ON THE PARASITISM OF THE COTTON LEAFWORM *SPODOPTERA LITTORALIS* (Boisd.). ON CABBAGE IN EGYPT

by FAWZIA A. HASSANEIN and A.H. EL-HENEIDY

Dept. of Biological Control, Plant Prot. Res. Inst. Dokki, Giza, Egypt

INTRODUCTION

Although the cotton leafworm, *Spodoptera littoralis* Boisd. attacks severaly vegetable crops, most of the previous studies concerning with the biological control agents of this pest were restricted on cotton plants (Kamal, 1951, Hammad *et al*, 1965; Hafez *et al*, 1976; Hegazi, 1976 and Kolib, 1983). Therefore the present study was initiated with the aim of estimating the role could be played by the parasites of this pest in controlling its population on cabbage. Obtained results could be helpful for planning any integrated control program for this pest on cabbage.

MATERIAL and METHODS

Samples of *S. littoralis* larvae were collected weekly from different infested cabbage fields in Gharbia, Menoufia, Qalubia (Lower Egypt), Fayoum and Beni-Suef (Middle Egypt) Governorates during the three successive plantation seasons (August — December) 1981, 1982 and 1983. The larvae were confined in glass jars covered with muslin and fed on the semisynthetic diet of Shory and Hale (1965) until the emergence of either moths or associated parasites.

RESULTS

Results obtained from the five Governorates in the three successive seasons are summarized in Fig. (1) and Table (I). As shown in Fig. (1) the total monthly percentages of parasitism increased gradually from August and September to reach their peaks during October and November, then began to decrease. The following parasitic species of *S. littoralis* on cabbage were recorded.

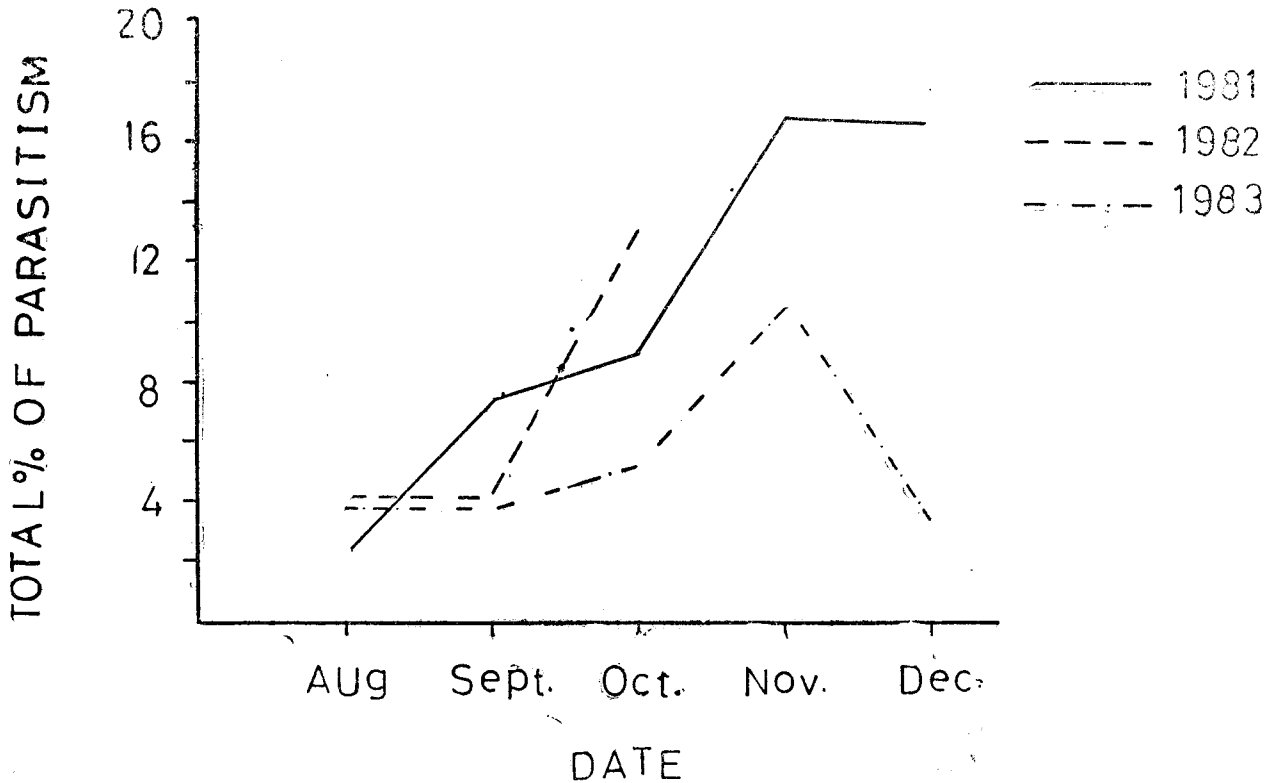

Fig. (1) : Monthly percentage of parasitism on S. littoralis on cabbage in Egypt during the period 1981 - 83

TABLE I

Total numbers of host, parasiitzed larvae and percentage of parasitism on *S. littoralis* on cabbage in Egypt during the period 1981 - 1983.

