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THE ESTABLISHMENT OF TWO PARASITES OF THE DIAMOND-BACK
MOTH, *PLUTELLA XYLOSTELLA* (L.) IN TRINIDAD, W.I.

M. YASEEN^(°)

INTRODUCTION

Although the diamond-back moth *Plutella xylostella* (L.) was recorded from Trinidad over forty years ago (Lamont and Callen 1945) it has not been a major pest of cabbages and cauliflowers until the present decade. Pesticides are frequently applied as a control measure against *Hellula phidilealis* Wlk. and *P. xylostella* and the latter is now apparently resistant to several of them here as in Jamaica (Suach and Ellis 1974). Following applications its numbers rebound very rapidly causing such severe damage that farmers often uproot the plants. As comprehensive surveys indicated a dearth of parasites (Yaseen 1974) *Apanteles plutellae* (Kurdj.) and *Tetrastichus sokolowskii* Kurdj. were introduced.

Native parasites

Yaseen (1974) reported *Apanteles aciculatus* (Ashm.) and *A. glomeratus* L. from larvae and *Spilochalcis hirtifemora* (Ashm.) from pupae of *P. xylostella*. *Trichogramma brasiliensis* (Ashm.) was reared during the present investigation. These parasites attack a wide range of hosts ; their incidence on *Plutella* is usually very low and they do not exert adequate control.

Parasite introduction

A. plutellae, a solitary larval parasite was obtained from Barbados where it had recently established (Alam 1974) and *T. sokolowskii* a gregarious pupal parasite of *Plutella* was obtained from India. The biologies of *A. plutellae* and *T. sokolowskii* have been investigated previously (Bennett and Yaseen 1972). Development from egg to adult of the former is completed in 11-13 days and of the latter in 11-18 days. From laboratory colonies periodic releases were made in the market gardens at Aranguez and Macoya (table 1).

Table 1 - Releases of *Apanteles plutellae* and *Tetrastichus sokolowskii* in Trinidad.

Locality	<i>A. plutellae</i>	No. of releases	No. released	Period	<i>T. sokolowskii</i>	
					No. of releases	No. releases
Aranguez	Mars - Oct. 1976	27	1109	Jul. 1976 Jan. 1977	19	6950
Macoya	Dec. 1976 - Feb. 1977	7	348	Aug. 1976 Feb. 1977	3	700

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Parasite adults were kept in the laboratory for one day to ensure mating before release. As commercial fields are sprayed once or twice a week the initial releases were made in abandoned fields or in those that had been harvested to avoid the effects of pesticide residues.

Recovery surveys

Initial recoveries of *A. plutellae* at Aranguéz were made in July 1976 and at Macoya in December 1976 soon after the first release. Details of parasitism obtained from samples up to June 1977 are given in table 2.

Table 2 - Recovery of *A. plutellae* at Aranguéz and Macoya 1976 - 1977

Month	Aranguéz			Macoya		
	<i>Plutella</i> larvae	<i>A. plutellae</i> No.	%	<i>Plutella</i> larvae	<i>A. plutellae</i> No.	%
Jul. 1976	375	19	5.1			
Aug.	800	74	9.3			
Sep.	850	72	8.4			
Oct.	680	77	11.4			
Nov.	545	66	12.1			
Dec.	425	61	14.2	250	9	3.6
Janv. 1977	730	201	27.5	370	30	8.1
Feb.	650	198	30.6	800	169	21.1
Mar.	565	159	28.1	680	181	26.6
Apr.	485	180	37.1	Samples not available		
May	217	105	48.4			
Jun.	393	220	55.9			

At Aranguéz where cabbages are grown very extensively while the earlier samples yielding the parasite were mostly from in and around the release sites samples from October onward when further releases were stopped showed that the parasite had spread throughout the area. During the early part of the dry season in January and March when the host populations are usually high *A. plutellae* showed a fairly high incidence. Its incidence, however, continued to increase even after the wet season had commenced in May - June when pest populations are usually at a reduced level.

At Macoya there were only three cabbage fields during December to March.

Two species of hyper-parasites *S. hirtifemora* and *Ceraphron* sp. were obtained from field-collected cocoons from both areas. The incidence of attack by both species was less than 5 %.

T. sokolowski was first recovered at Aranguéz in August. It has since been obtained from several samples and by April had spread all over this area although the incidence was not very high. At Macoya while only a few pupae field-collected in September-January yielded the Eulophid parasitism continued to increase up to March. Samples were not available for recovery surveys during the rest of the dry season.

DISCUSSION AND CONCLUSION

The regular occurrence of *A. plutellae* more than six months after the last release at Aranguez shows it has survived at least 12 field generations ; the rising level of parasitism indicates that it is well established in the main commercial cabbage-producing areas.

T. sokolowskii has survived for several generations and also appears to be well established. Parasitism by *A. plutellae* especially in the later samples shows its greatly appreciable role as a regulator of *Plutella* populations. However, it is too early to ascertain the final impact it may have on the pest. The two hyperparasites while not important to date could in the future affect its efficiency. Also the routine application of pesticides against other pests may adversely affect the parasites. Keeping in view the importance of *Plutella* it seems desirable to introduce additional known parasites as well as parasites of other cabbage pests. There are numerous species of parasites (Thompson 1948) ; several of these merit trial in Trinidad. Attempts are underway to obtain stocks of *Diadeguma varuna* Gupta, *Macromalon* sp. and *Thyraeella collaris* (Grav.).

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ABSTRACT

The diamond-back moth *Plutella xylostella* (L.) is a major pest of cabbages in Trinidad, W.I. The native parasites, *Apanteles aciculatus* (Ashm.), *A. glomeratus* L., *Spilochalcis hirtifemora* (Ashm.) and *Trichogramma brasiliensis* are usually scarce and do not exert adequate control. In an attempt to obtain biological control *Apanteles plutellae* (Kurdj.) and *Tetrastichus sokolowskii* Kurdj. were introduced. Both parasites are now established.