *D. nuda*.
Digitaria velutina (Forsk.) P. Beauv.

Slender, annual grass most common at middle altitudes and often a dominant weed in perennial crops. The stem, over 1 m long, is usually bent at the lower nodes which can root. Leaf blades are flat, softly hairy, and 5-12 mm wide. Panicle has 8 or more racemes, up to 7 cm long with an axis that can be as long as the lower branches. Spikelets are narrowly lanceolate, glabrous, acute, and 1.5-2.0 mm long with or without lower glumes scale-like.

DISTRIBUTION: CH, SR, NH, T, WH; 1660-1700 m

NAMES: warwat, shubbo (0)

ILLUSTRATION: D. velutina
**Dinebra retroflexa** (Vahl.) Panzer

An annual grass, especially on black soils under irrigation, growing up to 1 m tall but often less. Leaf blades are flat, 6-15 cm long, and sparsely hairy. The panicle is usually terminal, 8-30 cm long with numerous one-sided spikes. Spikes have a flattened rachis, 1 cm long, which at first are erect and later reflexed when mature. The glumes have a long awn-like tip, exceeding and concealing 2 to 3 florets.

**DISTRIBUTION:** WH, CH, SR, NE, NH, WL; 750-1800 m

**NAMES:** chew cehwit, barichao (T); um mamlitra (Arb)

**ILLUSTRATION:** *D. retroflexa*
**Echinocloa colona (L.) Link**

A tufted annual grass up to 60 cm tall but can be prostrate, often found in waterlogged situations. Leaves are glabrous, without ligules or auricles, and may have a purplish patch. The panicle is green or purplish, 5-13 cm long with alternate racemes located half their own length apart. Crowded, pointed spikelets, about 2 mm long, are in about 4 rows along one side of the rachis.

**DISTRIBUTION:** C, NH, WL, CH, T, NE, SR, G; 305-2400 m.

**NAMES:** kofaseesa, daahoo (0); teseri (?)A); difra (Arb)

**RELATED SPECIES:** *E. haploclada* (Stapf) Stapf is a tufted perennial and much taller, up to 2 m. The inflorescence is similar but almost always deep purplish. A plant found in very wet land.

**ILLUSTRATION:** *E. colona*
Eleusine indica (L.) Gaertn.

A tufted annual grass, 5-60 cm tall, is most common and often dominant at middle elevations. It has flattened branches arising at the base, which may be prostrate at the base but then becoming erect. Leaves are usually folded, hairless, abruptly pointed, and tough. Two to seven spikes form a terminal whorl but there may be 1-2 spikes slightly below the others. There are numerous sessile spikelets densely crowded in two rows along the lower side of the rachis.

DISTRIBUTION: NE, WH, SR, NH, C; 1500-1800 m

NAMES: wild finger millet (E); adowetaha (O?); akirma (A); daguscia-adghi (medri) (T)

RELATED SPECIES: E. multiflora A. Rich. has numerous inflorescences per plant. Each raceme is single or paired rather than in a whorl, much shorter and more crowded than E. indica. Names: chero (O); daguus-kelbi (T)

ILLUSTRATIONS: Top - E. indica plant, middle - seedling, bottom - E. multiflora.
Eragrostis cilianensis (All.) Lut.

This is the most common of the wild relatives of teff occurring as a weed. A variable, erect annual grass, up to 90 cm tall with bent or erect stems. Leaf margins have small glands. The inflorescence is a loose panicle on which spikelets are very small at first, maturing eventually after the emergence of the panicle to 2-3 mm wide by 10 mm long.

DISTRIBUTION: C, NE, WL, CH; 540-2150 m

NAMES: yewif tef, yetef arem (A)

RELATED SPECIES: E. aspera (Jacq.) Nees occurs mainly at low elevations (e.g., Gojam 1200 m). Similar to the above but with a remarkable diffuse panicle up to 60 cm long and 20 cm across with immature spikelets at the base and mature spikelets at the top, which can be up to 10 mm long but only 1.0-1.5 mm wide. Name: thaf-sakroe (T)

ILLUSTRATIONS: Photograph - E. cilianensis; Drawing - inflorescence of E. aspera (note very long panicle).
A tufted annual often found in swampy places and on irrigated black soils, grows up to 1 m tall. Leaf blades have a few bristle-like hairs near the base but otherwise are hairless. Leaf margins are slightly rough. The inflorescence is narrow with up to 10 racemes having spikelets in sets of two, terminating in a bristle, and with a characteristic bead-like internode. Sometimes confused with Echinochloa colona or Brachiaria eruciformis but spikelets very narrow, acute and falling early as they mature.

**DISTRIBUTION:** SR, C, CH; 750-1700 m

**ILLUSTRATION:** *E. fatmensis*
This is a large genus of grasses which are not easy to identify due to the complex structure of the inflorescence and large variation within some species. _H. anthistrioides_ is perhaps the most common to occur as a weed as it is an annual while most others are perennial. Stems are 0.5-1.0 m high and slender with a dense inflorescence of boat-shaped spathes about 2 cm long which turn bright orange when mature. Inside each spathe is a pair of racemes on a peduncle 1 cm long. Each raceme has 4-8 spikelets and 2-3 dark awns about 3 cm long.

**DISTRIBUTION:** SR, CH; 1200-1900 m

**NAMES:** sambelit (A); delan (O-Haraghe)

**ILLUSTRATIONS:** Top - _H. anthistrioides_; bottom - inflorescence close-up
GRAMINEAE

*Lolium temulentum* L.

An erect, tufted or solitary annual grass growing up to 1 m, commonly found in small-seeded cereal crops. Subject to the fungus disease, ergot (*Claviceps purpurea* [Fr.] Tul.) which is particularly dangerous as a contaminant of crop seed. Leaves are rough and have a short, spreading auricle. The inflorescence is rigid, unbranched, 10-30 cm long on a single, thickened spike. Sessile spikelets are on alternate sides of the spike, contain 4-5 florets each with lemmas having an awn at the base as long or longer than the spikelet. Lower glume is absent except for the terminal spikelet; upper glume is present and as long as the uppermost lemma.

**DISTRIBUTION:** C, ABH, CH, NE, NH, SR, T; 2100-3100 m

**NAMES:** darnel (E); inkerdad (A,T,O); enkerdada (O); kerdat (T)

**ILLUSTRATION:** *L. temulentum*

**CATION**

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**GRAMINEAE**

**Oplismenus hirtellus** (L.) P. Beauv.

**Oplismenus compositus** (L.) P. Beauv.

Closely related creeping perennial grasses of shady forest or tree plantations. They have runners rooting at the nodes. Leaves are characteristically dark green, broadly lanceolate, and relatively short (about 10 cm). An inflorescence of 2 to 10 racemes, very short and compact in *O. hirtellus*, less dense and up to 5 cm or more in *O. compositus*. Spikelets are 3-4 mm long, with awns about 10 mm on lower glume.

**NAME:** casi (O)

**ILLUSTRATIONS:** Photograph - *Oplismenus* spp.; Drawing - A= inflorescence, B= seed.
GRAMINEAE

**Pennisetum clandestinum** Hochst. ex Chiov.

A creeping perennial with long stolons and thick rhizomes which produce tough, fibrous roots and short branches at the nodes. It is primarily vegetatively spread. Leaves are characteristically bright green, quite distinct from *Cynodon* and *Digitaria*. Occurrence is in higher rainfall, higher altitude areas but is not usually a weed of crops in Ethiopia. The inflorescence is enclosed in the leaf sheaths of short side shoots. The stamens and styles, appearing as fine, white threads are the only visible parts of the floret.

**DISTRIBUTION**: SR, NE; 1800 m

**NAMES**: Kikuyu grass (E)

**ILLUSTRATIONS**: Top - rhizome, bottom - inflorescence.
**GRAMINEAE**

**Pennisetum polystachion** (L.) Schult.

A vigorous tufted annual, up to 1.5 m, sometimes a dominant weed at low altitudes. Leaves are flat with scattered, long hairs, and have a ligule which is a fringe of hairs. The inflorescence is a slender, cylindrical spike usually purplish. Spikelets are surrounded by numerous long feathery bristles. The rachis is strongly ridged.

**DISTRIBUTION:** CH, ABH

**RELATED SPECIES:** *P. ramosum* (Hochst.) Schweinf. is an annual or short-lived perennial, much branched, up to 2 m. Leaf blades are glaucous. It has a false spike 3-10 cm, somewhat thicker (1 cm) than other species. Especially common in Gojam. NH, WH; 1600-1900 m. Name: saar-maflet (T)

*Pennisetum thunbergii* Kunth. (=*P. glabrum* Steud.) is a tufted, or very shortly rhizomatous perennial, up to 50 cm tall. The narrow (0.5 cm), cylindrical spike is often purplish, denser than *P. polystachion*, and has spikelets pointing upwards. Also *P. sphacelatum* (Nees) Th. Dur. & Schinz (=*P. schimperi* A. Rich.) having a thick, dense spike, 1 cm diameter, on a hairy peduncle. These two species are abundant in highland grassland and occasionally persisting after inadequate tillage. CH, WH, NE; 2200-2660 m

**ILLUSTRATIONS:** Top, left - *P. polystachion*. Top, right - *P. ramosum*. Bottom, left - *P. sphacelatum*. Bottom, right - *P. thunbergii*.
P. thunbergii
P. sphacelatum

ערכי התנאי הם 2200 ל- 2600 מטרים מעל פני הים

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Phalaris paradoxa L.

A common weed of cereals at middle and higher elevations. A tufted, erect annual, growing up to 60 cm tall. Leaf sheaths are without hairs; ligules are membranous and up to 5 mm long. The panicle is very dense, spike-like (6 cm long, 10 mm wide), with small spikelets (one being sessile, the others being pedicelled) which have equal sized glumes with a tooth-like projection.

DISTRIBUTION: CH, ABH, C, NE, NH; 1550-3050 m

NAMES: asendabo, sinsi (A)

ILLUSTRATIONS: Top - whole plant, middle - inflorescence shedding seed, bottom - seedling.
GRAMINEAE

*Rottboellia cochinchinensis* (Lour.) W. D. Clayton

(=*R. exaltata* L.f.)

A fast growing annual grass found in higher rainfall, warm areas which grows to 3.5 m. Resistant to many herbicides, this is one of the most serious of all weeds on large-scale farms. After some growth, prop roots form on the lower nodes. Leaves are long (60 cm), hairy, with a rough upper surface and a white midrib. The leaf sheath is covered in stiff, irritating hairs, especially on lower leaves. The inflorescence, in the axil of the uppermost leaf, is a jointed, terminal spike 5-15 cm long, as bright green as the leaves, and sometimes overlooked. At maturity, it shatters into cylindrical flat-ended sections comprising the hollowed rachis and embedded seed.

**DISTRIBUTION:** WL, WH, G; 1100-1700 m

**NAMES:** itch grass (E); hilieta (O?)

**ILLUSTRATIONS:** Photograph - inflorescence; Drawings - A= seedling, B= leaf sheath, C= seed.
Setaria pumila (Poir.) Roem. & Schult.  
(= S. pallide-fusca [Schmach.] Stapf & Hubbard)

A tufted annual grass found commonly, but not exclusively, in small-grained cereals. Leaves taper to a fine tip, up to 30 cm long, with rough margins, with or without hairs, and a small membranous ligule of fine hairs. The panicle is spike-like, cylindrical, and terminal. The crowded spikelets have golden to reddish-purple bristles. Unlike Pennisetum species in which the bristles drop with the spikelet, Setaria species shed spikelets leaving the bristles on the rachis.

