CPSE

Proceedings

of the Second Annual Conference

Crop Protection Society of Ethiopia

26–27 April 1994
Addis Ababa, Ethiopia

CROP PROTECTION SOCIETY OF ETHIOPIA

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Contents

The Crop Protection Society of Ethiopia

The Crop Protection Society of Ethiopia (CPSE) is a non-profit professional association established in 1992 by the merger of two previously formed committees: the Ethiopian Phytopathological Committee (EPC), established in 1976, and the Committee of Ethiopian Entomologists (CEE), established in 1981. The objective of CPSE is to contribute towards the development of Ethiopian agriculture by reducing crop losses caused by plant pathogens, insect and vertebrate pests, birds and weeds through research and dissemination of research results; and by fostering a united approach among professionals and disciplines.

Acknowledgments

The Editorial Baord is very grateful to the Ethiopian Science and Technology Commission for publishing the abstract. Special thanks are extended to the Institute of Agricultural Research (IAR) for generous financial support and to Wo. Aynalem Haile for typing the manuscript.

PLENARY SESSION

Welcome Address

Dr. Tsedeke Abate

Vice - President, CPSE
Institute of Agricultural Research
P.O. Box 2003, Addis Ababa

Your Excellency, Dr. Awetahegn Alemayehu
Vice Minister of Agriculture

Invited Guests;
Colleagues!

I take a great honour in welcoming all of you to the 2nd annual conference of the Crop Protection Society of Ethiopia (CPSE).

May I ask you for a moment of silence in remembrance of two of our beloved colleagues, viz.:

- Ato Ababu Demissie of IAR, and
- Ato Tesfaye Amare of Shola Lab., MOA who passed away last year.

When we first merged the two sister committees (CEE & EPC) two years ago in this very hall, some of us were doubtful whether CPSE could survive as a viable professional organization.

We have now been able to hold our 2nd annual conference successfully. In each of these conferences we have been able to accomplish some of the goals we set out to accomplish. These included, among many others,

- Exchange of ideas among scientists;
- Imparting useful information to the user community;
- Fostering growth of the science of crop protection in our country;
- Creating awareness about our profession;
- And so on.

Last year we talked about the role of crop protection in the national agricultural development; our major topic for this year, as you might have already noticed, is "Locust pests of Ethiopia."

In the years to come we hope to talk about pertinent crop protection issues, including reassessment of our past and present activities, if our profession is to play a significant positive role in increased food production, food security and nutrition. We can be proud of our professions and ourselves only if and when we can influence agricultural policy of this country. And we can do this only if and when all agricultural scientists of this country could speak in one voice. It is my firm belief that the time has come for us to establish a forum which can bring together all agriculture - related professional societies.

Your Excellency;
Mr. Chairman;
Colleagues!

If I may bring you back to the agenda in front of us for two days, we will be deliberating on papers dealing with various topics, including 5 on desert locust and the remaining covering various areas of crop protection. We also have a poster on banned pesticides and on locust operations. We hope the next two days will be fruitful ones.

Before I close my short address, I would like to thank all who contributed to the success of convening this conference. On behalf of the executive committee of CPSE I would like to express our gratitude to H.E. Dr. Awetahegn Alemayehu, vice Minister of Agriculture, for taking time out of a very busy schedule to be with us this morning.

We are also particularly indebted to the IAR management for the generous financial support and for the cooperation to make this facility available for our conference.

Agri-service Ethiopia's support in producing posters and other necessary documents for this conference is well appreciated.

With that, may I take the honour to request H.E. Dr. Awetahegn Alemayeghu, Vice Minister of Agriculture to give the opening address.

I thank you all!

Opening Statement

His Excellency Dr. Awetahegn Alemayehu
Vice Minister of Agriculture

Mr Chairman,
Members of the Crop Protection Society of Ethiopia
Invited Guests
Ladies and Gentlemen

It is my great pleasure to address the 2nd Annual Conference of the Crop Protection Society of Ethiopia which is being held at a time when our country is faced with severe food shortages caused by drought and exacerbated by agricultural pests.

Agricultural pests pose a serious threat to crop production in our country. Although no systematic loss assessment studies have been undertaken, the annual pre- and post-harvest crop losses are estimated to be at least 30 percent or the equivalent of two million tons of grain. For a country like ours, where millions of people are suffering from lack of adequate food supply, such food losses cannot be tolerated.

As you are all aware the pest problems in our country might be divided into four main groups (Classes)

(1) the migratory pests that impact serious losses across national boundaries, and thus require both national and multinational action,
(2) sedentary pests that have periodic upsurges that are beyond the capacity of on-farm control,
(3) pests that may be introduced either intentionally or accidentally and which require special research efforts to develop resistant varieties, biological controls and farm level control programmes and
(4) the usually indigenous pest complexes whose control are normally an on-farm responsibility with government assistance through technical advises and services based on research findings.

It is clear that the class 1 and class 2 pests require both national and international capacity for early warning based on monitoring and international assistance when local capacity proves inadequate. The class 3 pests usually require the assistance of international efforts either through technology transfer or research. The class 4 pests require adequate national research and extension capacity to provide farmers with the necessary control information and the

development of the required input and credit infrastructure for the farmer to carry out the necessary control action.

Ladies and Gentlemen

I believe it is important to summarize the importance of locusts which I have referred to as class 1 pests and indicate the measures that had been taken to combat the recent locust upsurges which occurred during May to September, 1993. This would definitely help you to understand the magnitude of the problem and improve your contribution in the efforts made to control locusts.

As you are aware, our country is one of the focal centers for locust breeding and gregarisation in Eastern Africa and as such, it occupies key areas for locust development in the lowland areas of northern, north-eastern and eastern regions of the country.

Historically, these areas are characterized by high frequency breeding where during plague periods, substantial numbers of swarms and hopper bands are produced that threaten agriculture.

The most important locust species in this area are the desert locust and the African migratory locust of which the former has in recent decades become the most important.

The importance of locusts lie in their ability to swarm i.e. millions or even thousands of millions of individuals come together and when such densities of locust swarms occur, they leave behind nothing but a trail of destruction and hunger.

Since 1989, the country had largely remained free from any significant locust infestations. However, as early as November 1992, there had been locust development in the Red-Sea coastal plains of Eritrea, Sudan, Yemen, Saudi Arabia and Egypt. The upsurge gradually continued into 1993 when large scale control measures were undertaken.

