

THE BIOLOGY AND ECOLOGY OF CERTAIN  
NATURAL ENEMIES OF CORN PESTS

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By

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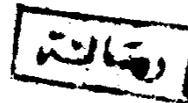


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## INTRODUCTION

Corn (*Zea mays*), millet (*Sorghum vulgare*) form the staple food for the vast majority of the Egyptian farmers.

In addition to, cotton leafworm *Spodoptera littoralis* Boisd the borer-species *Ostrinia nubilalis* Hbn. and *Chilo agamemnon* Bles., are known to infest corn in our country, and to cause considerable loss to the crop especially in lower Egypt.

It is now established that the biotic factors which comprise the work of predators and parasitoids are of great importance in checking pest populations in nature. The combined effect of these natural enemies play a big role in keeping the natural balance.

Although the problem of the susceptibility of different corn varieties to infestation by borers had received an increasing attention in many parts of the world, yet, the study of the population trend of entomophagous insects on corn varieties did not receive sufficient attention. As these natural enemies are closely associated with the insect pests that infest corn, it is thought that their density on the plant

should differ in different varieties in accordance to the degree of susceptibility of the latter to infestation. Therefore special attention was focussed in the present study on this point.

The destructive effect of wide application of chemical insecticides for pest control on the natural enemies is one of the most acute problems that faced the entomologists in recent years.

The present work was undertaken to throw some more light on the following points :

1. The trend of maize infestation by 3 species of pests (Ostrinia nubilalis Hbn., Chilo agamemnon Bles. and Spodoptera littoralis Boisd.) in relation with the population dynamics of 5 species of associated predaceous insects on the plants in successive cultivations.
2. The relationship between abundance of the predators and degree of infestation with the pests in several corn varieties of different susceptibilities to corn pests.

3. The effect of several insecticides on the population density of the predators on the plant.
4. The rate of parasitism by Trichogramma evanescens West. on the eggs of both borer species in 3 different localities of the U.A.R.

REVIEW OF LITERATURE

a) Predaceous insects on Corn plants :

Vuillet (1914) recorded Scymnus plebeius Weise, Chrysopa incongrua Nav., Chrysopa oralis Nav. and Chrysopa vuillet Nav., as natural enemies on Aphis maidis Fitch, at Koulikoro.

Fletcher (1918) recorded the adults of Broscus punctatus Klug as predators on the larvae of Chilo simplex Butl.

Scymnus nubes Cosey, was observed by Davidson (1923) in the Imperial Valley of California in grain, sorghum and cotton fields preying on the aphids. This Coccinellid first appeared in March and was active till the end of December.

Vayssiere et al (1925) reported that Scymnus ornatus Sicard, and S.soudanensis sicard, as natural enemies on Aphis sorghi, Theo., and A.maidis, Fitch.

Hergula (1928) mentioned that the ants, Myrmica laevinodis Nylander, and Lasius emarginatus Oliv., are active predators of the corn borers in Yugoslavia.

P Paillot (1928) stated that the predators of P.nubilalis Hbn. include the ant, Lasius sp., the Lacewing, Chrysopa vulgaris Schn. (the larvae of which suck the contents of the eggs and young larvae) and the mite, Allothrombium fuliginosum Herm., which is probably somewhat less important.

Zwolfer (1928) observed a mite that destroyed the eggs of P.nubilalis Hbn, the ant, Tetramorium caespitum Latr., and wire-worms (Elaterids) attacking the larvae, and syrphids and Coccinella septempunctata L., destroying the eggs and young larvae.

Buligan (1929) found that the Reduviid, Phemius tibialis Westw., and the Chesilochid, Proreus simulans Stal, were predaceous on the larvae of P.nubilalis Hbn, and the Reduviid, Sphodronyttus erythropterus Burm, and the Carpophilus foveicollis Murr. attacked both larvae and pupae.

Hergula (1930) investigated the mortality of the eggs and young larvae of P.nubilalis Hbn, and found that about 16 per cent of the eggs were destroyed by the predaceous mite, Allothrombium (Trombidium) fuliginosum Herm. The ants, Myrmica laevinodis Nyss.,

and Lasius emarginatus. Ol., attacked the larvae, and the latter, as well as the eggs, were destroyed by the predaceous larvae of Chrysopa vulgaris Schn., which were abundant at the end of July and beginning of August.

