

**REVIEW OF AGRICULTURAL ENTOMOLOGY  
RESEARCH ACTIVITIES IN KENYA**

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**1. INTRODUCTION**

In the late 19th and early 20th century a lot of crops were introduced into Kenya by the colonial settlers (Anon, 1907-1920). The crops which were introduced were mainly coffee, wheat, maize, cotton, beans, coconut, sisal, rubber, tobacco, beans and potatoes. It was soon realized that only the most suitable varieties of crops could be grown and the very best methods be adopted in their management if a farmer had to obtain highest returns for his/her produce, particularly if they were for export. Attention was directed to the research and growing of crops of high monetary value. Thus, adaptation trials for crops of valuable export were set at various experimental stations in Kenya- The cultivation of indigenous crops never drew the attention of the researchers to any serious extent unless they were of economic value. Thus crops such as groundnuts and simsim were encouraged to be grown by local people for export purposes. By 1910 the country was exporting maize, beans, chilies, coffee, cotton, copra, castor oil, groundnuts, millet, potatoes, rubber, and simsim to Europe (Anon., 1910). With the introduction of new crops and increasing acreage under their cultivation, it was soon realized that insect pests of economic importance were equally increasing in numbers. In this paper an attempt has been made to review both the past and current agricultural entomology research and its evolution over the years.

**2. HISTORY OF AGRICULTURAL ENTOMOLOGY RESEARCH ACTIVITIES  
IN KENYA**

**2.1. Entomology Activities in 1910-1920 (Anon. 1910-1920)**

The first specialist on crops in Kenya was an Entomologist posted in 1909 and based at Kabete Experimental Station. The Entomologist was also responsible for plant inspection work and entomology advisory work. In 1911 the Entomologist reported the outbreak of beetles, *Gonocephalum contractum* Gerst and *Phyrynocodus scripatus* Farm and wheat aphid, *Toxoptera graminum* on wheat at Lord Delamere's Njoro Farm (Anon., 1911). He recommended the control measures to be taken on those pests and other pests of maize and coffee that were of economic importance.

The Entomologist started collecting insects of economic importance and we do have a collection dating back to 1909 at National Agricultural Research Laboratories. By 1912 there was an intention of introducing ladybird beetles, *Hippodamia convergens* and *Aphidius graminum* for the control of wheat aphid, *Toxoptera graminum*. In 1913 an entomology laboratory was built at the Kabete Experimental Station. The laboratory was to be the centre of studies on life histories of the various insect pests which attacked the major crops of the country and advise settlers on remedies and preventative measures. Field surveys of economic pests of main crops and insect collection were the main work until 1920's.

## **2.2. Entomology Research Activities in 1920-1930 (Anon, 1920-1930)**

While advisory work and more intensive field surveys for pests on major crops were continued in 1920's, more serious research work was undertaken on various crops especially coffee (Anon., 1920-1930). The outbreak of coffee mealybug, *Planococcus kenyae* Le Pelly in the country in 1922-1923 led to a detailed research work on natural enemies and its proper identification. The coffee mealybug was recognized as an introduced pest from Uganda and nine species of parasites were collected from Uganda in 1938 and introduced into Kenya. *Anagyrus beneficans* proved an outstanding parasite in control of the coffee mealybug. It was a successful classical biological control case which led to reduction of the mealybug and upto now it is of no economic importance neither to coffee nor to other crops. Other control measures of the coffee mealybug were tried and

recommended. There are detailed reports on other coffee pests: their life histories, pest status, distribution and control measures. Detailed work on locust was done and results of surveys of cotton pests were recorded in detail. Other than a mere mention of maize stalk borers and their cultural control methods, little fundamental research work on this pest was undertaken in 1920-1930.