Our country had continued to remain free until May, 1993 where the occurrence of swarms were reported by ground survey teams from Dire-Dawa area. Extensive survey carried out in the northern parts further revealed the presence of different size and density of swarms in Tigrai, Wello and Afar regions.

The Ministry of Agriculture is responsible for the control of locusts. It is the national responsibility to undertake survey, make available the necessary

control inputs and other logistics needed to combat locusts.

In order to effectively control the 1993 locust upsurges, preparations were made in accordance with the action plan formulated jointly with the Desert Locust Control Organization for Eastern Africa (DLCO-EA). Various levels of coordination were set-up at the Head Quarters, regional and woreda levels to foresee mobilization of resources, survey and control activities. Pesticides, sprayers, safety devices and other ground support logistics were made available in high risk areas.

The Transitional Government has been closely following the locust development situation. As a matter of highest concern, over six million birr was earmarked by the government to cover operational expenses.

Control operations were organized and carried out in all outbreak areas with active participation of farmers where over 80,000 hectares were sprayed using different insecticides. The campaign was highly successful as a result of which major damage to crops was averted.

It must be noted however, that locust control should not be taken as a one time job left to one Ministry. I urge you to discuss this issue thoroughly and seriously during your deliberations. Therefore, efforts must continue to contain locusts by all those concerned not only at the height of upsurge and plague situations but also during periods of recessions in order to safeguard food security in our country.

Finally, ladies and gentlemen on behalf of all of you, I would like to thank all those involved in organizing this 2nd Annual Conference of the Crop Protection Society of Ethiopia and declare this conference open and wish you every success in your deliberations.

Thank you.

Keynote Address

Dr. Dereje Ashagari
MOA, Addis Ababa

Your Excellency, Dr. Awetahegn Alemayehu
Vice Minister of Agriculture,
Mr. Chairman,
Ladies and Gentlemen,

It is indeed a great pleasure and honour for me to have this invitation to make few remarks on crop pests and crop protection to this August session.

Your Excellency,
Mr. Chairman,
Distinguished Participants,

The complex biological world, as we all know, consists many species of life forms with all sorts of traits. One of the most impressive characteristics shared by all life forms is the intense drive to survive. This appears to be the primary quality that ensures life to continue, and presumably is the necessary condition for it. If this drive did not exist, life would have not existed either for long or there would have not been any improvement for adaptation. Man's freedom of action and his capacity to change himself and the society to cope with the changing physical environment are not shared by other biological species. In fact barring some of man's manipulations and interferences, all species are inexorably locked into the genetic and adaptive processes that have governed nature ever since living things first arose.

Every species, including man, strives to improve its or his lot to the maximum achievable. It is within these complex interacting - living - systems that man has had to make a place for himself as a consumer, and where he has come to label the species that compete with him as "pests". Thus, the definition of a crop pest as far as man is concerned, is simply a living organism that is out of place and injurious to his crops. In general, pests being an opportunistic species have the essential qualities of great reproductive potential, great power of dispersal, and generalized adaptability. The categories of crop pests include insect and mite pests, pathogens, nematodes, weeds, rodents, grain damaging birds, and injurious wildlives.

Your Excellency,
Mr. Chairman,
Ladies and Gentlemen,

As there are many species that are beneficial to man's well being, there are also as indicated above, many life forms that are debilitating or potentially lethal that endanger his survival. Pests have become a major problem ever since the cultivation of land to provide increased and assured supply of food replaced the practice of merely gathering natures produce. Throughout history, pests have had a profound effect on mankind as referred or evidenced by, for example, in the Holy Bible, I Kings; 8:36,37,39 to the blasting and mildew in connection with pestilence, locust and caterpillars; the history of ancient Romans (700 BC) about the destructiveness of the wheat and barley rusts and the worshiping of the rust god, Robigus; the Irish famine due to potato late blight which was responsible to the death and migration of millions of people; the elimination of coffee as a commercial crop from the Far East (Ceylon) due to the coffee rust; the ergot poisoning of Europe; etc. With these examples and others it might be safe to say that in general violent fluctuations to crop yields have been caused by the destructive effects of epidemics of plant diseases, plagues of insect pests and injurious weed infestations. This has been true for centuries, and despite man's best efforts to insure against these hazards through science and improved technologies, there still are many unsolved problems.

In Ethiopia about 95% of food production comes from the peasant sector, where production technologies are obsolute. Land preparation is done by oxen-drawn local plough (Maresha) or by manually operated hand tools, neither of which is effective in minimizing weed infestation; seeding is done by broadcasting; weeding is dependent upon labour intensive practices; the farmer has little access to improved technologies in the area of pest control, harvesting, threshing, farm transport machinery, storage facilities, food processing and preservation methods. As a result crop losses at pre - and post-harvest stages are believed to be very high. It is generally estimated that agricultural pests on food crops in Ethiopia cause about 20-30% of yield loss in the field and 8-12% in storage. A rough estimate is that there are over 200 major pest species involved on all food crops. The categories of pests are migratory insects (3), migratory bird (1), non-migratory field insect pests and mites (55), termites (4), stored insect pests (12), plant pathogens (64), parasitic weeds (4), non-parasitic

annual and perineal weed complex (52), rodents (7), bird complex (10), and other vertebrate pests (8).

The migratory insect and bird pests include the migratory locust, the desert locust, the African armyworm, and the red-billed quelea. The combination of their destructive power and rapidity of spread enables the migratory pests to cause catastrophic crop losses that are often of national and international concern.

Your Excellency,
Ladies and Gentlemen,

Ethiopia's agriculture is at a cross-road faced with numerous problems and challenges that need extra attention. Inspite of the country's endowment of high agricultural potential, our agricultural performance remains amongst the lowest in the world. Causes for the poor performance could be attributed to lack of improved technologies and the occurrence of natural disasters, such as drought, flood, invasion of pests, etc. The impending food shortage calls our attention on the need to increase food supplies in every possible way. The minimization, if not complete elimination, of the prevailing pre- and post-harvest losses due to the various pests is one of the most urgent and practical obligations of plant protection. The various methods that can be considered for adoption for the control of pests and minimization of crop losses could include:

1. Plant quarantine
   In the past two decades it is believed that over 20 major pests have been accidentally introduced into the country, some with devastating consequences. There is still an extensive list of pests absent from Ethiopia. Thus, there is a need for a stringent quarantine regulations and enforcement capacity.