**DISTRIBUTION:** NH, CH, SR, WH, ABH, T, C, NE; 1400-2400 m

**NAMES:** yewesha sindado, dimano (A); shesha (?); megere seray (T); mattaneh (O); hoggo (T)

**ILLUSTRATIONS:** Top - whole plant, middle - inflorescence, bottom - seedling.
Setaria verticillata (L.) P. Beauv.

A tufted, highly variable annual with erect or spreading stems, sometimes rooting at the lower nodes. Leaves are long (15 cm), hairy, and rough. The spike-like panicle is distinguished by its clustered spikelets having barbed, purplish-tinged bristles which will attach it to anything, including another panicle.

**DISTRIBUTION:** C, NH, SR, CH, ABH, WH, NE; 305-1800 m

**NAMES:** love grass, bristly foxtail (E); yemogne fikur, asindabo (A); marbo (Harar); be-getti-feddaui (T)

**ILLUSTRATION:** S. verticillata
**GRAMINEAE**

**Snowdenia polystachya** (Fresen.) Pilg.

A tufted annual grass with more or less erect stems, sometimes lying on the ground and rooting at the lower nodes, growing up to 15 - 180 cm tall. Most common on good soils and apparently dependent on high fertility for vigorous growth. Hence, serious in well-fertilized annual crops. Leaf sheaths are smooth but may have hairs near the top. Single racemes (up to 2-5 cm long) are axillary or crowded into a panicle-like structure with green or purplish spikelets (2-3.3 mm) with awns (5 mm).

**DISTRIBUTION:** CH, C, NH, SR, ABH; 1800-2500 m

**NAMES:** mudja (A,T,O); kara-nasara (T)

**ILLUSTRATION:** S. polystachya

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**Notes:**

- **Distribution:** CH, C, NH, SR, ABH; 1800-2500 m
- **Names:** mudja (A,T,O); kara-nasara (T)
- **Illustration:** S. polystachya
**GRAMINEAE**

**Sorghum arundianaceum** (Desv.) Stapf  
*(including S. vertilliflorum [Steud.] Stapf, S. brevicarinatum Snowden, and S. aethiopicum [Hack.] Stapf.)*

This is a varied group of tufted annuals or short-lived perennials, up to 1 m at middle and high elevations, to 4 m in hot lowlands. (Sometimes referred to as 'S. halepense' in Ethiopia, but the latter is a rhizomatous perennial and fortunately does not yet occur here.) Leaf blades are 1-5 cm wide, flat with a pale midrib. The panicle is large, loose, much branched, 20-60 cm long and 10-25 cm wide. The sessile spikelets (2-2.5 mm wide) are grey-green initially but finally turn yellow, brown or purple, and are deciduous when mature. The upper lemma can be awned (5-30 mm long) or awnless. Grains are enclosed by glumes. Closely related to the crop sorghum and may hybridise with it leading to intermediate populations of "shattercane".

**DISTRIBUTION:** ABH, C, NH, CH, WH, WL, NE; 305-2700 m

**NAMES:** wild sorghum (E); kilo (tilo) (O?); dapo (O)

**ILLUSTRATION:** S. arundianaceum

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*Image of grasses and annotations*
LABIATAE

*Leucas martinicensis* (Jacq.) Ait.f.

An erect, softly hairy annual (30-100 cm tall) with few branches and a square stem. Leaves are opposite, with short petioles, and bluntly, regularly toothed margins. Flower heads, almost spherical are in the upper leaf axils. Individual flowers are sessile, have a very hairy calyx, and a whitish, tubular flower with 2 lips. The fruit has 4 nutlets.

**DISTRIBUTION:** C, CH, SR, WL; 1600-1800 m

**NAMES:** bobbin weed (E); raskemir (A); jimaertu, boccu-farda (O); dekhatater, takhater (T).

**ILLUSTRATIONS:** Top - *L. martinicensis*; bottom - seedling
LEGUMINOSAE

Medicago polymorpha L.

A prostrate spreading annual having a compound leaf with 3 obovate leaflets with blunt ends, and a slightly serrate margin. The middle leaflet is on a short stalk. Small stipules with roughly serrate edges are present. Racemes with 1-5 yellow flowers arise from the leaf axils forming a head about 5 mm in diameter. A roundish pod (4-8 mm in diameter) is spiralled (3 times), has a margin with 3 keels, and a hooked, spiny edge. Makes good animal fodder.

DISTRIBUTION: T, NH, CH, ABH, NE, C; 2000-2400 m

NAMES: kumuto (O); maget, wajema (A)

ILLUSTRATIONS: Photographs: Top - whole plant, middle - seedling; Drawing - seed.
Scorpiurus muricatus L.

An annual often occurring on Vertisols. Leaves are simple with 3-5 parallel veins and linear stipules. Can be hairy or not. Flowers arising from leaf axils are solitary or in groups of 2-5, each about 1 cm long and often tinged with red. The yellow flower is typically 'pea-shaped'. The pod is twisted, with spines on the outer edges.

**DISTRIBUTION:** G, NH, CH, NE, ABH, WH; 2000-2800 m

**NAMES:** yebeglat (A); kotebay (O); erwe (T)

**ILLUSTRATIONS:** Photographs: Top — whole plant, middle — seedling; Drawing — seed.
LEGUMINOSAE

**Trifolium rueppellianum** Fresen.

An annual usually found in cooler, higher rainfall areas growing up to 50 cm long, usually somewhat erect but laying on the ground. Probably the most common *Trifolium* species to occur as a weed in crops in a wide range of Ethiopian conditions. The compound leaves on a 7 cm petiole with 3 leaflets, are oblong or obovate with a rounded apex. Stipules are entire with sharp tips. The many-flowered inflorescence is about 17 mm across on a long peduncle. The flowers are purple, very rarely white, and each surrounded by a glabrous calyx with narrow lobes.

**DISTRIBUTION:** CH, SR, NH, ABH, WH, C; 1700–3650 m

**NAMES:** clover (E); magad, maget (A); wodima (A-Gojam); magad, maget, messi (T); sidissa (G); naddo (K)

**ILLUSTRATION:** *T. rueppellianum*
LORANTHACEAE

*Tapinanthus globiferus* (A. Rich.) Van Tiegh.

This hemi-parasite occurs on coffee and citrus as well as other wild woody hosts. It has green leaves, thus produces its own sugars but takes water and minerals from the host causing die back of the host branches. Leaves have petioles, are 2-9 cm long, narrowly elliptic or oblong, and rounded at the apex. They have irregularly pinnately arranged lateral veins. The flowers, up to 5 cm long, are reddish with green or pale tips, and are 4-8 together in sessile umbels. The perianth is in 5 parts and the lobes turn upwards when flowers expand. Fruits are about 8 mm in diameter and red when mature. Primarily spread by birds.

**DISTRIBUTION:** WH, CH

**NAMES:** mistletoe (E); tekatilla (A, Goj); ertu (O-Shoa); dikwala (T)

**RELATED SPECIES:** *Phragmanthera regularis* (Sprague) M. Gilbert is a more robust mistletoe with leaves ovate up to 20 by 10 cm, covered in stellate hairs. Flowers are deep yellow-orange, hairy, and 5-6 cm long. Can cause serious damage to citrus and peach trees.

*Englerina woodfordioides* (Schweinf.) M. Gilbert is a more delicate plant with elliptical, pointed leaves, 5-7 cm long, and small flowers, 2-3 cm, grey-green with a red tip. Occurs on peach trees in Wellega.

**ILLUSTRATIONS:** Top - *T. globiferus*, bottom - *P. regularis*.
Englerina woodfordiioides: -  እንጋለት ያለው እንጋለት የጋለት እንጋለት ያለው እንጋለት ያለው እንጋለት ያለው እንጋለት ያለው እንጋለት ያለው እንጋለት ያለው እንጋለት ያለው እንጋለት ያለው
MALVACEAE

Hibiscus trionum L.

This coarsely hairy, tough-stemmed, erect annual can grow to 90-120 cm tall but is often smaller, 30-50 cm. The palmately divided leaves with irregular, deeply pinnate lobes have a 6 cm petiole. Flowers, which are whitish or pale yellow with purplish centers, are located on 7 cm stalks in the axils of the upper leaves. The 5-petaled flowers are 2-5 cm across, have a calyx with 5 triangular lobes which are joined and surrounded by a ring of narrow bracts. The fruit is a capsule (1.5 cm across) enclosed by the papery calyx which enlarges as the fruit ripens.

DISTRIBUTION: NE, NH, SR, ABH, C; 1900-2400 m

NAMES: flower in an hour (E)

ILLUSTRATION: H. trionum
NYCTAGINACEAE

**Boerhaavia erecta L.**

An annual herb, semi-prostrate to erect, having opposite leaves which are ovate, blunt-tipped with a wavy margin and 2-5 cm long. Inflorescences are terminal and axillary extending beyond the foliage in much branched leafless cymes with clusters of 2-5 pale pink or white flowers, each on short pedicles (1-3 mm). Fruit is 3-4 mm long without sticky glands. Mainly found at lower elevations.

**DISTRIBUTION:** SR, C, WL; 600-1700 m

**RELATED SPECIES:** *B. coccinea* Mill. also occurs and differs by having sticky fruits and leafy inflorescences with clusters of 6-12 pale pink or mauve flowers. The relative importance of these species is not yet clear.

**ILLUSTRATIONS:** *B. erecta* plant and seedling.
Orobanche cernua Loefl.

This is a total parasite (with no chlorophyl and hence no green color) on tobacco, tomato, and eggplant causing severe problems on some irrigated state farms in the Upper Awash valley. Rarely grows on any other host in Ethiopia. It can grow to 10-50 cm tall, is usually unbranched but can be branched below ground. Leaves are reduced to whitish scales. The flowers, up to 0.5 cm across, have a purple-rimmed corolla. It has single bracts and no bracteoles. For distinction of dried specimens from O. minor, the stamens are inserted at least 3-4 mm up from the base of the corolla tube.

**DISTRIBUTION:** CH, SR; 1100-1600 m

**NAMES:** broomrape (E); yemeder kitegne, yebeg eras (A); delantuba (O).

**ILLUSTRATION:** O. cernua
**OROBANCHACEAE**

**Orobanche minor Smith**

This is the most common Orobanche sp. in Ethiopia and is a total parasite found on many Compositae crops such as sunflower, noug, safflower, lettuce; also on tobacco, groundnuts, fababean, and others. Wild hosts include Datura stramonium, Bidens biternata, Tagetes minuta, Guizotia scabra and Xanthium sp. The plant grows 10-100 cm tall with single stems. The crinkly, tubular, 2-lobed flowers are whitish with streaky veins of purple but without distinct dark rim as in O. cernua. The rest of the plant is whitish when young and brown when old. Distinguished from O. cernua by stamens inserted only 1-2 mm from the base of the corolla tube.

