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PARASITES OF *PLUTELLA XYLOSTELLA* (L.) IN SOUTH-EASTERN QUEENSLAND

By W. H. T. YARROW, B.Sc.

SUMMARY

During a 2-year field study of cabbage moth (*Plutella xylostella* (L.)), the principal parasites were *Nyctobia cerophaga* Grav. and *Thyraeella collaris* Grav., both of which are introduced. Parasitism averaged 29.0 and 2.4% respectively. Lesser parasites were *Brachymeria phya* (Walk.), *Brachymeria sidnica* Hlgr. and *Apanteles ippeus* Nixon. Hyperparasites recorded were *Ceraphron fijiensis* Ferr., *Lienella* sp. and *Eupteromalus* sp.

I. INTRODUCTION

Cabbage moth (*Plutella xylostella* (L.)) was first reported as a pest in Queensland by Tryon in 1889, although he indicated that it was probably present for a number of years earlier. This is an exotic insect, with Europe generally accepted as its country of origin.

Records of cabbage moth occurrences in Queensland have been given in various published papers dealing with the habits, damage and control of the pest. In none of these is there any mention of parasites having been bred from *P. xylostella* in the field.

The egg parasite *Trichogramma minutum* Riley, introduced for the biological control of *Cydia pomonella* (L.), was reported as parasitizing eggs of *P. xylostella* in the laboratory (Veitch 1929). This parasite was released against *C. pomonella* in the Stanthorpe district, where *P. xylostella* is common in cabbage crops, but there is no evidence of a parasite-host relation with *P. xylostella* in the field.

Three natural parasites of *P. xylostella* have been introduced into Australia from overseas and released in Queensland. One of these, *Nyctobia cerophaga* Grav., is recorded as being established in this State (Simmonds 1952). The other two species, *Thyraeella collaris* Grav. and *Apanteles plutellae* Kurdj., are also recorded as being established in Queensland (Wilson 1960).

During recent studies on seasonal populations of *P. xylostella* in the Redlands district in south-eastern Queensland, parasites of this pest and the frequency of their occurrence were recorded.

II. MATERIALS AND METHODS

The investigations were continued for a period of 2 years commencing in February 1966. In this period, 11 plantings of cabbages were made at intervals of approximately 2 months, using the variety Early Jersey Wakefield. On each occasion the cabbages comprised one of five kinds of crop plants grown in a randomized plot layout. The cabbage plants received no pesticide sprays whatever.

A total of 27 plants from the various plots was examined weekly over the 2-year period. Records were made of all eggs, larvae and pupae of *P. xylostella* present on each plant. All pupae were collected and held for emergence of adults. Parasites also emerging from these were recorded, and pupae not producing moths were dissected to determine whether this was due to parasitism.

III. RESULTS

Eight species of Hymenoptera were bred from *P. xylostella* pupae during the 2-year period. These were as follows:

BRACONIDAE: *Apanteles ippeus* Nixon

CERAPHRONIDAE: *Ceraphron fijiensis* Ferr.

CHALCIDIDAE: *Brachymeria phya* (Walk.); *Brachymeria sidnica* Hlgr.

ICHNEUMONIDAE: *Nythobia cerophaga* Grav.; *Thyraeella collaris* Grav.;
Lienella sp.

PTEROMALIDAE: *Eupteromalus* sp.

ICHNEUMONIDAE

Nythobia cerophaga Grav.—The primary parasite *N. cerophaga* originally came from Europe and in 1947 was released in Queensland at Ayr, Brisbane, Stanthorpe, and Toowoomba (Departmental records 1947; Simmonds 1949). It was recovered from Gatton and Toowoomba in 1948 (Departmental records) and later was stated to be well established in liberation sites at Westbrook and Gatton (Simmonds 1952).

During the present investigations at the Redlands Horticultural Research Station, *N. cerophaga* was the major parasite of *P. xylostella* and was bred during all seasons. Numbers of the parasite and frequency were as follows:—

Period	No. of Host Pupae	No. of Parasite Adults	Parasitism (%)
16.3.66 to 21.3.67 ..	1,034	229	22.4
5.4.67 to 31.1.68 ..	1,188	394	35.7

Thyraeella collaris Grav.—The primary parasite *T. collaris* also came from Europe and was released with *N. cerophaga* in Queensland in 1947 (Departmental records; Simmonds 1949). Other than the statement by Wilson (1960) that this species is established in Queensland, there is no record of its having been bred from field-collected material in this State. During the present investigations it was second in importance of the parasites bred from *P. xylostella*. Records were as follows:—

Period	No. of Host Pupae	No. of Parasite Adults	Parasitism (%)
16.3.66 to 21.3.67 ..	1,034	13	1.2
5.4.67 to 31.1.68 ..	1,188	55	4.6

T. collaris can parasitize the larvae or pupae of the host. It was evident that parasitism is common only when the host occurs in large numbers.

Lienella sp.—From the *P. xylostella* material handled during the investigations five specimens of a species of the genus *Lienella* were bred. These emerged singly from individual host pupae. It is likely that the insect is a hyperparasite.

BRACONIDAE

Apanteles ippeus Nixon was recently described (Nixon 1965) from material bred from *P. xylostella* in Canberra. It is now recorded from Queensland and therefore this species must have a wide distribution on some native host or hosts and has adapted itself to *P. xylostella*. However, although it is a primary parasite, only 15 specimens were bred during the 2-year period of the investigations.

CERAPHRONIDAE

Ceraphron fijiensis Ferr. has not previously been recorded in association with *P. xylostella*. It is a hyperparasite and all individuals obtained emerged from one host pupa.

CHALCIDIDAE

Brachymeria phya (Walk.) was first recorded as a parasite of *P. xylostella* in Queensland in 1939 (Departmental records). Only 12 specimens were bred in the present investigations.

Brachymeria sidnica Hlgr. is now recorded for the first time from Queensland and almost certainly this is the first record from *P. xylostella* as host. Only one specimen, however, was bred.

PTEROMALIDAE

Several specimens of a species in the genus *Eupteromalus* were bred from seven pupae of *P. xylostella* parasitized by *Nythobia cerophaga*. This is the first record of a species of *Eupteromalus* associated with *P. xylostella* in Queensland, although an unnamed species is recorded in New Zealand (Robertson 1948) and one in Canada (Harcourt 1960).

IV. DISCUSSION

The primary parasite *Nythobia cerophaga* was recovered in considerable numbers from pupae of *P. xylostella* at all times of the year; however, at no stage in the 2-year period did these numbers reach a sufficiently high level to impose an acceptable control of the pest. Only in the second year was the level of parasitism consistently above 50%. This did not appear to impose any immediate or latent effect in reducing economic levels of damaging larvae.

The four other primary parasites accounted for no more than 5% of *P. xylostella* pupae.

Some other parasitic Hymenoptera recorded in the past in association with *P. xylostella* by the Queensland Department of Primary Industries were not found in the present study. These are *Diplazon laetatorius* (F.) and *Hymenbosmina rapi* Cam. (Ichneumonidae) and *Pteromalus* sp. (Pteromalidae).

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The author is an officer of Entomology Branch, Queensland Department of Primary Industries, and is stationed at Brisbane.