

SOME NEW RECORDS OF PARASITES OF *TRICHOPLUSIA NI* (HUBNER) AND *PLUSIA ORICHALCEA* (F.) IN INDIA

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HAMPSON (1894) has mentioned *Trichoplusia ni* (Hübner) [= *Autographa brassicae* Riley, *Phytometra brassicae* (Riley), *Plusia ni* (Hübner)] (Lep.: Noctuidae) as occurring in north-west India. According to Fletcher (1920) it occurs throughout India, and is scarcely a pest, but the records of its occurrence extend only to Bihar, Gujarat, Maharashtra and Uttar Pradesh. He listed cabbage (*Brassica oleracea* var. *capitata*), cauliflower (*Brassica oleracea* var. *botrytis*), nettle (*Laportea crenulata*), opium poppy (*Papaver somniferum*), safflower (*Carthamus tinctorius*) and *Solanum* as larval food-plants. Gardner (1947) observed larvae on *Antirrhinum*, cabbage and tomato (*Lycopersicon esculentum*) in Dehra Dun (Uttar Pradesh). David (1960) recorded a serious

Plutellidae), *T. ni* and *P. orichalcea* at Chickballapur, Devanahalli, Venkatagirikote and other adjoining areas near Bangalore (Mysore State.) *P. xylostella* and *T. ni* were quite abundant and equally serious while *P. orichalcea* was less so. Defoliation was so severe (Fig. 1) that the cultivators ploughed in their fields. Cabbage was again planted in these areas in September; although all the pests reappeared, they were less common due to treatment with insecticides. *P. orichalcea* and *T. ni* were found occasionally feeding also on tomato and niger (*Guizotia abyssinica*). Periodic collections of eggs, larvae and pupae of *P. orichalcea* and *T. ni* were made and kept for emergence of parasites, of which the following were reared:

Order/family	Parasite	Stage attacked	Remarks*
HYMENOPTERA			
Braconidae	(1) <i>Apanteles</i> sp.	Larval	Solitary
	(2) <i>A. ruficrus</i> Hal.	"	Gregarious
	(3) <i>A. plutellae</i> Kurdj.	"	Solitary
Encyrtidae	(4) <i>Litomastix</i> sp. (Fig. 2)	Egg	Polyembryonic, egg-larval parasite. About 1,200 adult parasites emerged from a single full-grown host-larva
Ichneumonidae	(5) <i>Enicospilus</i> sp.	Larval	Solitary
Trichogrammatidae	(6) <i>Eckthromorpha punctum</i> Brutte	Pupal	"
	(7) <i>Trichogramma australicum</i> Gir.	Egg	Gregarious
	(8) <i>T. chilostraeae</i> Nag. and Nagar.	"	"
	(9) <i>T. japonicum</i> Ash.	"	"
DIPTERA			
Tachinidae	(10) <i>Carceia</i> sp.	Larval	Solitary
	(11) <i>Voria edentata</i> Bar. (Fig. 5)	"	Gregarious
Sarcophagidae:			
Mittogramminae	(12) <i>Senotainia</i> sp.? <i>nimalaika</i> Rohd.	"	"
FUNGI IMPERFECTI			
Moniliales	(13) <i>Beauveria bassiana</i> (Bals.) Vuill.	"	"
EUBACTERIALES	(14) Unidentified bacterium	Larval and pupal	

* All are internal parasites.

attack on cabbage by this pest in Madurai District (Tamil Nadu).

Plusia orichalcea (F.) on a variety of host-plants occurs throughout India (see Fletcher, 1920).