**DISTRIBUTION:** WH, CH, ABH, C, NE, G, SR, NH; 1320-2850 m

**NAMES:** See O. cernua; batri-thebbi (T)

**ILLUSTRATIONS:** Top - on safflower, bottom - on Guizotia scabra.

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O. minor is a common Orobanche sp. in Ethiopia and is a total parasite found on many Compositae crops such as sunflower, noug, safflower, lettuce; also on tobacco, groundnuts, fababean, and others. Wild hosts include Datura stramonium, Bidens biternata, Tagetes minuta, Guizotia scabra and Xanthium sp. The plant grows 10-100 cm tall with single stems. The crinkly, tubular, 2-lobed flowers are whitish with streaky veins of purple but without distinct dark rim as in O. cernua. The rest of the plant is whitish when young and brown when old. Distinguished from O. cernua by stamens inserted only 1-2 mm from the base of the corolla tube.

**DISTRIBUTION:** WH, CH, ABH, C, NE, G, SR, NH; 1320-2850 m

**NAMES:** See O. cernua; batri-thebbi (T)

**ILLUSTRATIONS:** Top - on safflower, bottom - on Guizotia scabra.
Orobanche ramosa L.

This species, distinguished by being branched, grows to be 20-30 cm tall with a whitish stem. It has uniform, pale to bright blue flowers up to 2 cm long, 1 cm across with an open mouth that is wider than those of the other two species. Flowers have a bract and 2 bracteoles. It occurs on tobacco, tomato, potato, linseed, rapeseed and cabbage causing severe damage locally, especially on irrigated state farms in the Upper Awash valley.

**DISTRIBUTION:** CH, SR, ABH: 1700-2800 m

**NAMES:** See *O. crenua*

**ILLUSTRATIONS:** Top - *O. ramosa*; bottom - *O. crenua* (left) compared to *O. ramosa* (right).

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Oxalis corniculata L.

A creeping annual having alternate trifoliate leaves. The stem forms numerous branches from the base, rooting at the nodes, and is covered with long hairs. Leaves are on long petioles (7.5 cm); leaflets are heart-shaped and deeply split at the apex distinguishing it from Trifolium or Medicago species. At night, leaves fold downwards. Flower stalks bear up to 6 yellow flowers about 1 cm across, arise in leaf axils, and bend downwards as the fruits develop. Flowers have 5 sepals and 5 wedge-shaped petals. The fruit is an elongated capsule; explodes upon contact when mature.

**DISTRIBUTION:** NE, C, ABH, CH, SR; 1800-2400 m

**NAMES:** yellow sorrel (E); yebere chew (A).

**ILLUSTRATION:** O. corniculata
**Oxalis latifolia H.B.K.**

A perennial growing from thickened tap roots and bulbs (5-7 mm in diameter) which are covered with papery scales. The leaves and flowers arise directly from the bulb, so there is no stem. Numerous white rhizomes originating at the 'mother' bulb produce small, terminal bulbils. The trifoliate leaflets, up to 2.5 cm wide and a bit longer, are heart-shaped, often with purplish markings. The inflorescence of 5-15 pink flowers with 5 petals each with 2 orange-colored glands at their tips, are arranged in an umbel. The fruit is rarely seen as most populations are sterile.

**DISTRIBUTION:** C, ABH, CH; 2000-2400 m

**NAMES:** oxalis (E); yebere chew (A)

**RELATED SPECIES:** *O. obliquifolia* A. Rich. differs by having rounder leaves, without the indented apex. It also has pink flowers. Its bulbs are several centimeters underground linked to the structure by a vertical underground stem; whereas *O. latifolia*'s are closer to the surface. It is common in highland crops but of doubtful significance as a weed. Names: yelam chew (A).

**ILLUSTRATION:** *O. obliquifolia.*
Argemone mexicana L.

An annual herb which is drought-tolerant and can survive through dry periods because of its tap root. Commonly germinates quite late in the rains and persists through the dry season. The plant is bluish-green, prickly, and has yellow juice when cut. Leaves are sessile, alternate, sheathed at the base, deeply lobed with spines on the margins and greyish-white veins on the upper surface. Solitary, pale yellow flowers, up to 5 cm occur at the ends of the branches, and have 6 petals and 3 prickly sepals. Fruits are a prickly capsule with 4-6 valves opening at the tip where numerous, dark brown seeds are released.

DISTRIBUTION: CH, NE, NH, SR, ABH; 1600-2400 m

NAMES: Mexican poppy, Mexican thistle (E); nech lebasse, medafee (A); hadalafa, balamint (?)

ILLUSTRATIONS: Top - A. mexicana; bottom - seedling.
**Plantago lanceolata L.**

An abundant weed of all highland crops, germinating mainly in July and hence not destroyed by earlier tillage. A variable smooth to slightly hairy biennial herb coming from a thick short rhizome. Leaves form a rosette of lanceolate blades, up to 20 cm long, having 3-5 mostly parallel veins, narrowing gradually into the petiole which is equal in length to the blade. The stem, up to 30 cm tall, is simple and has silky hairs. It holds the spike-like, cylindrical inflorescence.

The flower is brownish-white, 3 mm long, having anthers that are white. The capsule is ellipsoid, 3-6 mm long, and 1-2 seeded. Seeds are shiny and range from yellow to dark brown.

**DISTRIBUTION:** C, WH, CH, ABH, T, SR; 1400-2600 m

**NAMES:** gorteb (A, T); korissa (O); kortobi (G); mandeldo (T)

**RELATED SPECIES:** P. afra L. has very short spikes, about 1 cm long, on a branched inflorescence with small, linear leaves, and bracts up to 5 cm long. Only found at high elevations. CH, WH.

**ILLUSTRATIONS:** Photographs - Top - P. lanceolata whole plant, middle - seedling; Drawing - A= P. afra inflorescence, B= P. lanceolata inflorescence.
Oxygonum sinuatatum (Meisn.) Dammer

(=O. atriplicifolium var. sinuatatum [Meins.] Bak.)

A sprawling annual (prostrate near the base and becoming erect) with many branches which are reddish-green. Leaves are ovate and irregularly lobed with a very short clasping petiole which is reddish at the base with a few hairs. Slender inflorescences are long (30 cm) arising from terminal leaf axils. Flowers are small, 2-3 mm across, whitish-pink, and in groups of 2-4 in the tubular bract axils. The characteristic fruits are angular, pointed at each end, with 3 sharp spines near the center.

DISTRIBUTION: WH, SR, G, NE, CH, T; 1200-2250 m

NAMES: double thorn (E); sogdo (O); kirnchit, akakima (A); chu-merakat, dashan-mirehat, gagume (T); koomuto (G).

ILLUSTRATIONS: Top - plant, bottom - inflorescence with seeds.

POLYGONACEAE
**Polygonum nepalense** Meisn.  
(=*P. alatum* Spreng.)

A weak-stemmed annual, up to 30 cm high, is common and sometimes dominant in highland crops. Germinates mainly in June and July; hence, not affected by earlier tillage. Leaves are alternate, simple, relatively broad (5 cm long, 3 cm wide) or ovate with a short petiole, a broadly winged clasping base, often with a purple marking. Small pink or whitish flowers are mainly in terminal heads each containing about 12 flowers. Fruits are reddish-brown and 3-angled.

**DISTRIBUTION:** T, CH, G, ABH, SR; 1400–2900 m

**NAMES:** (ye)tija siga (A); labuche (?)

**RELATED SPECIES:** *P. aviculare* L. a more strictly prostrate annual, leaves narrow, pointed with numerous inconspicuous, pinkish, sessile flowers singly in the axils of virtually all leaves. Name: enfafa-dehl (T)

**ILLUSTRATIONS:** Top - *P. nepalense* plant, middle - *P. nepalense* seedling, bottom - *P. aviculare*. 

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**POLYGONACEAE**
POLYGONACEAE

Rumex abyssinicus Jacq.

An herbaceous perennial growing between 1-2 m with a thick, erect stem. The alternate leaves have long petioles with the base clasping the stem. Leaves, 30 cm by 20 cm, can be variable, from arrow-shaped to strap-shaped, with narrow basal lobes. The large, much-branched inflorescence has many small greenish or reddish flowers on slender stalks, 0.5 cm long. Characteristic fruits are triangular-shaped with a winged structure up to 1 cm across. The root is used in dyeing processes, as herbal medicine, and as a substitute for tea.

DISTRIBUTION: CH, SR, ABH, C; 1800-2600 m

NAMES: dock (E); dangago (O); mekmeko, tult (A); mohoho, mokmoko (A,T); choldia, dangago (Wolaitigna); abeshaoria, abas churie (G)

RELATED SPECIES: R. bequartii De Wild. reaches 1.5 m with longer, flatter leaves. The inflorescence has longer branches from which the flowers hang downwards. The inner perianth segments are brown and have 5-6 long, hooked teeth on each side. R. crispus L. is very similar but lacks teeth on the fruit. Names: tult (A); eyasu, tulti (G).

**Portulaca oleracea** L.

An annual succulent herb with prostrate or semi-prostrate, many-branched stems forming a dense mat. Very difficult to destroy by normal cultivation due to its ability to resist desiccation and to regrow. Leaves are sessile, thick, ovate, shiny, spirally arranged or opposite, and often crowded at the stem tips. Yellow flowers with 4-5 petals are sessile, terminal, only open in bright sunlight, and can be solitary or in groups surrounded by several leaves at the stem tips or where stems diverge. The fruit is a spherical capsule containing many small, black seeds.

**DISTRIBUTION:** WH, C, CH, NE; 305-1700 m

**NAMES:** purslane (E); yebeglat (A); jiabarra, melhenna, melkhenna, sallata (T)

**RELATED SPECIES:** *P. quadrifida* L. has smaller, paired, ovate leaves, pointed at the tip, and long hairs present where the leaves join the stem. Flowers are solitary with 4 petals. A weed of poor soils and even more resistant to desiccation than *P. oleracea*. Names: same as for *P. oleracea*.

**ILLUSTRATIONS:** Top - *P. oleracea*. middle - comparison of *P. oleracea* (left) and *P. quadrifida* (right), bottom - *P. quadrifida*. 
PRIMULACEAE

Anagallis arvensis L.

A delicate, weak-stemmed, sprawling annual with 4-angled stems. Leaves are opposite, ovate with a rounded base and pointed tip, and dotted with black glands on the underside. Bright blue (occasionally red) flowers, 1 cm across, are stalked in the leaf axils, have 5 petals and a calyx with 5 sepals. The small, roundish fruit contains many small, black seeds.

DISTRIBUTION: SR, CH, C, T, ABH: 1100-2400 m

NAMES: pimprenil (E); chigagawahit (T)

ILLUSTRATIONS: Top - plant, middle - flower, bottom - seedling.
RUBIACEAE

*Galium spurium* L. var. *africanum* Verdc.
(= var. *echinospermum* Auctt. non [Wallr.] Desportes)

A weak-stemmed, sprawling annual with a 4-angled stem having hooked bristles on the edges, scrambling and sometimes causing lodging in highland cereal crops. Leaves are in whorls of 6-8, up to 5 cm long, and pointed at the tip. Prickles at the margins and midrib make the plant feel 'sticky'. Small, greenish-white flowers in clusters of 1-9 occur on branched or unbranched stalks in the leaf whorls. The small, 2-lobed fruit is covered with hooked hairs.