Kuwayama (1930) mentioned that the Carabid Chlaenius sp. is a predator of P.nubilalis larvae in Japan.

Fletcher (1931) observed that Scymnus nubilus Muls., attack Aphis sacchari Zehnt., through it did reduce its numbers to any great extent.

Putman (1932) observed that the larvae of Chrysopa rufilabris Burm., and C.plorabunda Fitch, destroy those of the corn-borer P.nubilalis Hbn, in maize stalks.

Wildermuth et al (1932) stated that Aphis maidis has a large number of natural enemies, those in the United States including 13 Coccinellids, of which Hippodamia convergens, Guer., and Cratomegilla fuscilabris, Muls., are the chief, 7 Syrphids, of which the most important is Allograpta fracta, O.S., and the lacewing, Chrysopa californica Coq.

Chiaromonte (1933) found that Aphis maidis is preyed upon by the Coccinellids, Cydonia lunata F., C. vicina Muls., C. propinqua var. nigrescens Wse., Hyperaspis usamberica Wse., and Scymnus morelleti Muls.

Loftin et al (1933) found that Aphis maidis is preyed upon by the Syrphids, Baccha clavata F., Ocyptamus scutellatus Lw., O. dimidiatus F. and Allograpta venusta Curran. the Coccinellids, Cycloneda sanguinea L., Scymnus roseicollis Muls., Hyperaspis festiva var. apicalis Wse., and the Psyllobora nana Muls., the earwig, Doru lineare Esch., which probably consumes large numbers of the Aphids.

Barber (1936) stated that young larvae of O.nubilalis are attacked by the Anthocorid Orius insidiosus Say.

Koo (1940) observed that the Predaceous Anthocorid, Orius (Triphleps) sauteri Popp., destroys the eggs and the young larvae of O.nubilalis before they enter the plants, and the Carabid, Chlaenius pictus Chaud, also feeds on the larvae.

Swezey (1940) reported that the infestation by A.maidis is rapidly controlled by Coccinellids, of which the most important are Coccinella (Horn) septempunctata F.

Coelophora inaequalis F. The larvae of Xanthogramma scutellare F., feed on the Aphid.

Diakonoff (1941) observed that the bug (Scoloposcelis parallelus Motsch.) showed a preference for the young larvae of O.nubilalis.

Pruthi (1941) stated that Chilomenes sexmaculata F. is a common predator on Aphis maidis Fitch., in Delhi.

Knechtel et al (1944) stated that some control of Aphis maidis Fitch, was afforded in September by Coccinella septempunctata L. & Adalia bipunctata L.

Sloan (1945) observed that Orius australis China, which preys on other insects was found in grain sorghum heads infested by Aphis maidis Fitch.

Bartholomai (1954) studied the predatism of European corn borer eggs by arthropods and found that 1,166 of the 10,070 eggs laid during the season were destroyed by predators, 785 of 9,061 being destroyed in the first generation and 381 of 1,009 in the second. The total numbers of predators observed were 212 and 1,445, respectively. It thus appears that in years in which there is a high population of O.nubilalis.

predators may destroy a considerable proportion of the eggs. The only predators actually seen attacking the eggs were mites and Orius insidiosus (Say.). Ceratomegilla fuscilabris (Muls) was the commonest predator in the experimental plots.

Hassan (1957) stated that the Aphis maidis Fitch. is checked by various natural enemies, but they appear too late in the season to prevent the building up of large populations. Coccinellids were the most numerous predators, especially Coccinella undecimpunctata L. and Symnus spp. Other predators comprised Anthocorids (Orius albidipennis (Reut.) and O. laevigatus (Fieb.)) and Chrysopa vulgaris Schn.

Conrad (1959) studied the spotted lady beetle, Coleomegilla maculata (DeGeer), as a predator of O. nubilalis eggs. He observed that the eggs are apparently laid only near aphid colonies, and larvae were never found on maize until it was infested by Aphis maidis Fitch. The Coccinellid fed on 16.5 and 15.3 per cent of the egg masses of O. nubilalis, respectively, in two fields.