2. Cultural methods
   Pests live successfully within rigid limits with respect to time, temperature, humidity, and various other factors in their environment. Determination as to what these factors are and limits that can be tolerated by the pest provides the basis for rational manipulation of the environment which is known as cultural method. Some of the cultural practices include sanitation, crop rotation, tillage, use of trap crops, thinning, pruning, water

management, strip cropping, adjusting date of planting. With these practices, pest control programmes are oriented toward escaping infec tion/infestation potential, or improving host resistance or recovery from attack. Cultural methods if done properly could be practical and cost effective.

3. Biological control methods

Biological control as is known is the use of living organism to control pests. Natural enemies including predators, parasites and pathogens with proper manipulation and utilization can check pest populations and prevent outbreaks. The advantages of biological control are that

- once established it is relatively permanent,
- it has no undesirable side effects such as those associated with chemical control, and the cost is relatively modest compared to annual treatments with pesticides.

In Ethiopia, the potential of biological control has not been fully appreciated and relatively little effort has been devoted to its development. Efforts should be made to develop this control measure and use it in our crop production system.

4. Building up host plant resistance

The breeding of plants for resistance to pests is one of the most effective means of pest control. The principle involves altering the "fit" between the pest and its host. Alterations in the fit may make the plant more susceptible or less susceptible to the pest. This is an ideal way of controlling pests if it were always feasible. However, the constantly changing forms of pests with the continuing evolution of new types or strains with increased capacity to attack hitherto resistant host plants make the resistance short-lived.

5. Chemical control

Chemical control refers to the use of pesticides for the control of injurious insect pests, pathogens, weeds, and vertebrate pests. In general, because of their cost and hazard to the environment, pesticides are recommended as the last resort for the control of pests. However, inspite of these short

comings, voluminous quantities of pesticides are applied - annually. Most of the chemicals are selected on the basis of optimum effectiveness and maximum persistence. Relatively little thought is given to their safety or selectivity with regard to higher animals and to the ultimate quality of the environment. It is important that the chemicals of choice and the means of employing them should take the above into consideration.

Your Excellency,
Mr. Chairman,
Ladies and Gentlemen,

With the above lists of control methods in mind, now the question would be, "in what direction(s) can we move in quest of an effective control method?" Well, success in the control of pests depends upon the skillful blending of many methods. Rarely does any single control measure proves successful for a sustained period of time unless supporting measures are soundly conceived. In fact in the present state of relative knowledge all the control measures mentioned above should be mutually supplemental rather exclusive. The employment of the various control measures in an integrated approach, i.e. by harmonizing and applying two or more control techniques to reduce pest populations to and maintain them at levels below those causing injury of economic importance is believed to achieve this ideal. In all cases it would be important to keep in mind the fact that our research efforts and recommendations to be responsive to the needs and aspirations of the farming communities. Doing this will not only make high the probability of acceptance of the technology by the farmers, but also would make the efforts relevant and useful.

Finally, hoping that I am not too late, I would like to express my deepest appreciation to the Ethiopian Phytopathology Committee and the Ethiopian Entomology Committee for their courage and vision in joining together and establishing the Ethiopian Crop Protection Society. Really, these pioneers through their selfless efforts in the formation and sustenance of this society once again have shown not only of their being farsighted bodies, but also their dedication and determination in the improvement of Ethiopia's agriculture.

I wish you most fruitful deliberations and thank you for your kind attention.

Thank you.

Locust Pests in Ethiopia

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Abstract

Locusts are one of the most destructive insect pests in Ethiopia. The most important species are Desert Locust, *Schistocerca gregaria* (Forskal), African Migratory Locust, *Locusta migratoria migratorioides* and two species of Tree Locusts, namely *Anacridium melanorhodon* (Walker) and *Anacridium wernerellum* (Karny).

The Desert Locust attacks the leaves, flowers, fruits, seeds as well as barks of all types of crops grown in the country. Swarms may also cause damage by breaking down trees when they settle in masses. The preferred foods of the African Migratory Locust are wild grasses and cereals. Generally, non-cereal crops are attacked when wild grasses are dry or when cereal crops are not available. The natural food for the Tree Locust is mainly Acacia leaves. Occasionally, they may damage crops such as cotton and fruit trees. The areas affected by the tree locusts are eastern and western Hararghe, Dire Dawa, North Shewa, North and south Welo as well as Tigrai Region.

Solitary Desert Locusts are mainly found along the Red Sea coast during the recession period, but during plagues the whole country can be affected by swarms. The areas affected by the African Migratory Locust are Tigrai Region, northern and southern Welo, eastern and western Hararghe, Region Five and Dire Dawa Provisional Administration. The main source of the African Migratory Locust is the flood plains of the Middle Niger River in Mali. High density populations that are found within the country can also be the source of local outbreaks.

Desert Locust Research Activities in Ethiopia

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Desert Locust Control Organization
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Abstract

The current research programmes in the field of Desert Locust (*Shistocerca gregaria* (forsk) have the main objectives of developing economical, safer and environmentally friendly control and management procedures.

Organophosphates (OPs), carbamates, pyrethroids, combinations of OPs and pyrethroids, and a phenyl pyrazole were evaluated for efficacy, safety and environmental impact against desert locust adults and numphs in DLCO-EA Head quarter laboratory. Fenitrothion (12.0 ug/g), chlorpyrifos (7.0 ug/g), polytrin - C (2.5 ug/9), deltanet (4.0 ug/g), carbosulfan (7-2 ug/g) and fipronil (0.025 ug/g) achieved 100% mortality when applied topically. Fipronil exhibited the longest persistence in treated wheat seedlings (24 days) followed by polytrin-c (15 days), fenitrothion and hexaflumuron (10 days each). Deltanet and chlorpyrifos - methyl did not persist for more than five days. Field application rates of 500, 225, 250, 125, 100, 110, 10 and 50 g.a.i./ha were found suitable for fenitrothion, chlorpyrifos (dursban), chlorpyrifos-methyl (Reldan), carbosulfan, deltanet, polytrin-c, fipronil and hexaflumuron, respectively

Locust Control in Ethiopia

Aynekulu Yemane

Ministry of Agriculture
Agricultural Development and Crop Protection Department
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Abstract

Ethiopia is one of the focal centres for locust breeding in Eastern Africa. Swarms of locusts found in Ethiopia may arise from traditional breeding areas within the country or from neighbouring countries such as the Sudan, Eritrea and Somalia.