**DISTRIBUTION:** ABH, CH, C; 2200-2400 m

**NAMES:** cleavers, goosegrass (E); ashikit (A); metene (A, O)

**ILLUSTRATIONS:** Top - *G. spurium*; bottom - seedling
Alectra vogelii Benth.

An obligate, semi-parasite recently discovered in Haraghe parasitizing roots of groundnut and cowpea. A stoutly stemmed herb, branching or simple at the base, up to 50 cm tall, arises from a characteristically orange base below ground. Leaves are lanceolate, up to 4 cm long, with shallow teeth, soft with short hairs, often dying and dropping off. A terminal, branched inflorescence has pale yellow flowers, about 1 cm across, and very short hairs all over the calyx. The fruit is a capsule releasing numerous, minute, light seeds readily spread by wind.

**DISTRIBUTION:** C near Basidimo

**RELATED SPECIES:** *A. sessiliflora* (Vahl.) O. Kuntze is widespread as a parasite on *Compositae*, occasionally on noug, but so far is not a serious pest. It differs by having broader, brighter green leaves with more pronounced teeth, and a calyx with longer hairs only on the nerves and margin.

**ILLUSTRATIONS:** Top - *A. vogelii* on groundnut, right - *A. vogelii* flowers, bottom - *A. sessiliflora*.
Striga asiatica (L.) Kuntze
(=S. lutea Lour.; =S. hirsuta Benth.; =S. coccinea Benth.)

An obligate hemi-parasite on sorghum, maize, and finger millet in Ethiopia, and has been reported on sugarcane in other countries. Causes severe wilting and reduction of crop yields. The Striga is attached to the host plant's roots. The stem once emerged is 5-30 cm tall, simple or branched, covered with rough hairs, and is yellowish-green. Leaves are green, linear (up to 4 cm long), and more or less alternate. Flowers are bright red or a dull orange, alternate, and on terminal spikes which arise from leaf axils and are subtended by a bract which is somewhat smaller but similar in shape to the leaves. The corolla has one flat upper lip and a second flat lower lip which is 3-lobed. The fruit is a capsule containing hundreds of minute dark seeds. The seeds are stimulated to germinate by exudates from host plants but otherwise remain viable in the soil for 7-10 years.

DISTRIBUTION: SR, C; 1500-1700 m

NAMES: witchweed (E); atkenchera, atikur (A); letisa (O)

ILLUSTRATION: S. asiatica
**SCROPHULARIACEAE**

**Striga hermonthica** (Del.) Benth.

An annual parasitic weed on sorghum, maize, rice, and finger millet as well as on wild hosts including *Rottboellia* and wild sorghum; in other countries it has been reported on sugarcane. It is attached to the host roots causing severe damage, sometimes resulting in total crop failure. The erect stem, up to 60 cm, can be branched, is hairy and 4-angular. Leaves are linear (3-9 cm long), sessile, rough, and hairy. Pink to purplish flowers are in 15 cm spikes and arise singly in the axils of small, lanceolate bracts which have a ciliate fringe. The calyx is tubular with pointed teeth. The flower has a shallowly 2-lobed upper lip and a flat lower lip which is divided into 3 rounded lobes. The corolla tube is bent sharply about half way from the base to the lobes. The fruit is a capsule containing hundreds of minute black seeds.

**DISTRIBUTION:** CH, NE, NH, C, WL, G, T; 1350-2400 m

**NAMES:** witchweed (E); atkenchera (acanthera), yemeher ketegne, atikur (A); letisa (O); mezellam (met-zelam), how-aina (T)

**RELATED SPECIES:** *Striga aspera* (Willd.) Benth. is very similar to *S. hermonthica* but with smaller, more delicate flowers in which the corolla tube is bent at least two-thirds of the distance from base to lobes. Bracts are also much narrower, without a ciliate fringe. Only known from two state farms in Gojam and Wellega but causing serious damage to maize at Fincha. Also occurs on wild grasses but apparently not on sorghum.

**ILLUSTRATIONS:** Top - *S. hermonthica*, bottom - *S. aspera* (right) compared to *S. hermonthica* (left).

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*Illustration details*
Striga aspera и Striga hermonthica

Striga aspera and Striga hermonthica are parasitic plants that attack crops. They are known for their ability to attach to the roots of their host plants and suck their nutrients, leading to significant crop yield loss. The images show the parasitic nature of these plants, with Striga aspera on the left and Striga hermonthica on the right.
SOLANACEAE

Datura stramonium L.

A woody, strong smelling, stout annual, poisonous to livestock, which grows to 120 cm tall with dichotomous branching. It is associated especially with fertile soils. Large leaves have 9 cm petioles, are alternate and have irregularly, sharply toothed margins and a pointed tip. White flowers are up to 10 cm long, and occur singly on short stalks in the leaf axils where stems diverge. The calyx is 5-angled, tubular, and terminates in 5 teeth. The corolla is tubular with 5 lobes ending in a point where joined. The fruit is a spiny capsule, 5 by 3 cm, containing dark brown seeds.

DISTRIBUTION: C, CH, ABH, WH, NH, NE, SR; 1250-2350 m

NAMES: thorn apple (E); atafaris (asefaris), astenager, stanagert (A); manji, asangirra (O); maserba, thrifra (T)

ILLUSTRATIONS: Top - with flower, middle - with fruit, bottom - seedling.
Nicandra physalodes Scop.

An erect annual with a ribbed, smooth stem and many branches growing usually from 90-120 cm tall but can reach 180 cm. It occurs frequently in fertile areas, often in maize and is very competitive. Alternate leaves (13 by 8 cm) have a long petiole (5 cm), and irregularly and deeply-toothed margins narrowing to a blunt point. Pale blue or purplish flowers (2.5-3.0 cm across) with white centers are solitary on 2.5 cm stalks in the upper leaf axils. The calyx has 5 heart-shaped wings. The corolla is funnel-shaped with 5 lobes. The yellow berry is enclosed in the enlarged green, later brown membranous calyx and contains many brown, flat seeds.

**DISTRIBUTION:** C, CH, ABH, WH, T, NE, NH, SR; 1700-2260 m

**NAMES:** chinese lantern, apple of Peru (E); gheraccia (T)

**ILLUSTRATIONS:** Photographs: Top - plant, middle - seedling; Drawing - leaf.
**SOLANACEAE**

**Solanum nigrum** L.

A branched annual, grows up to 60 cm tall. Alternate leaves are ovate, pointed at the tip, with petioles, and have an indented or wavy margin. White flower clusters of 2-6 with yellow stamen centers arise on small stalks from a common stem on the internodes. The flowers have 5 lobes which are curved backwards at the tips. The fruit is a green berry, later turning black or orange, and contains many flat, light to dark brown seeds.

**DISTRIBUTION:** NE, CH, ABH, SR; 1600-2400 m

**NAMES:** black nightshade (E); awitt, tikur-awitt (when fruits are ripe), nech awitt (before fruits are ripe) (A); samareye (O); acho (K)

**ILLUSTRATIONS:** Top - with green unripe fruit, bottom - with red ripe fruit.
**Corchorus trilocularis** L.

An erect or semi-prostrate annual growing to 50 cm tall. Leaves have a petiole (1 cm) and stipules (0.5-1.0 cm). The leaf blade is narrowly elliptic to ovate about 10 cm long with regular, coarse, blunt teeth and bristle-like appendages up to 7 mm long at the base. Yellow flowers, 0.5-1.0 cm across, in clusters of 1-4 are on short pedicels in the leaf axils. The fruit is a 3-valved capsule having a blunt beak. The valves have distinct ridges, 3-4 angles, are slender, and 3-6 cm long and 2 mm diameter.

**DISTRIBUTION:** C, NE, CH, WL, SR; 305-2000 m

**NAMES:** Humera weed (E); mulukia (Arb)

**RELATED SPECIES:** *Corchorus olitorius* L. is more erect, up to 100 cm tall, but often smaller. Leaves are lanceolate to ovate, up to 20 cm long, with a more finely toothed margin also with soft bristle-like appendages about 1 cm long. Yellow flowers are similar but the fruit is 2-8 cm long, 10-ribbed, straight, and about 5 mm in diameter splitting into 5 valves when dry. Found NE, Awash, 1500 m.

*C. fascicularis* Lam. is more prostrate and with capsules only 1-2 cm long by 2 mm wide.

*C. pseudocapsularis* Schweinf. is very similar to *C. olitorius* in leaf shape but with a round capsule, 1 cm across, covered in hooked hairs. Common in Gojam lowlands.

Corchorus olitorius L. - 1.2.1. Семена: Обрабатывают аммиаком и сушен.

Corchorus pseudocapsularis L. - 1.2.2. Семена: Обрабатывают аммиаком и сушен.

C. fascicularis L. - 1.2.3. Семена: Обрабатывают аммиаком и сушен.

C. pseudocapsularis L. - 1.2.4. Семена: Обрабатывают аммиаком и сушен.
Tribulus terrestris L.

A tap-rooted annual herb with hairy, prostrate, branches up to 90 cm long spreading from a central axis. Leaves are pinnately compound in opposite pairs with a linear stipule. The lanceolate leaflets are in 4-8 pairs along a hairy rachis. The 5-petaled, yellow flowers, highly variable in size (from 0.5-2.0 cm diameter), are solitary in the axils of the smaller leaves. The fruit is a hard, woody capsule, breaking into 5 triangular-shaped, spiny (2 at the tip and smaller ones down the sides) sections when ripe. These are painful to human and animal feet.

DISTRIBUTION: CH, NE, NH, SR, WL, C; 750-1600 m

NAMES: puncture vine (E); akakima (A); kakite-harmath, kurakito, kuremehit, cachito, gottbet (T); kurumshit (O-Arsi)

ILLUSTRATIONS: Photograph - T. terrestris; Drawing - fruit.
Annex i

Family Descriptions

ACANTHACEAE
1. Leaves opposite and entire.
2. Flowers bluish or purplish. May have conspicuous bracts.
3. May have spines.

AIZOACEAE
1. Herbaceous.
2. Fleshy flowers. Petals are absent or may have many petals which are free from each other.
3. Leaves when present are thick, juicy and succulent and have an entire blade. When absent leaves are reduced to scales. No spines.
4. Fruit splits into 2 or more locules.

AMARANTHACEAE - PIGWEED FAMILY
1. Usually herbaceous annuals but can be perennial.
2. Opposite or alternate simple leaves with no stipules, narrowing gradually to the petiole.
3. Small greenish flowers with a very small or no stalk. Usually densely crowded and difficult to separate from each other on spikes, heads or racemes. Surrounded by stiff, scarious, prickly bracts and have no petals.
4. Sepals 3-5 usually dry and membranous.
5. Seeds smooth and roundish.
6. Characteristics useful to separate the species are: whether leafy or leafless at the tip; the spinyness of the perianth; whether spiny at the leaf base.

BORAGINACEAE - BORAGE FAMILY
1. Usually bristly or hairy herbs.
2. Usually alternate, simple leaves without stipules.
3. Flower tube-like with 5 petals. May be coiled in clusters.