### **2.3. Entomology Activities in 1930-1940 (Anon., 1930-1940)**

In the early 1930's, the Entomologists were posted to Regional Centres. However, they continued to work more on coffee in their areas of operation than on other crops. Detailed work on the distribution, pest status and control of coffee mealybug, Antesia bug and capsid bug continued to be the main thrust. There was a lot of interest on work on biological efficacy of pyrethrum extracts on mealybug, Antesia bug and capsid bug. In 1937 all the Entomologists working on coffee were transferred to coffee services section and only a few Entomologists were left to Entomology Section at NARL working on other crops. In 1937 legislation of cultural control measures for maize stalkborer were effected and their effectiveness reported. Some preliminary investigations were done on more pests and crops than in 1920's. Storage pest research on air-tight containers was started in 1937. A control campaign and research activities on locusts was done in late 1930's and continued in early 1940's.

### **2.4. Entomology Activities in 1940-1950 (Anon., 1940-50)**

The major activities in the early 1940's was the control of locust outbreak. The eucalyptus beetle, *Gonipterus scutellatus* Gyll, which was introduced into Kenya in 1944 from South Africa was successfully controlled by egg parasite, *Pattasson nitens* Gir which was imported from Australia in 1945. It was reared and liberated into the country. Successful control was achieved in both the areas infested in the 1940's and in other areas of the country where the eucalyptus weevil subsequently spread. Major research work continued to be done and reported on coffee pests. In 1946 chemical

control of maize stalk borers, using DDT and other related compounds, were recommended and other research work on maize stalk borer was recorded. More intensive research work on new insecticides such as DDT and BHC as baits were done for the control of termites, ants and desert locust. Experiments on the protection of stored maize with insecticides were begun in late 1940's. Thus other pests of crops were more researched on than it was previously done. The general advisory work on entomology constituted a great portion of the entomologists' work. In 1948 the East African Agriculture and Forestry Research Organization (EAAFRO) was formed. The body was mandated to carry out basic research and technological investigations. It undertook research on control of migratory pests namely, armyworm, locust and *Quelea*.

## **2.5. Entomology Activities in 1950-1960 (Anon., 1950-60)**

There were more research work on more crops and a lot of publications are reported in journals. In the early 1950's more research work on chemical control of maize storage pests was done than in the past years. Surveys on stored products, effects of fumigants, DDT, BHC, pyrethrum and pyrethrum/piperonyl butoxide on maize pests and survey on storage methods and advisory work on stored products were extensively carried out. A lot of work on identification of scales was done in 1950's and is widely quoted all over the world. In 1950's preliminary investigations were done on a wide range of crops on regional basis and the pests attacking them. Investigations on the control of pests, especially with the use of insecticides was mainly emphasized. Laboratory and field testing of insecticides was done against a wide range of pests of economic importance. Research on biological control of coffee mealybug, woolly aphid, eucalyptus weevil and jacaranda weevil was done using introduced parasites and predators. For example, importation of natural enemies of jacaranda beetle, *Orthezia insignis* namely *Hyperapsis donzeli* Muls(Cocceiidae), *Hyperapsis* sp, *Gitonides braziliensis* Costa lima (Drosophilidae) was done. Research work on rhinoceros beetle, which was started in 1910's, continued to be done

in respect of biological, chemical and cultural control. A lot of insecticidal trials on cotton pests were set in all the cotton growing regions. The insect collection at the laboratory continued to be added with new records.

## **2.6. Entomology Activities in 1960-1970 (Anon., 1960-1970)**

In 1960's research work on cotton pests and chemical control was intensified. Diagnostic survey of pests of various crops was intensified and control measures tried or suggested for the crops of a given region. While research work on many pests and their control on a wide range of crops was emphasized, there was more research work done on chemical control of cotton pests than any other pests of other crops. Trials on storage of maize and insecticidal treatments under various storage structures and transit routes were intensified.