Locusts inflict heavy damage to agro-silvo-pasture environment on a scale likely to create great hardship to farmers and economic dislocation to local governments.

Since the last major upsurge of 1986-89 Ethiopia had largely remained free of any significant locust development. However, after a recession period of 4-5 years the country was faced with yet another locust upsurge which occurred during May - September, 1993.

Over the last five decades the strategy for locust control in Ethiopia has largely depended on the application of pesticides against hopper bands and flying or settled swarms. At present chemical control seems the only option available for locust control and it may remain to be so for the foreseeable future. Ground and aerial control operations were undertaken during 1993 upsurges in all outbreak areas where over 80,000 hectares were treated using 44,891 litres and 26,956 kg of various insecticides. The control operation was highly successful and major damage to crops was averted.

It must be emphasised that locust control should not be viewed as a one time job and hence every effort must be made by all those concerned to combat locusts and to protect the food security of our country.

Quelea Control Operations in Ethiopia, 1991-1993

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Abstract

Currently, aerial control is the most commonly used method of red billed quelea (*Quelea quelea*) control in Ethiopia. Extensive control operations were carried out in the Rift valley and associated lowland areas during 1991, 1992 and 1993 crop seasons on 13 roosting and seven breeding colonies which were found on a total area of 799 hectares. The total population was estimated at about 33.3 million birds. Aerial control was undertaken both on the roosting and breeding colonies using 2140 lts of Fenthion 60% ULV and 90% kill was achieved. As a result the bird pressure in the areas were highly minimized. On the other hand, large colonies of birds located at Awash National park, Shewa Robit and in some parts of western Hararghe were not controlled due to technical and logistic problems. Airstrips should be constructed in these areas to prevent grain losses caused by quelea birds. Moreover, remote sensing technology need to be used in order to improve quelea control operations.

Fruit Fly Species Composition, Distribution and Relative Abundance in Coffee

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Abstract

Samples of 300 ripen coffee cherries collected from Jima Research Centre, sub-centres and State Farms were kept in perspex cylindrical cages in the laboratory for adult emergence from 1988 to 1990. The species, distribution and abundance of emerged fruit fly adults were determined. The results showed that there were more than three species of fruit flies infesting coffee cherries in Ethiopia.

The Natal Fruit Fly (NFF) *Ceratistis rosa* (Karesch) and the Coffee Fruit Fly (CFF) *Trirhithrum coffeae* Bezzi were the most frequently distributed and relatively abundant species. Observation on the seasonal population variation at Melko has indicated that the NFF species was more abundant during the humid months of June - December 1992, and the CFF was more abundant in the dry months of April to May 1992 and January to March, 1993. In general, the number, distribution and relative abundance of fruit fly species observed in coffee to be significantly affected by local climatic factors (amount of rainfall, relative humidity and temperature). Presently it is common to find coffee cherries infested with fruit flies almost in all locations. Therefore, research emphasis to detect fruit fly associated damage and proper pest suppression methods need to be studied.

A New Record of Pests of Wheat at Alemaya

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Abstract

Wheat fields at Alemaya, were observed to be infested by unknown pest species causing dead-hearts to wheat seedlings in the 1992 crop season. Following this observation, systematic collection and rearing of adult insects from damaged seedlings was initiated and this revealed the involvement of many shoot fly pests of wheat, namely: *Atherigona angiustiloba van Embden, Melanochaeta vulgaris* (Adams), *Oscinella acuticornis, O.nartschukiana Beschovski, Rhopalopterum* sp.n., *Scoliophthalmus micatipennis* Duda and *Delia arambourgi* (Seguy). This is the first record of the first six species as pests of wheat from Ethiopia and elsewhere. Among these *A.anguistiloba* and *D.arambourgi* seem to be important. Damage by *A.anguistiloba* ranged from 4.7% to 11.9% (9.2 $\pm$ 0.9) and that of *D.arambourgi* ranged from 0.8% to 6.3% (3.6 $\pm$ 0.8). Characters are also given to separate *A.anguistiloba* from *A.naqvii* Styskal, a serious shoot fly pest of wheat from Yemen to India. It is concluded that what appears to be a damage due to a single species in wheat was actually due to a complex of species. It is thus recommended that where shoot fly damage to wheat is prevalent varietal screening or insecticidal control must be attempted only after the major species involved are identified.

The Importance and Phenology of the Maize Stalk Borer, *Busseola fusca* (Fuller) as a Sorghum Pest at Alemaya

Kassahun Yitaferu[1], *Assefa Gebre-Amlak*[2] *and Mengistu Hulluka*[1]

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Abstract

Annual yield of 19.3 and 10.3 percent as a result of *Busseola fusca* infestation occurred in 1990 and 1991, respectively. *B.fusca* infestation and the ensuing damage was influenced by sowing dates. Early sowing (April) showed low yield loss (about 3 percent) due to *B. fusca* infestation. Sorghum sown in late May suffered from a high yield loss (upto 32.5 percent) due to damage by *B.fusca*.

The current phenological study in sorghum fields has shown that *B.fusca* is bivoltine around Alemaya. The first generation begins at the end of April while early August marks the beginning of the second (Diapause) generation. The second generation passes through the dry season in stalks and stubble as diapasue larvae, of which a considerable proportion survive in the stubble until the next crop. The onset of pupation of the diapause larvae is in the middle of April. A progressive increase in the mortality of the larvae of both generations is observed towards the later stages. Five hymenopterous parasitoids (*Bracon sesamiae* (Cameron); *Cotesia (=Apanteles sensu lato) sesamiae* (Cameron); *Dolichogenidea (=Apanteles sensu lato)* sp. near *laevigatus; Pediobius furvu* (Gahan) and *Procerochasmias nigromaculatus* (Cameron) and one dipterous parasitoid (*Sacrophaga* sp.) attacking the larvae and the pupae of *B.fusca* at Alemaya, eastern Ethiopia were identified.

Developing Experimental Technique for Bioassaying Bait Carriers for Desert Locust, *Schistocerca gregaria* (Forsk.) (Orthoptera:Acrididae).

Waktola Wakgari

Alemaya University of Agriculture
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Abstract

A laboratory investigation into the development of a bioassay technique to screen various natural products as potential carriers for the control of desert locust, *Schistocerca gregaria* (Forsk.) was carried out using mid-fifth stadia hoppers.