CAPPARIDACEAE - CAPER FAMILY
1. Herbaceous with watery juice.
2. Alternate, simple leaves or may have 3 (trifoliolate) to 7 (palmate) digitate compound leaves with or without tiny spiny stipules.
3. Flower center has a slender filament which bears a small thickened locule near the tip (apex). Petals 4 or more; also may be absent. Petals are usually long and connected at the base.
4. Fruit is a capsule.
CARYOPHYLLACEAE - CHICKWEED OR PINK FAMILY

1. Annual herbs.
2. Usually have opposite, simple leaves. Stipules absent or if present often scarious.
3. Flowers may be solitary or in clusters. Petals may be notched at the apex. Petals may be free or united at the base. They may often be small or absent.
4. Fruit is a capsule opening by valves or teeth.

CHENOPODIACEAE - GOOSEFOOT FAMILY

1. Annuals which may be covered by greyish, green "mealy" hairs or yellowish glandular hairs and have an aromatic smell when crushed. Stems ribbed.
2. Alternate, stalked, simple leaves without stipules. Often fleshy.
3. Small greenish, greyish flowers, with no petals, often clustered and axillary with a single perianth whorl.
4. Fruit often included in and falling with the calyx.
5. Characters which distinguish the species are: whether the plant is mealy, aromatic, and with yellowish glandular hairs; leaf and lobe shape; seed color and whether keeled.

COMMELINACEAE - SPIDERWORT FAMILY

1. Prostrate, fleshy herbs with jointed stems, often rooting at the nodes. Difficult to control by cultivation because they do not readily desiccate and can reroot after disturbance.
2. Monocotyledons.
3. Alternate leaves whose base clasps the stem. Veins more or less parallel.
4. Flowers with 3 petals joined at the bottom may be blue, blue and white, or yellow. Sepals being green and somewhat enclosing the flower, called a spathe.
5. Filaments may be distinctive: hairy, thick or brightly colored.
6. Characters useful for distinguishing the species are: flower color; stamen pattern and form; spathe form; leaf shape; presence or absence of underground stems; presence of hairs fringing leaf sheath.

COMPOSITAE (ASTERACEAE) - SUNFLOWER FAMILY

1. Herbaceous, sometimes woody.
2. Leaves are alternate, opposite or whorled. May be entire or dissected but never compound and never with stipules.
3. Flowers in dense heads which are clusters of florets. Outer florets are called ray flowers having larger petals;
inner florets are called disk flowers which usually lack large petals.
4. The flower usually has a round head and is surrounded by many bracts forming an involucre. Flowers are often yellow but may be pink, purple, white, or blue.
5. Fruit is called an achene and may have hairs, pappus, bristles, awns or scales.
6. Some species have milky sap.

CONVOLVULACEAE - MORNING GLORY FAMILY
1. Annuals or perennials, often twining or climbing. May be parasitic.
2. Leaves simple, alternate and without stipules.
3. Plants can be leafless, twining parasitic herbs (Cuscuta).
4. Flowers showy, single or in clusters. Petals are joined from the bottom to the top edge making a funnel or tube-shaped corolla which appears twisted when a bud.
5. Fruit made of 2 locules.

CRUCIFERAE (BRASSICACEAE) - MUSTARD FAMILY
1. Herbaceous with watery juice which may have a distinctive smell.
2. Alternate leaves, no stipules.
3. Flowers have 4 petals in the shape of a cross.
4. Fruit is distinctive, usually with 2 valves or carpels which split apart when dry leaving a thin partition (bivalved). The capsule is long and thin or can be heart-shaped.

CYPERACEAE - SEDGE FAMILY
1. Grass-like but have stems which are triangular in cross section, are not jointed, often with solid pith.
2. Annual or perennial.
3. Leaves in 3's with a closed sheath, no ligule and with parallel veins.
4. Flowers are small, arranged in spikelets. Each flower has 1 bract which is 2-ranked or spiral. Inflorescence is 1 or more spikelets.
5. Often grows in wet places but not exclusively.
6. Can reproduce asexually using bulbs, tubers when perennial.

EUPHORBIACEAE - SPURGE FAMILY
1. Herbaceous (weeds) but also woody. Always with milky sap. May have spines.
2. Leaves simple or compound, usually alternate.
3. Inflorescence may be a cluster of flowers, usually flat topped. Flowers with or without perianth. Often male and
female flowers separate (monoecious). Inflorescence may simulate a flower with ornamental bracts.
4. Fruit is a capsule splitting in 3, each with 1-seeded nutlets.

GRAMINEAE (POACEAE) - GRASS FAMILY

1. Annual or perennial – monocotyledons.
2. Stems can be branched at the base which can be flowering or not. Stems usually cylindrical or somewhat flattened, jointed, usually with hollow internodes and solid nodes.
3. Leaves alternate and 2-3 ranked each having a sheath, blade and usually a ligule.
4. Sheath encircles the stem and margins can be free, united or overlapping.
5. Ligule occurs at the junction of the sheath and the blade and may be membranous, hairy or a combination. In some cases it may be absent.
6. Leaves are usually long, narrow and with parallel veins.
7. Flowers are very small, surrounded by glumes. Within are a lemma and palea (=floret or false flower).
8. Glume and floret makes up a spikelet which may or may not be on a pedicel (small stems). When pedicled, can be in the form of a panicle, raceme or spike (no pedicel).

LABIATAE (LAMIACEAE) - MINT FAMILY

1. Often aromatic herbs with square stems (4-sided).
2. Leaves opposite without stipules.
3. Flowers are 4 parts with joined corolla tube with 2 lips and are usually irregularly shaped. Each flower has a calyx.
4. Fruit is 4-pieced, each with a 1-seeded nutlet. The calyx usually is present with the fruit.

LEGUMINOSAE (FABACEAE) - PEA FAMILY

1. Herbaceous.
2. Alternate compound leaves, with or without stipules. May have tendrils at the end of each leaf.
3. Flowers are irregular with 5 petals. They have a standard or banner (upper, larger petal); 2 wings (smaller side petals) and 2 keel petals (lower petals).
4. Fruits are distinctive ‘leguminous’ pods usually with longitudinal dehiscence - splitting along two sides. They may be 1- or 2-celled with seeds attached to one side. They can be flattened or rounded. There may be constrictions around each seed.

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LORANTHACEAE - MISTLETOES
1. Parasitic on trees and shrubs. Its branches and leaves differ from other branches and leaves on the same plant.
2. Leaves usually present and are brownish or green, opposite, usually stiff and thick.
3. Flowers borne on stem of parasite, usually with colorful perianth.

MALVACEAE - MALLOWS FAMILY
1. Herbaceous.
2. Leaves alternate, simple, usually palmately veined. Stems and leaves hairy.
3. Flowers showy with 5 petals and joined at the base. Often with distinctive capsule or ‘schizocarp’, a fruit which splits apart into 1-seeded parts.

NYCTAGINACEAE - FOUR O'CLOCK FAMILY
1. Herbaceous.
2. Leaves simple, alternate or opposite without stipules.
3. Flowers usually are dense, head-like groups. Petals absent.
4. Perianth is tubular with 4-5 lobes at the top which may be notched. Plants with no petals may have colorful bracts or have sticky hairs.
5. Fruits indehiscent, enclosed by a persistent calyx base.

OROBANCHACEAE - BROOMRAPE FAMILY
1. Root parasites with scale-like leaves and no green color.
2. Flowers are tubular with fringed lips, and whitish, purplish or bluish in color.
3. Usually with a single stem or may be branched.

OXALIDACEAE - WOOD SORREL FAMILY
1. Annuals or perennials having a sour juice because of oxalic acid. Perennials have bulbs or rhizomes.
2. Leave trifoliate, often with a long petiole and which fold up at night. No stipules.
3. Flowers may arise on a leafless stalk from a rhizome, bulb, or from a short stem bearing basal leaves. Usually solitary with 5 petals.
4. Stamens are usually in 2 sets, one set longer than the other. Filaments are united at the base.
5. Fruit splits in 5 sections along the locules of the capsule.
PAPAVERACEAE - POPPY FAMILY
1. Annuals or perennials with milky or colored juice.
2. Leaves simple, may have a spiny margin. Usually alternate, without stipules.
3. Flowers showy and often large.
4. Sepals 2-3 and fall as flowers open.
5. Petals showy, usually 4-6, in series of two, and are crumpled when in the bud.
6. Fruit is a many-seeded capsule opening by pores at the top or by valves.

PLANTAGINACEAE - PLANTAIN FAMILY
1. Herbaceous with parallel-veined basal leaves.
2. Inflorescence spike-like with small bracts.
3. Flowers small and inconspicuous with a thin, dry non-green corolla.
4. Fruit is a small capsule opening by a circular lid.

POLYGONACEAE - BUCKWHEAT FAMILY
1. Herbs with a sour juice. Can be annuals or perennials.
2. Leaves alternate, simple, with entire margins and a leaf base forming a membranous sheath (ocrea) or collar-like stipule around the stem at the nodes.
3. Flowers are small, inconspicuous and numerous with the perianth resembling a petal joined together. Petals are absent. Appears in 4-6 parts.
4. Fruit is an indehiscent triangular achene (3-angled or 3-winged).

PORTULACACEAE - PURSIANE FAMILY
1. Small, terrestrial herbs.
2. Leaves thick and succulent, alternate or opposite with thin, dry non-green stipules.
3. Flowers with 4-6 petals can be solitary or in clusters on racemes.
4. Fruit is a many-seeded capsule which opens by valves or has a cap.

PRIMULACEAE - PRIMROSE FAMILY
1. Herbaceous.
2. Leaves can be rosette-like (whorled) with a bare flower stalk arising from basal leaves or else with a leafy stem with alternate or opposite leaves.
3. Flowers have 5 petals which are joined at the base forming a usually short tube.
4. Fruit is a capsule which breaks into 5 pieces by valves or teeth.
RESEDACEAE
1. Herbaceous with watery juice.
2. Leaves are simple, alternate or finely divided and crowded together with small stipules.
3. Flowers are irregularly shaped with separate petals which may be small and inconspicuous or nonexistent. They have many (>40) stamens.
4. There are usually 3 carpels.
5. Fruit is a capsule with numerous kidney- or horse-shoe shaped seeds.

RUBIACEAE - MADDER FAMILY
1. Herbaceous, can be slightly climbing.
2. Leaves opposite and whorled, simple, with entire margins and stipules resembling leaves.
3. Inflorescence grouped into a cluster of flowers or in panicles.
4. Flowers 4-5 parts with partially united petals.
5. Fruit is a capsule, drupe or berry.

SCROPHULARIACEAE - FIGWORT FAMILY
1. Mostly herbaceous, can be partially parasitic.
2. Leaves green, alternate, opposite or whorled without stipules.
3. Flowers can be in groups on racemes or spikes. They have 5 petals which may be united at the base, are regularly shaped to strongly 2-lipped.
4. Fruit usually a capsule or berry.

Solanaceae - Potato Family
1. Herbaceous, sometimes woody or climbing. Some contain poisonous alkaloids. May have a strong smell.
2. Leaves usually alternate without stipules.
3. Flowers have 5 parts with corolla of united petals.
4. Fruit can be fleshy, a capsule or a berry with 2 or more cells with numerous seeds.
5. Often food or drug plants.