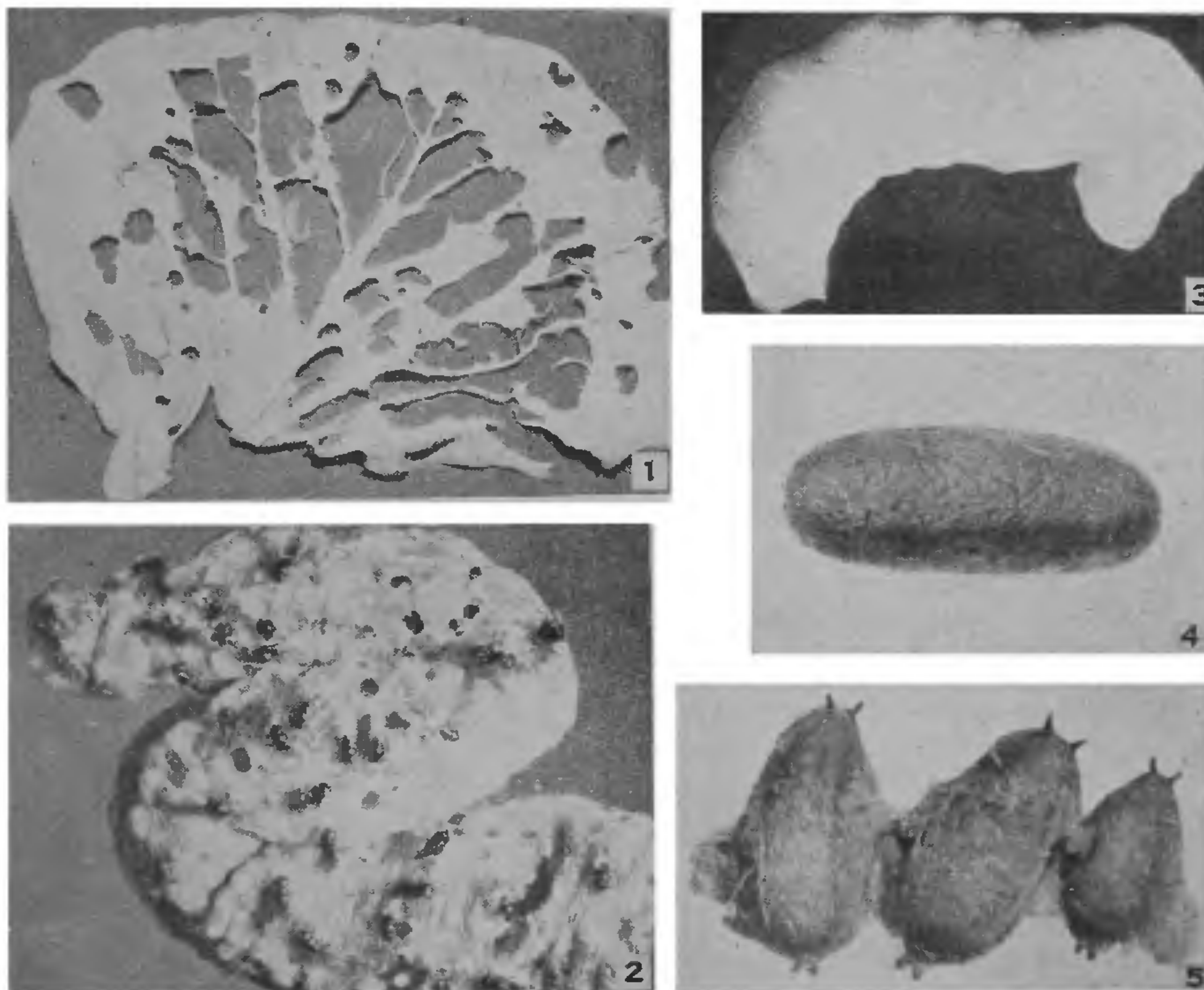
In May-June 1970, the author noticed simultaneous attacks on cabbage by *Plutella xylostella* (L.) (= *maculipennis* Curtis) (Lep.:

The egg-parasites were reared only in May, parasitism being upto 20% (18% by *T. australicum* and 2% by *T. japonicum* and *T. chilostraeae*. All these three egg-parasites were also recorded on *P. xylostella* for the first time). As the eggs of *T. ni* and *P. orichalcea* were inadvertently mixed during collection and rearing, parasitism of each species could

not be separately recorded. The larval parasites were reared both during May-June and from September to November. The maximum parasitism obtained was 12% in October, *Enicospilus* sp. (Figs. 3 and 4) being the most important, responsible for up to 10%. In other months parasitism was generally low (5% and below). The pupal parasite was very rare.

DISCUSSION

T. ni is one of the most destructive pests of crucifers in the U.S.A. where it is native. The pest seems to have been initially introduced into north-west India from where it has gradually spread to other areas including the south. It has been known to occur in India since the beginning of this century but,



FIGS. 1-5. Fig. 1. A cabbage leaf defoliated by *Trichoplusia ni*. Fig. 2. The egg-larval, polyembryonic parasite, *Litomastix* sp., emerging from a full-grown larva of *T. ni*. Upto 1,200 adult parasites emerged from a single host larva. Fig. 3. A full-grown larva of *Enicospilus* sp. Fig. 4. A cocoon of *Enicospilus* sp. Fig. 5. Puparia of *Voria elentata*. Note the cuticle of dead larva of *T. ni* encircling these Tachinid puparia.

There is no previous record of any parasite of *T. ni* in India, while *P. orichalcea* is known to be parasitised by *Brachycoryphus nursei* (Cam.) (earlier under *Goryphus*) (Hym.: Ichneumonidae), *Voria ruralis* Fall. (Dip.: Tachinidae) (Thompson, 1944) and the bacterium *Pseudomonas plusiae* (Mathur and Rao, 1966). Thus all the parasites listed are new records on these hosts.

except for rare sporadic outbreaks, the pest seems to have been kept under check either by its natural enemies, by some abiotic factors, or both. The author made attempts to study the influence of parasites on the population of *T. ni*, but could not collect systematic, long-term data as the infested fields were sprayed (against *P. xylostella* and *T. ni*) at weekly intervals with insecticides which killed off the

pest as well as its natural enemies. It is desirable to establish study plots, free from insecticidal sprays, and evaluate the role of parasites in controlling *T. ni*. A number of parasites of *T. ni* have been recorded in the U.S.A. (see Thompson, 1944) and some of the more promising species might well be tried in India. Similarly, the Indian parasites, after they have been evaluated, might be tried in other countries where *T. ni* is a pest.

The generic status of *orichalcea* seems to be uncertain since the specimens sent to the Commonwealth Institute of Entomology, London, have been identified as *Plusia orichalcea* F. while those sent to the United States Department of Agriculture, Columbia, Missouri, have been determined as *Diachrysis orichalcea* (F.). As the species is more familiar under *Plusia*, the author has used this name in this article.

The present survey was only carried out incidentally while looking for parasites of other pests, and a more careful survey in India might produce additional information.

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