Visual orientation in insects was manipulated using black vertical rods presented in a circular arena in different temporal and spatial patterns. Insects responded significantly to the visual targets and traversed part of the experimental arena designated as 'bioassay surface' on which bait carriers were bioassayed. This technique permitted bioassay of bait carriers arranged on this surface in such a way that insects orientating to visual targets encountered and ingested them. Various, cheap and readily available natural products were screened as potential carriers for locust baits. Bran, and rice bran in particular, was found to be the most preferred bait carrier whereas sawdust was rejected as food source. The feeding rejection of sawdust was not due to the presence of specific deterrent compound but because of the presence of low or sub-optimal concentration of stimulator compounds as confirmed by TLC and GC-MS. Moisture content of food is also shown to have significant impact on its acceptability. The effect of moisture was substantially manifested as food and water deprivation of insects prior to testing prolonged.

Bioassay of Bait Toxicants for the Control of Desert Locust, *Schistocerca gregaria* (Forsk.) (Orthoptera:Acrididae)

Waktola Wakgari

Alemaya University of Agriculture
P.O. Box 138, Dire Dawa

Abstract

Bioassay of two insect growth regulators (IGRs), Diflubenzuron (Dimilin) and teflubenzuron (Nomolt) and an insecticide, fenitrothion (Dicofen) delivered in bran baits to the desert locust, *Schistocerca gregaria* (Forsk.) hoppers was undertaken in the laboratory. Teflubenzuron was shown to be consistent in its efficacy, more toxic and gave positive, significant probit regression. Toxicity of diflubenzuron was, on the other hand, found to be inconsistent and no significant probit regression was computed. Nonetheless, with both IGRs X^2 test comparing number of insects dying and surviving bait treatments revealed a significant effect of concentration on mortality. Fenitrothion is shown to be the most efficacious, both in terms of its speed of action and the concentration required to cause 100% mortality of treated insects. Bait incorporating this insecticide caused 100% mortality at 100 ug/average meal of an insect.

The Response of Some Sweet Potato Genotypes to Sweet Potato Pest Complex at Alemaya

Kassahun Yitaferu and Sileshi Gudeta

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Abstract

This study was conducted to identify the major insect pests of sweet potato and to evaluate the response of 28 sweet potato genotypes (21 from the whole country and 7 from Hararghe) to major insect pests.

The major insect pests causing foliar damage were identified to be the tortoise beetles (*Aspidomorpha spp* and *Conchyloctenia punctata*), sweet potato leaf miner (*Bedellia somnulentella*) and the weevils (*Alcidodes dentipes* and *Cylas spp*). Minor pests belonging to four insect orders and 18 families of insects and one mite species were also recorded. Mole rats were also noted as serious problems.

The severity of leaf damage ranged from very mild to very sever on a 0 to 5 damage scale. Root damage caused by *Cylas spp* and *Alcidodes dentipes* ranged from 25-100% (73.1 $\pm$ 12.2) in the Hararghe collections and 50-100% (83.5 $\pm$ 8.7) in the all Ethiopian collections. The sweet potato genotypes of the Hararghe collections showed significantly lower ($P < 0.05$) root damage when compared to the collections from other parts of the country. However, there was no significant difference ($P > 0.1$) among genotypes of both collections in their response to weevil damage.

The Effect of Seed Dressing with Aldrin on Termite Control in Maize in Western Ethiopia

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Abstract

Almost all of the crops grown in the western part of Ethiopia are attacked by one or more species of termites either throughout their growing season or at one stage of their development. Damage levels were observed to be higher and widespread on maize in the region. A series of seed dressing experiments on maize were conducted with aldrin 40 % WP/sticker combinations from 1977/78-1982/83 at Anger Didessa and Bako. Aldrin seed treatment was also compared with an untreated check on large and unreplicated plots at Didessa, Assosa and Bako in 1987 and 1988 crop seasons.

Combined analyses results over the years showed that seed dressing with aldrin (with or without stickers) did not increase maize yield significantly over the untreated check. Plant damage was significantly reduced by aldrin treatment at Bako but not at Anger Didessa. The lack of significant difference in grain yield between aldrin treated and the untreated check over the years, suggests that seed dressing with aldrin did not provide adequate protection to bring differences in yield or the species of termites involved were not harmful and/or termite infestation occurred after crop maturity. Therefore, it appears necessary to determine the species of termites harmful to maize, the growth stage of the crop sensitive to infestation and the associated loss in yield before attempting to apply control measures.

Maize Storage Insect Pest Status in South-Western Ethiopia

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Abstract

Surveys were conducted in the low, intermediate and high altitude areas of the South-western Ethiopia during the 1992 and 1993 cropping seasons to determine the economic importance of stored product insect pests. Samples were taken on five different farm-stores at each of the three altitudinal categories indicated. Weevils, *Sitophilus spp*; Angoumois grain moth, *Sitotroga cerealella* (Oliver); dried fruit beetle, *Carpophilus spp*; flour beetles, *Tribolium spp*; flat grain beetle, *Cryptolestes spp*; and the Indian meal moth, *Plodia interpunctella* (Hubner) were found to be the most widely spread stored product insect pests in the region. However, only the first two species were considered the major pests.

The percentage of damaged kernels and associated weight losses were found to vary with locations , duration of storage periods and the type and numbers of insect species recorded. Damage and weight losses were significantly higher in the low altitudes than in the intermediate and high altitudes. The mean grain damage and weight losses during the storage periods of 5-9 months ranged from 43.1-81.0 percent and 2.7 - 17.3 percent, respectively. Hence, search for proper maize storage and appropriate pest control methods are essential to tackle maize storage insect pests problems.

Evaluation of Insecticide dusts for the Control of the Maize Weevil, *Sitophilus zeamais* Motsch. (Coleoptera:Curculionidae) on Stored Maize in the Laboratory

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Abstract

Deltamethrin 0.2% and 2.5% at 1 ppm and 2 ppm respectively, lindane 0.5% at 5 ppm, malathion 1% at 10 ppm, a cocktail of malathion with permethrin at 10 ppm, methacrifos 2 DP at 10 ppm, neem seed powder at 1% w/w, permethrin 1% at 2 ppm, pirimiphos-methyl 2% at 5 ppm and 10 ppm and untreated check were compared for their effects on the maize weevil in the laboratory at Bako. The evaluation parameters were parent weevil mortality, progeny emergence, grain weight change and seed germination. All of the insecticide treatments including the neem seed powder were significantly superior to the untreated check in all of the parameters considered. However, some degree of resistance indicated by parent weevil survival and/or progeny emergence from grain treated with lindane, malathion and deltamethrin 2.5% may restrict their use. Deltamethrin 0.2%, methacrifos, permethrin, a cocktail of malathion with permethrin and pirimiphos-methyl can be recommended at rates tested.