TILIACEAE - BASSWOOD FAMILY
1. Herbaceous and many trees or shrubs having strong fibers.
2. Leaves usually alternate and simple with stipules and palmate venation.
3. Flowers have 5 parts and are often yellow.
4. Fruits are variable but can be pod-like and fleshy.
1. Herbs often terrestrial. Often found in drier areas.
2. Leaves opposite and compound with small pointed stipules.
3. Flowers with 5 parts.
4. Fruit a berry or drupe or 5-part capsule with spines or burs.

ZYGOPHYLLACEAE - CALTROP FAMILY
Acanthaceae

1. *Aizoaceae*

2. *Aizoaceae*

3. *Aizoaceae*

4. *Aizoaceae*

Amaranthaceae

1. *Amaranthaceae*

2. *Amaranthaceae*

3. *Amaranthaceae*

4. *Amaranthaceae*

5. *Amaranthaceae*

6. *Amaranthaceae*

Boraginaceae

1. *Boraginaceae*

2. *Boraginaceae*

3. *Boraginaceae*

Capparidaceae

1. *Capparidaceae*

2. *Capparidaceae*

3. *Capparidaceae*

4. *Capparidaceae*
Caryophyllaceae (h) (h) (h) (h) (h) (h)

1. 
2. 
3. 
4. 

Chenopodiaceae (h) (h) (h) (h) (h) (h)

1. 
2. 
3. 
4. 

Commelinaceae (h) (h) (h) (h) (h) (h)

1. 
2. 
3. 
4. 
5. 

Compositae (Asteraceae) (h) (h) (h) (h) (h) (h)

1. 
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Convolvulaceae  DirectX the (h)  نتایج

1. To the treatment, it is very important to ensure that the plants are well-watered and fertilized. It is recommended to use organic fertilizers to promote healthy growth. Additionally, it is important to monitor the soil pH and adjust it if necessary.

2. The flowers of Convulvulus are showy and attract pollinators. They are typically pink or purple in color.

3. The fruits of Convulvulus are small and dry, containing one seed. They are shed by the plant after the fruit has fully developed.

4. Convulvulus is a plant of high medicinal value. It is used in traditional medicine for various ailments, including coughs, colds, and fever.

Cruciferae (Brassicaceae)  DirectX the (h)  نتایج

1. To the treatment, it is very important to ensure that the plants are well-watered and fertilized. It is recommended to use organic fertilizers to promote healthy growth. Additionally, it is important to monitor the soil pH and adjust it if necessary.

2. The flowers of Cruciferae are showy and attract pollinators. They are typically yellow in color.

3. The fruits of Cruciferae are small and dry, containing one seed. They are shed by the plant after the fruit has fully developed.

4. Cruciferae is a plant of high medicinal value. It is used in traditional medicine for various ailments, including coughs, colds, and fever.

Cyperaceae  DirectX the (h)  نتایج

1. To the treatment, it is very important to ensure that the plants are well-watered and fertilized. It is recommended to use organic fertilizers to promote healthy growth. Additionally, it is important to monitor the soil pH and adjust it if necessary.

2. The flowers of Cyperaceae are small and inconspicuous. They typically grow in clusters.

3. The fruits of Cyperaceae are small and dry, containing one seed. They are shed by the plant after the fruit has fully developed.

4. Cyperaceae is a plant of high medicinal value. It is used in traditional medicine for various ailments, including coughs, colds, and fever.

Euphorbiaceae  DirectX the (h)  نتایج

1. To the treatment, it is very important to ensure that the plants are well-watered and fertilized. It is recommended to use organic fertilizers to promote healthy growth. Additionally, it is important to monitor the soil pH and adjust it if necessary.

2. The flowers of Euphorbiaceae are showy and attract pollinators. They are typically yellow in color.

3. The fruits of Euphorbiaceae are small and dry, containing one seed. They are shed by the plant after the fruit has fully developed.

4. Euphorbiaceae is a plant of high medicinal value. It is used in traditional medicine for various ailments, including coughs, colds, and fever.

Gramineae (Poaceae)  DirectX the (h)  نتایج

1. To the treatment, it is very important to ensure that the plants are well-watered and fertilized. It is recommended to use organic fertilizers to promote healthy growth. Additionally, it is important to monitor the soil pH and adjust it if necessary.

2. The flowers of Gramineae are small and inconspicuous. They typically grow in clusters.

3. The fruits of Gramineae are small and dry, containing one seed. They are shed by the plant after the fruit has fully developed.

4. Gramineae is a plant of high medicinal value. It is used in traditional medicine for various ailments, including coughs, colds, and fever.
Labiatae (Lamiaceae) พิกุล (ล) ณานันต์

1. ผักสด
2. ผักสด

Leguminosae (Fabaceae) พิกุล พิทัก (ล) ณานันต์

1. ผักสด
2. ผักสด

Loranthaceae พิทัก (ล) พิกุล พิทัก (ล) ณานันต์

1. ผักสด
2. ผักสด

Malvaceae พิทัก (ล) ณานันต์

1. ผักสด
2. ผักสด

Institute of agricultural Research Library Addis Abeba
Nyctanginaceae (λ) እንጭ

1. የመጋገር እምት ፕሬው::
2. የላስ ይጆን እንወ እምምነት ፕሬው:: ያስከና ይሳስ።
3. እውነት መጋገር የስለ እንወ ዜና ፕሬው::
4. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: መጋገር ለጎጋ ለማሽ ይታሳስ ከማ በፋስ ይሳስ።
5. ይወራጎ በጆነ መስፈራ ውስጥ ይችሉ እንደተረጋ እስከና ከማ::

Orobanchaceae (λ) እንጭ

1. የስለ ከስለ ከስለ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
2. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
3. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
4. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
5. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።

Oxalidaceae (λ) እንጭ

1. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
2. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ:System Error
3. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
4. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
5. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።

Papaveraceae (λ) እንጭ

1. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
2. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
3. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
4. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
5. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።

Plantaginaceae (λ) እንጭ

1. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
2. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
3. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
4. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።

Polygonaceae (λ) እንጭ

1. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።
2. የስለ ከስለ ትወ ትወ ሆነ ለታየት ከማ በተለቀ ከማ:: የስለ ይጆን ይሳስ። ያስከና ይሳስ።

242
Portulacaceae የትላንት (λ) እትለል

<table>
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<th>ያስለጆች</th>
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<tbody>
<tr>
<td>1. በምወቱ በፀኞት በመለለት አለም ይገኛል::</td>
<td>2. በጉጉር ባጭት እንጂ ለማስታወቅ ከላይ ይታገሉ እንዳሉ ሊይ ይታገሉ::</td>
</tr>
<tr>
<td>3. በባለት ያስለጆች እንወስ ይገኛል::</td>
<td>4. በባለት ያስለጆች እንወስ ይገኛል::</td>
</tr>
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Primulaceae የትላንት (λ) እትለል

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<tbody>
<tr>
<td>1. በምወቱ በፀኞት ይገኛል::</td>
<td>2. በጉጉር ባጭት እንጂ ለማስታወቅ ከላይ ይታገሉ እንዳሉ ሊይ ይታገሉ::</td>
</tr>
<tr>
<td>3. በባለት ያስለጆች እንወስ ይገኛል::</td>
<td>4. በባለት ያስለጆች እንወስ ይገኛል::</td>
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Resedaceae

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<tbody>
<tr>
<td>1. በምወቱ በፀኞት ይገኛል::</td>
<td>2. በጉጉር ባጭት እንጂ ለማስታወቅ ከላይ ይታገሉ ይታገሉ::</td>
</tr>
<tr>
<td>3. በባለት ያስለጆች እንወስ ይገኛል::</td>
<td>4. በባለት ያስለጆች እንወስ ይገኛል::</td>
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Rubiaceae የትላንት (λ) እትለል

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<tbody>
<tr>
<td>1. በምወቱ በፀኞት ይገኛል::</td>
<td>2. በጉጉር ባጭት እንጂ ለማስታወቅ ከላይ ይታገሉ ይታገሉ::</td>
</tr>
<tr>
<td>3. በባለት ያስለጆች እንወስ ይገኛል::</td>
<td>4. በባለት ያስለጆች እንወስ ይገኛል::</td>
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Scrophularaceae የትላንት (λ) እትለል

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<tbody>
<tr>
<td>1. በምወቱ በፀኞት ይገኛል::</td>
<td>2. በጉጉር ባጭት እንጂ ለማስታወቅ ከላይ ይታገሉ ይታገሉ::</td>
</tr>
<tr>
<td>3. በባለት ያስለጆች እንወስ ይገኛል::</td>
<td>4. በባለት ያስለጆች እንወስ ይገኛል::</td>
</tr>
</tbody>
</table>
Solanaceae ჯამშები

1. ზოგადად, ხელთან წყალი და პალასტი გამოყოფთ ღვთის სიმსროთით. ღვთის სიმსროთით ხელთან წყალზე განისაზღვრება ღვთის სიმსროთით.
2. ჰათაფით პირველ და მონაწილეობა გამოყოფთ ღმერთს.
3. მინიჭებული ხელთან წყალი გამოყოფთ ღვთის სიმსროთით.
4. გამოყოფთ ჯამშებით „ძვ” ხომ.
5. მინიჭებული ხელთან წყალი გამოყოფთ ღმერთს.

Tiliaceae ჯამშები (λ) მინა

1. ზოგადად, ხელთან წყალი და პალასტი გამოყოფთ ღვთის სიმსროთით. ღვთის სიმსროთით.
2. ზოგადად, ხელთან წყალი გამოყოფთ ღმერთს.
3. მინიჭებული ხელთან წყალი გამოყოფთ ღმერთს.
4. გამოყოფთ „ძვ” ჯამშებით „ძვ” ჯამშები გამოყოფთ ღვთის სიმსროთით.

Zygophyllaceae ჯამშები (λ) მინა

1. ზოგადად, ხელთან წყალი და პალასტი გამოყოფთ ღმერთს.
2. ზოგადად, ხელთან წყალი და პალასტი გამოყოფთ ღმერთს.
3. მინიჭებული ხელთან წყალი გამოყოფთ.
4. გამოყოფთ „ძვ” ჯამშები „ძვ” ჯამშები გამოყოფთ ღმერთს.
Annex ii

Collection of Weed and Other Plant Specimens for Identification

Three specimens of each plant should be prepared: one for the regional office, one for Shola Laboratories at Headquarters, and one for the Addis Ababa University herbarium in Addis Ababa. Either of the latter two organizations can also assist in identification of the species collected.

Information to Collect

It is important to collect information with each specimen. The following list explains what should be included with each specimen.

Flora of: Give country, region

Name of species: Include Latin name if known. If not, leave a space which can be filled in when identified.

Local name: Ask the farmers in the area to give you the local name. Specify the language.

Uses or economic value: Make notes on whether the plant is edible, used as medicine, fed to animals, used for fuel or building material, whether it is poisonous, etc.

Locality: Note the woreda, peasant association, nearest village, cooperative name, etc. Describe any permanent landmarks (nearby river, mountain, etc.). If known, give the longitude and latitude.

Altitude: Express in meters above sea level. Give an approximation if not known precisely.

Habitat: Give the vegetation type (e.g. forest, grassland, farmer’s field) where the plant was found. Describe the soil type (color and texture), terrain (slope or flat), wet or dry conditions, full shade or sun.