## **2.7. Entomology Activities in 1970-1980 (Anon., 1970-1980)**

In the early 1970's, a project on Grain Storage Entomology was started at NARL. Ecology and chemical control of storage pests and pest status in small scale and large scale storage were intensively studied. Infestation control and losses surveys on large scale and small scale storage were done frequently to update the pest status and economic losses under those storage conditions. Fewer but specific research project on field pests were done during this period. Serious research work on sugarcane scales, *Aulacapsis spp*, *Maliarpha sp* and *Diopsis sp* on rice, maize stalkborer, *Busseola fusca* were done. A considerable amount of research work on field testing of insecticides for control of important cotton pests continued in 1970's.

The International Centre of Insect Physiology and Ecology (ICIPE) was involved on basic research of the African armyworm and grassland termite in the early 1970's. These two research programmes terminated in late 1970's. ICIPE started the Maize Borer Programme in 1971 and the sorghum shootfly in 1974. Many research papers were published in 1970's on the bionomics, taxonomy, alternative host plants and seasonal activity of the two pests. In 1979 the Crop Borer and Host plant resistance Research Programmes were started at

ICIPE. Research on major crop borer species included sorghum shootfly, *Atherigona soccata*; maize and sorghum borers, *Chilos partellus*, *Busseola fusca*, *Eldana saccharine* and *Sesamia calamistis*; rice stemborer, *Maliarpha separata* and cowpea podborers, *Maruca testulalis*. On-station and on-farm trials were emphasized on studies on ecology, biology, parasitoids and predators, damage and loss assessment, and insect/plant relationship in subsistence intercropping.

### **2.8. Entomology Activities in 1980-1990 (Anon., 1980-1991)**

In late 1970's and 1980's a lot of research in agricultural entomology was done at the University and useful thesis written on biology and control of major pests of pigeon peas, wheat, cowpea, English potatoes, maize and horticultural crops. However, there was little research work done by Research Division of the Ministry of Agriculture during this period despite more Entomologists. This may be attributed to less funding for research and lack of coordination of Entomology at the National and Regional Research Centres. There has also been no proper record of research work done during the early 1980's at the Research Centres.

### **2.9. Entomology Activities in 1990-2020s )**

A lot of International Research Centres (IRCs) dealing with specific crops have reported a lot field and entomology work in their annual reports. CIAT has contributed to a lot of research work on Bean Stem Maggot and bean bruchids done at the universities and KARI Research stations. CIP and local collaborators have done a lot work on potato tuber moths and potato aphids. ICRISAT has contributed to studies on podborers and bruchids. IITA has pioneered research work on banana weevil. CYMIT has pioneered research work on maize stalkborer. Icipe has continued to take a lead on maize, rice and horticultural pests

## **3. FUTURE RESEARCH PRIORITIES**

The major insect pests of various crops in Kenya are recorded (Le Pelly, 1959; Maillu and Kibata, 1987; Karue and Mukunya, 1978 and 1979; Various research programmes by KARI have identified future research needs on Entomology (Maillu and Kibata, 1987; Njoroge, 1989; Muchena, 1988; Anon., 1991). Maillu and Kibata (1987) have written a detailed research programme on entomology which is worth to look in detail and discuss.

The following are future Entomology research priorities to be considered:

- (a) To establish major pests and assess crop losses.
- (b) To evolve appropriate integrated control strategies for major field and stored products pests.
- (c) To develop appropriate integrated control strategies for birds, Fall armyworm, Armyworm and mammals.

#### **4. CONCLUSIONS**

1. In the past 12 decades research work has mainly been done on survey and identification of pests of major crops especially cash crops i.e. tea, pyrethrum, cotton, wheat, coffee, barley and sugar. Major insect pests of various crops have been listed and some detailed work done as regards their biology, distribution and methods of control.
2. Past pest surveys reports should be used to identify specific research areas. However, surveys should be done on horticultural crops and floriculture.
3. Field advisory work should always been an integrated part of entomology
4. Entomology research in Kenya. This work should be emphasized to serve as a diagnostic survey of the pests on continuous basis.
5. Infestation surveys of crop storage pests should be strengthened to update information on pests of stored products and storage losses.
6. The reference centre for pests and natural enemies at NARL should be strengthened

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