Neem seed powder at 1% w/w may not give adequate control. However, it has a promising potential as part of integrated pest management in stored maize. Investigations into the use and applicability of neem as grain protectant under farmers conditions should be encouraged.

Polyethylene Sheets as a Solar Heat Collecting Devices to Disinfest Grains from Storage Insect Pests

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Abstract

If grain is heated to 60°c for 10 minutes then all the insects and their stages on or in the grain will be killed. However, the grain can not attain this level of heat by the conventional solar drying unless and otherwise the solar energy is harnessed by some other means.

A preliminary experiment was conducted to evaluate polyethylene sheets (bags) for their effectiveness in collecting solar heat and disinfesting weevils on maize grains. Maize grains infested with weevils were kept inside polyethylene sheet bags and exposed to sun until grains in bags attain 60°c. Twenty four hours after the bags removed from the sun, the number of live and dead adults were recorded and discarded from the grain. The grains were then kept for about 2 months at 28°c and checked for the presence of live insects.

The results indicated that black polyethylene bags enveloped with another transparent polyethylene sheets killed a higher proportion of the insects (90.5%) as compared to the check (sisal sacks = 30%) as determined by counting 24 hrs after the exposure period. Similarly, after two months the lowest number of live insects were recorded on polyethylene sheet treatments.

Late Blight and Potato Production in Hararghe Highlands

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Abstract

Potato production, potato late blight and other production constraints were surveyed in Hararghe highlands in 1993 using stratified survey procedure. Late blight was recorded in 80% of plots with an average severity of 61.5%. Incidence and severity appears to vary with altitude, planting date and varieties used. Thirty seven *P. infestans* isolates were made for phenotypic characterization.

Average potato yield during blight free season is 26 q/ha and less than 1 q/ha in blight season. Potato vascular wilt, powdery mildew and termites are the limiting factors during dry seasons. Effective control for late blight is not known or practiced by the farmers. Late blight management through an IPM approach is imperative for sustainable potato production and growing expansion in Hararghe highlands.

Diseases of Important Crops in Southern Ethiopia

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Ministry of Agriculture
Awassa Plant Health clinic

Abstract

Disease surveys on crop plants were conducted since 1988 in different agroecological zones (Sidama, North Omo and Borena) in Southern Ethiopia by Awassa Plant Health Clinic (APHC). The result showed the presence of different diseases on major crops. Disease status varied with agroecological zones and the crops infected. The main diseases were *Helminthosporium turcicum, Sphacelotheca* sp. on maize and sorghum; *Puccinia graminis, P.recondita, P.striiformis* and *Pyrenophora* sp. on wheat and barley, *Botrytis* sp., *Fusarium* sp., *Uromyces fabae*; on faba bean *Ascochyta* sp., *Perenospora pisi*. on field pea *Alternaria brassica, cercospora beticola* on vegetables and brasica; *Phytopthora infestans* on potato and tomato; *Puccinia porri*, *Erysiphe* sp. on onion and carrot *Diaporthe citri, Colletotrichum* sp. on citrus; *Taphrina deformans* on peach; *Cladosporium herbarum* on papaya, *Plasmopara viticola* on grapevine, *Mycosphaerella musicola* on musacea, *Colletotrichum coffeanum, Hemilia vastatrix* on coffee. There was a general awareness of the use of fungicides to control coffee diseases in coffee growing areas and potato and tomato diseases in Sidama zone (eg. Wondogenut).

Distribution and Prevalence of Minor Diseases of *Coffea arabica L.* in Ethiopia

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Abstract

A number of minor diseases have been recorded on *Coffea arabica* L. in the country. Currently only coffee berry disease (CBD) is economically important, but this should not give the impression that other less important coffee diseases would remain so indefinitely because they may gain economic importance if the existing host-parasite relationship is disturbed. This survey was conducted to determine whether or not there was a shift in the status of coffee diseases in Ethiopia. Severity was determined as the percent plant parts affected by the disease.

The survey indicated that leaf blight (*Ascochyta tarda*) was prevalent in all surveyed areas except in Hararghe regions. It was severe at Sidamo and Gera. Coffee rust (*Hemilleia vastatrix*) was prevalent in all surveyed regions being more severe in Hararghe regions. Brown eye spot (*Cercospora coffeicola*) was also present in trace amount in all regions but was severe in Hararghe. Thread blight (*Corticium coleorga*) was only recorded at Metu. Tree death was more severe at Tepi-Bebeka and Gera. Tracheomycosis was prevalent at Gera, Tepi and Bebeka. The disease mainly occurred in coffee plantations. Although there was not shift in the status of minor coffee diseases in Ethiopia, Tracheomycosis in plantations and coffee leaf rust in Harerghe region need due attention.

Important Storage Pathogens in Sidama Zone

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Abstract

In Ethiopia post-harvest losses of stored products are significant. However, much attention has not been given to research on pests of stored products. There are some limited information on identification and management of insects associated with stored products. Next to insect pests and mites, post-harvest losses of crops due to pathogens are also important. As their effect is often taken simply as mould formation, sufficient attention has not been given to their nature and injuries. Thus, the objective of this preliminary study was to identify the most important pathogens associated with various crops and storages types in Sidama Zone.

To conduct this preliminary observation specimens were collected from different places including local markets in Sidama zone. The result showed that, the most important and abundant storage pathogens of different stored crops are *Penicillium* sp, *Botrytis* sp, *Fusarium* sp, *Aspergillus* sp, *Rhizopus* sp, *Alternaria* sp. and *Sclerotinia* sp. The most important ones are *Penicillium* sp. on fruits and vegetables, *Aspergillus* on cereals and pulses, *Alternaria* on fruits and vegetables and *Rhizopus* on fruits and vegetables.

It is suggested that (1) survey on storage diseases and crop loss assessments must be conducted at different ecological zones of the country; and (2) control measures must be demonstrated in different types of storages.

Variabilities in Maize and Sorghum Isolates of *Exserohilum turcicum* (Pass.) Leonard and Suggs.