Description: Is it an annual, perennial, biennial; erect or prostrate (growing flat on the ground); whether an herb, shrub, or tree? Describe any vegetative features such as flower and fruit color (often this changes after dried). Describe any other characteristics which may be noticeable and useful in identification, such as kind of bark, type of branching, whether growing singly or in clumps, whether common or rare. Include only the aspects which make sense for the specimen you are collecting.
Collected by: Give the name of the person who collected the specimen.

Date: Give the day, month, year and note whether it is in Ethiopian or European calendar.

Place this information separately in the folder with each specimen. Make a carbon copy for each specimen. Make sure to keep one copy in case the original gets lost.

Notes on Collecting Plants:

1. What to Collect:

Specimens should be as complete as possible. Collect the whole plant if it is a small one. If it is large, collect a stem or stems with leaves, flowers, and fruits if present. Roots need not be included unless it is a perennial species. In this case, collect the underground parts (bulbs, tubers, rhizomes, etc.). The specimen will be mounted eventually on an herbarium sheet measuring 51.5 x 26.5 cm. It is crucial to collect as much as can be mounted showing the main characters of the plant. Flowers and fruits are very important; otherwise, it may not be possible to identify the material.

2. How to Collect:

Collect plants that are dry, not wet with dew. Break if not too tough, or cut with scissors or secateurs if woody. Pick representative samples. After each specimen is collected, number it and make notes at the time of collection. A number of specimens can be collected and kept in a plastic bag for a few hours, until it is convenient to press them, unless conditions are very hot and dry.

3. How to Press:

Pressing is carried out by flattening and drying the specimen. Normally a plant press is used for such a purpose. If a plant press is not available, use heavy books or objects to flatten the specimens in their folders. Arrange the plant on drying paper (newspaper) so it looks as natural as possible. Arrange so that you can see distinguishing features. Turn over one or two leaves so that the backside will be visible. If the plant is very leafy, you may have to carefully remove some of the material so the different parts can be seen. Display the flowers so that you can get different views. Large flower heads or fruits may have to be cut in half before pressing. Very thorny specimens should have their thorns broken or bent by putting the specimens between two boards and treading on them to flatten. Do this to avoid damaging other specimens in the press.
Succulent plants must be killed before pressing, because if dried in the normal way they will continue to grow. Kill by immersing in methylated spirits or some other alcohol for an hour, or put in boiling water for 5-10 minutes, although this is not the desired method because it adds water. Press the specimen as soon as possible after this treatment.

Newspaper can be used. Place the specimen in between single sheets of newspaper. Use a double sheet as a ‘drier’ between each single sheet.

4. How to Dry:

Try to dry the specimens as fast as possible. If available, corrugated paper can be interspersed between several specimens. Replace the drying papers every day until the specimens are dry. Do not disturb the specimens in their paper folders, merely replace the double sheets in between. After one day, check the specimens and rearrange them if it is needed.

Place the press in a dry warm place but avoid excess heat. If it is very damp, place the press over a heat source. If corrugated paper is used, put the press in a vertical position so the air can circulate through this paper.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>achene</td>
<td>small, dry, indehiscent, one-seeded fruit</td>
</tr>
<tr>
<td>adventitious</td>
<td>roots which are found in an unusual place usually attached to the stem (or shoots arising from roots)</td>
</tr>
<tr>
<td>alternate</td>
<td>located singly at a node, as leaves on a stem</td>
</tr>
<tr>
<td>annual</td>
<td>a plant that completes its development in one season or in one year and then dies</td>
</tr>
<tr>
<td>anther</td>
<td>the pollen-containing part of the stamen</td>
</tr>
<tr>
<td>apical</td>
<td>at the apex or tip</td>
</tr>
<tr>
<td>appressed</td>
<td>lying close and flat</td>
</tr>
<tr>
<td>auricle</td>
<td>an ear-like lobe or appendage usually at the base of a leaf or other organ</td>
</tr>
<tr>
<td>awn</td>
<td>a bristle-like appendage usually found on grass glume or lemma tips</td>
</tr>
<tr>
<td>axillary</td>
<td>in the angle formed between the leaf and the stem</td>
</tr>
<tr>
<td>axis</td>
<td>the main stem, or central support structure</td>
</tr>
<tr>
<td>barbed</td>
<td>with rigid structures that are pointing backwards like a fish-hook</td>
</tr>
<tr>
<td>bearded</td>
<td>with a long awn, or with long stiff hairs</td>
</tr>
<tr>
<td>biennial</td>
<td>a plant completing its life cycle in two seasons, usually blooming during the second season</td>
</tr>
<tr>
<td>blade</td>
<td>the expanded portion of the leaf, sepal or petal</td>
</tr>
<tr>
<td>bloom</td>
<td>whitish, powdery covering of a surface easily rubbed off</td>
</tr>
<tr>
<td>bract</td>
<td>a modified leaf below a flower or flower cluster</td>
</tr>
<tr>
<td>bracteoles</td>
<td>small bracts on the pedicel or close to the flower</td>
</tr>
</tbody>
</table>
bulb having fleshy leaves arranged in circles when viewed in cross section and with buds in the leaf axils, usually underground like an onion; for storage and propagation

bur a seed or fruit having spines or prickle which are barbed

calyx the outer set of floral leaves (sepals) beneath the petals, usually green

capsule a simple, dry, dehiscent fruit of two or more parts and usually many-seeded

carpel one compartment or section of a compound ovary/fruit

caryopsis the fruit of grasses; a grain

chalf small and dry scale-like bracts

circumscissile usually referring to a capsule which opens by a transverse circular split, making a lid

clasping partly surrounding another structure at the base, as a leaf to a stem

compound composed of two or more parts, as with leaves (leaflets)

corm a modified stem that is fleshy and thickened often bearing scale-like leaves and usually found underground

corolla the inner set of floral leaves, consisting of petals

cotyledon a seed leaf

culm a flowering stem of a grass or sedge

cyme an inflorescence that is made up of flower clusters and is rounded or flat-topped

decumbent with a flat base and the apex rising up

deflexed pointing downwards

dehiscent split open (of a fruit)

dicotyledon a plant having two cotyledons
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>digitate</td>
<td>having parts which diverge from a common base, as fingers from a hand</td>
</tr>
<tr>
<td>disk floret</td>
<td>florets in the central part of the flower head of Compositae which have a tubular shape, also called a tubular floret</td>
</tr>
<tr>
<td>dissected</td>
<td>cut into many fine segments</td>
</tr>
<tr>
<td>distinct</td>
<td>separate (parts)</td>
</tr>
<tr>
<td>drupe</td>
<td>a simple, fleshy fruit with a single seed enclosed by pith; a stone fruit</td>
</tr>
<tr>
<td>entire</td>
<td>an unbroken, even margin of a leaf or petal</td>
</tr>
<tr>
<td>filament</td>
<td>the stalk of a stamen</td>
</tr>
<tr>
<td>floret</td>
<td>a small flower; in grasses includes the lemma and palea</td>
</tr>
<tr>
<td>glabrous</td>
<td>smooth, without hairs</td>
</tr>
<tr>
<td>glaucous</td>
<td>bluish/grey in color (can be because of a coating of minute powdery or waxy particles (mealy))</td>
</tr>
<tr>
<td>glumes</td>
<td>a pair of scale-like bracts at the base of the grass spikelet</td>
</tr>
<tr>
<td>gynophore</td>
<td>a stalk supporting the female part of the flower</td>
</tr>
<tr>
<td>head</td>
<td>the inflorescence of a composite flower made up of disk and ray florets and an involucre</td>
</tr>
<tr>
<td>herb</td>
<td>a leafy plant that completely dies down at the end of a growing season; not woody (hence herbaceous)</td>
</tr>
<tr>
<td>indehiscent</td>
<td>not splitting open</td>
</tr>
<tr>
<td>inflorescence</td>
<td>a cluster of flowers</td>
</tr>
<tr>
<td>internode</td>
<td>the portion of the stem between two adjacent nodes</td>
</tr>
<tr>
<td>involucre</td>
<td>a ring of bracts below the flower</td>
</tr>
<tr>
<td>jointed</td>
<td>having swollen or otherwise obvious nodes, as in grass or Commelina stems</td>
</tr>
</tbody>
</table>

252
keel
labeled
latex
leaflet
legume pod
lemma
ligule
locule
margin
membranous
midrib
monocotyledon
naked
node
nut
ocrea
opposite
ovary
ovule

a sharp fold or midrib, as in the lower petal of a pea-like flower
lipped
milky sap
one of the divisions of a compound leaf
a simple, dry, dehiscent fruit with one section, usually splitting along two sutures
the main bract component of the individual floret in a grass spikelet
a small appendage (of membrane or hairs) at the junction of the blade and the sheath of grasses
the cell or compartment of an ovary (e.g. 3-locular)
the leaf edge
thin, soft, flexible and more or less translucent
the main or central vein of a leaf
a plant having a single cotyledon
lacking organs or parts; thus a naked flower is one lacking a perianth
a point of a stem where leaves or branches are attached
a simple, dry, indehiscent fruit with a hard shell
a stipule-like sheath surrounding the stem
in pairs, one on either side of the node (of leaves)
the bulbous, basal portion of a pistil containing the ovules
the structure that becomes the seed after fertilization
palea the inner and usually smaller of the two bracts in a grass spikelet
palmate with parts diverging from the base, as fingers of a hand (digitiate)
panicle an elongated inflorescence with compound branching
pappus ring of hairs around the top of the fruit of the Compositae
parasite a plant which gets its food from another living plant to which it is attached
pedicel the stalk of a single flower in an inflorescence
peduncle a stalk supporting a whole inflorescence, or the stalk of a solitary flower
perennial a plant that continues to live for season after season, usually with a period of inactivity between seasons (perennation)
perianth the calyx and corolla
petal one of the parts of the corolla, often brightly colored
petiole the stalk of a leaf
pinnate with compound leaflets lying opposite each other on a common stalk (rachis)
pistil the central female reproductive part of the flower
pod any simple dry, indehiscent fruit
prostrate lying flat on the ground
pubescent covered with short, soft hairs
raceme a type of inflorescence having a long axis with the order of blooming from the base to the apex
rachis the axis of a spike or of a pinnately compound leaf
-ranked usually preceded by numbers referring to the number of rows
ray floret: a floret around the edge of the head of flowers in Compositae, different from the disk florets.

receptacle: the part of the pedicel or peduncle where the petals, sepals, stamens and pistils are inserted.

reticulate: like a network.

rhizome: a modified underground stem, usually growing horizontally.

rib: one of the main veins of a parallel-veined leaf.

rosette: a basal cluster of leaves produced on a very short stem.

scabrous: rough to the touch because of small stiff hairs or other projections.

scale: similar to a bract, a reduced leaf-like structure found on rhizomes.

scape: a leafless flowering stalk arising from the ground or from a very short stem bearing basal leaves.

scarious: thin and dry, like tissue paper, not green.

schizocarp: a fruit that splits apart into 1-seeded parts.

segment: a part or division of an organ.

sepal: one of the parts of the calyx.

sessile: of leaves or flowers lacking a stalk.

sheath: a tube-like part surrounding another part, as the lower part of the grass leaf that is wrapped around the stem.

simple: consisting of a single piece (e.g. one leaf blade).

spathe: a largish bract partially or completely enclosing a flower or inflorescence.

spike: an unbranched, elongated inflorescence of flowers.

spikelet: a component of the grass inflorescence consisting of 2 glumes and 1 or more florets.

spine: a sharp pointed structure.
| **stamen** | the male, pollen-producing organ of the flower consisting of the filament and anther |
| **stigma** | the part of the pistil to which the pollen adheres |
| **stipule** | a leaf or scale-like appendage that may be present where the leaf attaches to the stem |
| **stolon** | a modified horizontal stem, creeping above ground, that may root at the nodes (runner) |
| **style** | the stalk-like part of the pistil connecting the stigma and ovary |
| **subtend** | to occur immediately below, as a bract to a flower |
| **succulent** | with a fleshy or juicy texture, usually resistant to drying |
| **suture** | a seam or line where splitting may take place as on a pod or capsule |
| **taproot** | a thick tapering root which may have buds above ground which will regrow next season |
| **tendril** | a leaf modified into a twisting, slender structure which can wrap around objects |
| **translucent** | transmitting rays of light but not transparent |
| **trifoliate** | with three leaflets |
| **tuber** | a thickened, modified stem with numerous buds which stores food in order to propagate later |
| **tubular** | shaped like a tube, as with a corolla base |
| **tufted** | having a cluster of hairs; stems being very close together |
| **tuber-culed** | covered with wart-like knobs |
| **umbel** | a flat-topped or rounded inflorescence having flowers on pedicles of nearly equal length and attached to the top of the peduncle at the same point; usually blooming from the outside to the center |
| **unarmed** | without prickles or spines |
valve  a portion of the wall of a fruit that separates from the remaining parts at maturity

vein  a bundle of externally visible transporting tissue in a leaf

venation a system or pattern of veins

whorl  a group of three or more parts at a node (bracts, leaves or inflorescence branches)
(Petal) -

(Corolla) -

(Net venation) -

(Umbel) -

(Regular flower) -

(Palmately Veined or Palmate Venation) -

(Palmately compound) -

(Budding) -

(Complete flower) -

(Whorled) -

(Habitat) -

(Pistillate flower) -

(Pistil) -

(Root) -

(Venation) -

(VEin) -

(Capsule) -

(Parasite) -

(Parasitism) -
(Stipule) ለማስታወቅ ያለ ሕወ ገምዝ ይወጣል::

(Shrub) መስታወቅ ያቀቃስ ይምህር መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Unisexual) እንወ ሀገር ድን ይያ ከክል ምስ::

(Abscission) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Deciduous) ለማስታወቅ ያቀቃስ መስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Ligule) ለማስታወቅ ያቀቃስ መስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Leaflet) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Petiole) ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Seedling) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Berry) ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Cereal) ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Panicle) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Species) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Stigma) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Anther) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Rhizome) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

(Opposite leaves) ይወጣል ለማስታወቅ ያቀቃስ መስታወቅ ለማስ ከም በተ-
አማ ይህ መስታወቅ ይወጣል::

259
(Parallel venation) 

(Dehiscent fruit) 

(Simple leaf) 

(Alkaline soil) 

(Weed) 

(Weed Control) 

(Chlorophyll) 

(False fruit) 

(Host) 

(Floret) 

(Flower) 

(Peduncle) 

(Sepal) 

(Calyx) 

(Monocotyledon) 

(Alternate leaves) 

(Monoecious) 

(Entire) 

(Node) 

"Achene"
(Lemma) ձուանա օծր մեկ հատ նմա թղթակից հատִ: ձուանա

(Glume) ձուանա օծր մեկ հատ նմա թղթակից հատִ: ձուանա

(Filament) ձուան թախխատ թախխատ թախխատ հատִ: ձուան

(Seed) ձուանա ձուանա ձուան ձուան ձուան ձուան ձուան ձուան

(Tree) ձուանա ձուանա ձուան ձուան ձուան ձուան ձուան ձուան

(Pod or legume) ձուան ձուան ձուան ձուան ձուան ձուան ձուան ձուան

(Compound leaf) ձուան ձուան ձուան ձուան ձուան ձուան ձուան ձուա

(Compound leaf) ձուա

(Leguminous) ձուա

(Tuber) ձուա ձուա ձուա ձուա ձուա ձուա ձուա ձուա

"Drupe" ձուա

(Conical) ձուա

(Hedge) ձուա ձուա ձուա ձուա ձուա ձուա ձուա ձուա

(Germination) ձուա

(Shoot) ձուա ձուա ձուա

(Stem) ձուա ձուա ձուա ձուա ձուա ձուա ձուա ձուա
(Pith) पिथेत् यो खाय खेला हृदय के अन्दर द्वितीय संस्काराः

(Leaf sheath) जैमिन्दार यो जीवार खेला हृदयाः

(Bud) बुद्धिः यो वर्तते खेला हृदयाः नाना खेलाः

(Bristle) धीरजाय खेला खेला खेलाः खेलाः

(Hedge) धीरजाय खेलाः खेलाः खेलाः खेलाः

(Herbicide) धीरजाय खेलाः खेलाः खेलाः खेलाः

(Glabrous) धीरजाय खेलाः खेलाः खेलाः खेलाः

(Pollen grain) धीरजाय खेलाः खेलाः

(Style) धीरजाय खेलाः खेलाः

(Rachis) धीरजाय खेलाः खेलाः

(Fruit) धीरजाय खेलाः खेलाः

(Pericarp) धीरजाय खेलाः

(Ray flower) धीरजाय खेलाः
Leaf Characteristics and Parts

**Dicot plant**

- a flower
- b leaf blade
- c node
- d internode
- e petiole
- f roots
- g cotyledons

**Arrangement:**

- a1 alternate
- a2 opposite
- a3 whorled
- a4 basal
Leaf Parts and Arrangements

Leaf:
11 simple
12 compound
13 with stipule
14 petiole clasping stem
(oorta)

Venation:
v1 parallel
v2 netted
v3 palmate
Leaf Shapes

Lanceolate  Ovate  Deltoid
Oblanceolate  Obovate  Spatulate  Elliptic
Cordate  Sagittate  Peltate
Linear  Oblong  Oval
Leaf Apices and Bases

**Apices**

- Acuminate leaf tips
  - Abrupt
  - Broadly
  - Narrow

- Acute leaf tips
  - Broadly
  - Medium
  - Narrow

- Obtuse
- Rounded

- Cuspidate
- Mucronate

- Truncate
- Emarginate
- Retuse

**Bases**

- Rounded
- Oblique
- Cordate

- Truncate
- Cuneate

- Sagittate
- Hastate
Leaf Margins

Incised margins

Cleft margins

Pinnate  Palmate

Lobed margins

Pinnate  Palmate

Entire  Sinuate  Crenate

Serrate  Double serrate  Dentate
Perennating Organs

Underground parts

- bulb
- tuber
- corm
- taproot (primary root maintained)
- rhizome with scale-like leaves

Above-ground parts

- stolon
Parts of the Flower

Anther
Filament
Stamen
Pistil
Stigma
Style
Ovary

Cross section of ovary with 5 carpels

Top view
ovary
stigma
style
anther
filament
sepals(s)
petals(s)
bract(s)
pistil
stamen
calyx
corolla
perianth
involucre

Cross section
flower

270
Types of Floret Arrangements

- Umbellet
- Involucel (bractlets)
- Ray
- Involucre (bracts)
- Peduncle

Umbel

Raceme

Cyme

Head [Compositae]
Parts of a "Pea" Flower

Parts of a Composite Flowerhead

a ray floret
b disk floret
c involucre
Fruit Characteristics, Parts and Types

**Fruit parts**

- **Dehiscent fruit**
  - 2 carpels
  - 2 locules
  - 2 placentae

- **Indehiscent fruit**
  - 2 carpels
  - 2 placentae

**Fruit types**

- **Dehiscent fruit**
  - Exocarp
  - Mesocarp
  - Endocarp
  - Seed
  - Drupe

- **Indehiscent fruit**
  - Thin skin
  - Berry
  - Fleshy
  - Schizocarp

- **Achene**
  - Attachment of seed

**Capsule types**

- **Septical capsule**
  - Suture
  - Seed
  - Septum

- **Circumscissile capsule**
  - Pore

- **Poricidal capsule**
  - Suture
  - Septum

- **Loculicidal capsule**
  - Seed
Parts of a Grass Leaf

Grass plant
a inflorescence  e nodes
b peduncle      f rhizomes
c leaves       g roots
d internode
Parts of a Grass Leaf

Grass leaf
a blade
  a1 linear
  a2 lanceolate
  a3 ovate
  a4 flat
  a5 folded
  a6 involute

b ligule
  b1 membranous truncate
  b2 membranous fringed
  b3 rings of hairs

c leaf-sheath
Inflorescence of Grasses

Main structures
- a spike
- b raceme
- c panicle
- d spike-like raceme

Arrangement
- a1 solitary
- a2 paired
- a3 digitate
- a4 racemose

One-flowered spikelet

- g1, g2 glumes
- l lemma
- p palea
- lo lodicles
- st stamens
- o ovary
- s stigma

flower

floret

grass
References


Edwards, S., notes on Ethiopian flora, unpublished.


Moore, J. E., Weed Control in Ethiopia. unpublished.

Polhill, R. M. et al. (eds.). Flora of Tropical East Africa. In sections by family, of which the most relevant are: Aizoaceae (£1), Amaranthaceae (£11.20), Capparidaceae (£2.20), Caryophyllaceae (£1), Chenopodiaceae (£1), Convolvulaceae (£4.05), Cruciferae (£5), Gramineae 1 (£4.40), Gramineae 2 (£6.85), Gramineae 3 (£24.40), Orobanchaceae (£0.50), Oxalidaceae (£1), Plantaginaceae (£0.50), Polygonaceae (£1), Primulaceae (£1), and Zygophyllaceae (£1.90), Crown Agents (London) and A. A. Balkema, P. O. Box 1675, Rotterdam, The Netherlands.


In the TCP/ETH/4532 project, the objective was to address and improve technology transfer for weed management to small farmers. The project was implemented by the Ministry of Agriculture, Crop Protection and Regulatory Department. An information base useful to extension officers for problem identification and solving must be established before relevant technology transfer can take place. Therefore, the project concentrated on production of two manuals - Weed management in Ethiopia - An extension and training manual and A weed identification guide for Ethiopia. These materials were reinforced by a 2-week training course for 50 upper-level, regional extension staff.

The project also contributed in the formation of a trial/demonstration programme verifying research results on enclosed sites and on farmers’ fields. Surveys supported all work including a more concentrated effort on Striga control (a parasitic weed on sorghum and maize). The project also purchased equipment to assist in the running of the weed management programme. The above contributions are the first of their kind in Ethiopia. The assistance took place over a 14-month period (July 1986-December 1987).

Recommendations are to continue and expand the work. To do this, the Government may need additional technical assistance, particularly in the Ministry of Agriculture extension area. Recommended new activities include: quarantine assistance for weed pest identification; data and survey analysis and use system; further work on Striga and extension methodologies including in-the-field training; formation of a more extensive technology verification network; assistance in herbicide policy justification.