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Abstract

Maize and sorghum isolates of *Excerohilum turcicum* collected from Bako area were compared for cultural variability and differential pathogenicity. Variations in spore number, shape, size, septation and anastomosis and chlamydospore formation, colony radial growth, growth type, edge, branching habit and sector formation were evaluated on lactose casein hydrolysate agar medium. Rate of spore germination was determined on 3% water agar. Pathogenicity was differentiated in greenhouse based on days to lesion formation; lesion type, length and number; percentage disease and daily lesion number increase.

Of the various characters observed in the laboratory, mean radial growth rate after 9 to 12 days incubation showed significant differences between the two isolates. Besides, pathogenicity of the two isolates was similar although some differences in intensity was observed; as the maize isolate being more pathogenic to maize and sorghum isolate to sorghum. Generally it can be concluded that the fungus isolate from maize and sorghum were cross compatible, and either isolate could be used as inoculum to initiate *E. turcicum* leaf blight epiphythotic on maize or sorghum.

dupd) for days when the sunshine was greater than 5.5 hours per day and was 0 for those days with greater than 7.5 hours per day.

In general, temperature, rainfall, relative humidity, wind velocity and the cloud coverage of the sky (sunshine) have a paramount effect on the rate of chocolate spot development in faba bean.

Preliminary Study on Atmospheric Spore Load of Wheat Rust at Ambo

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Abstract

Uredospores of leaf, stem and stripe rusts of wheat caused by *Puccinia recondita, P. graminis* and *P. striiformis*, respectively, are airborne in their dissemination. The atmospheric spore load of these rusts was recorded from July, 1990 to September, 1991 using wooden made spore traps on which microscopic slides were mounted in the north, south, east and west directions. Preliminary result indicates that exception in July, 1990, stem and leaf rust spores were present in the air throughout the year. Yellow rust was caught for 9 months excluding February, March and April. The highest number of leaf and stem rust uredospores were caught in January 1991 (9 and 13 spores/slide), and that of stripe rust was in September, 1990 (113 spores/slide). There were more rust spores caught in the direction of wind movements. The dominant wind movement during the test period was North-South and East-West. Consequently, more number of spores were counted on slide placed on the north and east side of the wooden traps. It seems that the higher concentration of the uredospores in the atmosphere coincides with the infection of the host plant.

The Effect of Intercropping Bean with Maize on Bean Rust and the Common Bacterial Blight Diseases

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Abstract

The effect of intercropping bean with maize on bean rust and common bacterial blight (CBB) diseases, bean yield and yield component, total and partial land equivalent ratio (LER) was assessed during the main rainy season of 1993 at Alemaya University of Agriculture, Alemaya. Three cropping systems: Sole Cropping of bean (SC), Row Intercropping (RI) and Mixed Intercropping (MI) were evaluated using five promising bean varieties in RCBD. The varieties were: A-176, Brown Speckled, GLPX-92, Mexican 142 and Red Wolaita.

Intercropping (RI and MI) reduced incidence and severity of bean rust and CBB significantly compared to SC. In MI rust incidence levels were reduced by an average of 51.13% (+0.76) and 22.33% (+4.02) compared to SC and RI, respectively. Similarly, MI reduced CBB incidence levels to the average of 25.71% (+2.04) and 3.39% (+0.44) from those of SC and RI, respectively. The varieties also differed significantly in their susceptibility to both diseases ($P<0.05$). (Grain yield, Pod no./plant and seed no./pod from the three cropping systems varied significantly ($P < 0.05$). Row intercropping and MI, however, reduced grain yield, pod no./plant and seed no./pod relative to SC. Yield in these cropping systems may be optimized by determining relative planting date and intra-associated crop spacing. Total LER values for some bean varieties were found to be greater than 1.)

Evaluation of Optimum Spray Volume Applications Against Coffee Berry Disease on *Coffea arabica* in Hararghe Region

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Abstract

Controlling coffee berry disease (CBD) with chemicals is often highly appreciated by coffee growers in Hararghe region. But their use is restricted by the scarcity of water for spraying purposes. Considering this problem a trial was conducted at Mechara, to provide coffee growers in Hararghe region with optimum spray volume applications which are suitable and require minimum quantity of water for spraying against CBD. Daconil '2787' 75% w.p. (Chlorothalonil) at the rate of 4.4 kg/ha was suspended in various volumes (high, low, very low and ultra low) of water. Applications were achieved by using manually operated knapsack sprayer, motorized knapsack sprayer and Micron ULVA-8 sprayers. The low and ultra low volume applications were found to be as effective as the high volume application.

However, considering the unmanageably tall size of the coffee trees, the amount of water needed for spraying and other factors, the low volume application should be encouraged in the region.

Effects of Black Point Disease on Barley Seed Germination and its Chemical Control

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Adet Agricultural Research Center
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Abstract

Black point disease of barley is caused by *Cochliobolus sativus* (Ito & Kurib.) Drechs. ex Dast. (syn. *Helminthosporium sativum* Pammel, King, & Bakker). The disease also attacks wheat and rye. On the kernels of barley, it appears as numerous dark-brown spots on the germ end. Fourteen barley varieties and one local check were tested to identify fungal pathogens associated with black point of barley and see its effect on germination. In the first case, the mycoflora associated with the disease were assessed and 11 fungi were recorded, and in the latter healthy and infected seeds were sampled from each variety for comparing seedling shoot length, and percent seed germination. This study assures that *Helminthosporium sativum* is the major cause of black point and has been found to infect each entry 100%. The possibility of controlling this pathogen by seed treatment was also assessed by dressing variety HB114 with Vitavax/Prochloraz, Vincit, Baytan Universal, Prelude Universal and Agrosan H at the rate of 3,2,1.5,2 and 2 gm/kg seed, respectively. The efficacy of these chemicals in controlling the main cause of black point was assessed and they were all found to be effective.

Evaluation of Haricot Beans for Resistance to Anthracnose (*Colletotrichum lindemuthianum*)

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Abstract

Over 6500 bean accessions were evaluated for their response to anthracnose (caused by *Colletotrichum lindemuthianum*) in the field and greenhouse under artificial and natural condition for the period (1991-93). The materials were received from Mexico and Central American countries were the century of their evaluation takes place.

Out of the tested entries 4.2% and 2.4% exhibited resistant reaction to anthracnose under field condition and in the greenhouse using artificial disease pressure, respectively. The inoculums were collected from Ambo, Bako, Areka, Awassa, Arsi-Negele and Meki. However, some entries have shown resistant reaction under both field and greenhouse condition. The rest of the test entries exhibited varying degree of response to the pathogen. The resistant entries could be used in bean improvement program as a source of resistant gone against *C. lindemuthianum*.

BUSINESS MEETING AND CLOSING

Report of the Editorial Board
Crop Protection Society of Ethiopia

Introduction

The Crop Protection Society of Ethiopia (CPSE) was established in March 1992 with the objective to contribute towards the development of Ethiopia's agriculture by reducing crop losses caused by plant pathogens, insect and vertebrate pests through research and dissemination of research results.

In order to achieve this noble objective, the need for a periodically published media was felt soon after the establishment of the society.

Last year, during the conference of CPSE, we announced the launching of a new periodical under the title "Bulletin of Crop Protection" which will be a recognized and referred journal of the society. This annual publication is intended to provide a forum for exchange of information on scientific findings. Research papers, review articles and short notes are considered for publication. Guidelines for potential authors has been prepared and distributed last year. The editorial board had planned to put out the inaugural issue for this conference. However, inspite of great efforts made by the editorial board, this was not possible. Some of the problems encountered were as follows:-

A. Quality of papers:
- During the past two annual meetings 57 papers were presented. Among these only 18 papers passed the first screening based on the abstracts submitted during the conferences.
- Memo was sent to authors to rewrite them according to the guidelines and return 3 copies to the editors.
- After a long delay, 17 papers were received and sent to reviewers: of which 5 were reviewed and re-written by authors as per recommendations by the reviewers; 3 were reviewed and are still with authors for rewriting; 3 are still with reviewers and 6 were rejected.

- Generally, the quality of most of these papers was poor and were intended for presenting them at the conferences and not for publishing them in a journal.

- Most authors did not follow the guidelines distributed last year and thus the papers did not meet the style and standards to be published in the bulletin.

- Results of many of the papers were based on one year data or on some preliminary studies, which may not be usually conclusive.

- Data presented in some of the papers are too few; one table or one figure only.

- Results and discussions in some papers were very poorly written. In some cases the points discussed in the result and discussion portion and summarized in the abstracts were not consistent.

- References cited were either too few, not recent or not appropriately stated.

B. Reviewers:

- As you may know we have too few competent reviewers in this country.

- We were forced to send up to 5 different manuscripts to a reviewer at a time.

- Normally we would have liked to get a manuscript be reviewed by 2 to 3 reviewers.

- We were not sure whether to publish a manuscript seen by just one reviewer.

- Almost all the reviewers we contacted were pre-occupied with many other responsibilities and were too busy to respond by the dead line. Some of them responded after repeated reminders.

- Some reviewers are not critical enough in their reviewing, and gave some general comments that have little relevance to authors and editors.

- It was difficult to get appropriate reviewers for papers on some specific topics such as rodents, pesticide chemistry, bacteria and virus diseases.

C. Experiences of the Editorial Board:

- We, the editorial board members admit that our experiences in editing articles for journals and managing the publication of a journal is very much limited.

- Moreover, members of the editorial board are scattered in different institutions and locations which makes frequent meeting and consultation very difficult.

D. Communications:

- No one deny the fact that frequent communication among the Editorial Board members, between the editors and authors, between editors and reviewers is necessary, especially during the establishment of a new journal.

- There were cases where authors could not be reached for almost 6 months just for simple clarification.

These are some of the problems we would like to raise for now. But stating the problems only without pointing to some solution may not be useful. Thus we forward the following recommendations.

Recommendations:

1. Although some of the problems seem to be unmanageable for the time being, the editorial board believe that they will be resolved through time as we accumulate experience. However, we realized that publishing the bulletin should not be left to the editorial board alone. The executive committee and the editorial board have to apply their concerted efforts in the establishment of the bulletin.

2. The term "Bulletin" gives wrong impression to some people. For some reason, they think that "Bulletin" is less important than a journal and save their best article to be published in already established journals. We have already made it clear last year that Bulletin of crop protection will have

the same status and recognition as many other professional journal. We should also know that there are reputable publication in the world known as Bulletins. However, if the term continue to be a problem to some people we may have to change the name of our publication.

3. Authors should strictly follow the guidelines provided. It will be wise for an author of a manuscript to seek advice from experienced colleagues on appropriate analysis and presentation of data; on how to discuss results and how to write scientific paper. In general, authors should convince themselves that they have written acceptable manuscript they can and meet the standard to be published in the journal before submitting it. It should be noted that no reviewer or editor will have the time and patience to rewrite badly written article.

4. If we have to have a recognized bulletin, senior scientists in crop protection should take the lead in submitting quality articles, participate in reviewing and editing papers.

5. The possibility of getting reviewers abroad should be explored, the names together with their addresses should be forwarded to the editors for the possible contact.

6. We would like to emphasize again that publishing the bulletin is no more an easy task that should be handled by the editorial board alone. At least for the initial period of establishment, it should also be the concern and responsibility of the executive committee, every member of CPSE and concerned individuals and institutions.

Thank you.

Election

The major issues discussed during the business session were elections of the executive committee and editorial board members in place of the outgoing members. Each officer was nominated, seconded and elected by showing hands. The result of the election is shown as follows:

Executive Committee

Dr. Dereje Ashagari	President
" Tibebu H/Wold	Vice President
Ato Kemal Ali	Secretary
W/o Tsehay Azage	Treasurer
Dr. Eshetu Bekele	Editor-in-chief

Editorial Board

Dr. Eshetu Bekele	Editor-in-chief
" Abdurahman Abdulahi	Member
" Fantahun Assefa	"
" Masresha Aklilu	"
Ato Aynekulu Yemane	"

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List of abbreviations

AAU	Addis Ababa University
AUA	Alemaya University of Agriculture
DLCO-EA	Desert Locust Control Organization for Eastern Africa
DZARC	Debre Zeit Agricultural Research Centre
ESTC	Ethiopian Science and Technology Commission
IAR	Institute of Agricultural Research
MOA, ADCPD &	Ministry of Agriculture, Agricultural Development Crop Protection Department
MOA, PHC	Ministry of Agriculture, Plant Health Clinic
MSFCTD	Ministry of State Farms, Coffee and Tea Development
PGRC/E	Plant Genetics Resource Centre of Ethiopia
PPRC	Plant Protection Research Center