Season	No. samples	No. host larvae	No. parasitized samples	No. parasitized larvae	Secured parasites	Total % of parasitism
1981	36	2844	17	253	*Microplitis rufiventris* *Zele* sp. *Strbliomyia aegyptia* *Meteorus gyrator*	8.89 (0.3 — 32.1)
1982	17	674	8	81	*Microplitis rufiventris* *Strobliomyia aegyptia* *Zele* sp. *Meteorus gyrator* *Chelonus inanitus*	12.02 (3.0 — 23.3)
1983	42	905	14	51	*Microplitis rufiventris* *Strobliomyis aegyptia* *Meteorus gyrator*	5.63 (1.8 — 62.5)

1) *Microplitis rufiventris* Kok. (Hymenoptera : Braconidae)

This parasite was encountered 13 times throughout the whole period of the survey in 1981 season. The percentage of parasitism ranged from 0.88 to 22.97%, with an average of 8.18%. The highest percent occurred on Oct., 3 in Qalubia Governorate. In season 1982, the parasite was encountered 5 times only during October with an average of 6.48% (3.13 - 12.89%) parasitism; the peak was recorded on October, 5 from Menoufia Governorate. In 1983, it was found 11 times throughout the whole period of survey. A range of 1.96 — 50.0% parasitism and an average of 9.39% were reported. During this season two peaks were reported on Oct., 11 (from Qalubia) and Nov., 1 (from Gharbia).

2) *Zele chlerophthalma* Nees. (Hymeneptera : Braconidae)

This parasite was encountered in six samples during season 1981 with a low percentage of parasitism ranged between 0.30 — 3.60, with an average of 1.11%. In season 1982, the parasite was obtained only twice during a period from 21/9 to 5/10; being represented by 1.16 — 2.0% parasitism. In season 1983, this parasite was never secured.

3) *Meteorus gyrator* Th. (Hymenoptera : Braconidae)

Meteorus gyrator Th. was recorded for the first time in Egypt on *S. littoralis* by the authors (El-Heneidy et al 1984).

In season 1981, this parasite encountered on 17/8 from Fayoum location; representing 0.67% parasitims. In season 1982, it was recorded twice on 10/8 and 13/10 with 9.1% and 3.13% parasitism, respectively from Fayoum location. In season 1983, the parasite was found two times during the period from 15/11 to 6/12 (from Qalubia), a range of 3.3 - 12.5% parasitism was recorded.

4) *Chelonus inanitus* L. (Hymenoptera : Braconidae)

This egg larval parasite was recorded only twice in the first week of October during the three seasons of study. Its parasitism rate did not exceed 1.56%.

5) *Strobliomyis (Actia) aegyptia* will. (Diptera : Tachinidae)

This tachnid was obtained 9 times, throughout the whole season of 1981, an average of 6.79% (0.41 - 25.0) parasitism was reported. In season 1982, the parasite was encountered 6 times with different percentages of parasitism ranged between 0.52 - 16.28, with an average of 6.37%. It reached its peak

(16.28) on 5/10 from Menoufia Governorate. In 1983, the parasite was secured from 3 host samples collected during October, with an average of 4.89% (1.8 - 7.0) parasitism.

DISCUSSION and CONCLUSION

The obtained results indicated that five solitary parasitic species (4 hymenopterous and 1 dipterous) were secured on *S. littoralis* on cabbage during the three seasons of study.

In general, *M. rufiventris* was the dominant parasite on *S. littoralis* on cabbage (represented by 60%), followed by *S. (Actia) aegyptia* (represented by 33.75%). The highest percentages of parasitism by these two species occurred during October.

The relatively low percentages of parasitism during August and September could be attributed to the seasonal spray against cotton pests in cotton fields during this period, that may reflect its side effect on the parasitism rates in vegetable crops.

Kamal (1951) stated that before excessive use of pesticides, parasites cause as high as 75% mortality among the cotton leafworm populations of the winter and 32% during the summer months.

Hafez et al (1978), estimating the average percentage of parasitism on *S. littoralis* during the five years 1968 - 1972 on cotton, clover, maize and different vegetables, reported the respective averages of 2.04, 2.8, 3.9, 6.2 and 3.61%.

SUMMARY

Weekly samples of *Spodoptera littoralis* Boisd. larvae were collected from cabbage fields from five Governorates during three successive plantation seasons (August - December), 1981 - 1983. The percentage of parasitism of each of the secured parasitic species was recorded.

The following five parasitic species were reported : *Microplitis rufiventris* Kok., *Zele chlorophthalma*, *Meteorus gyrator* Th. *Chelonus inanitus* L. (Hym. : Braconidae) and *Strobliomyia (Actia) aegyptia* Will. (Diptera : Tachinidae). *M. rufiventris* was the dominant species followed by *S. aegyptia*.

In general, the highest percentage of parasitism was recorded during October and November in the three seasons of study.

REFERENCES

EL-HENEIDY, A.H. and FAWZIA A. HASSANIEN (1984) : *Meteorus* spp. (Hym. : Braconidae), new record parasites, on main lepidopterous pests in Egypt. Z. ang. Ent., (in press).

HAFEZ, MOSTAFA, M.F.S. TAWFIK, A.K. AZAB and A.A. IBRAHIM (1976) : Survey and economic importance of parasites of the cotton leafworm, *Spodoptera littoralis* Boisd. in Egypt. *Bull. Soc. ent. Egypt, 60 :* 179-189.

HAMMAD, S.M., A. EL-MINSHAWY and A. SALAMA (1965) : Studies on *Microplitis rufiventris* Kok. (Hym. : Braconidae). *Bull. Soc. ent. Egypt, 49 :* 215 - 219.

HEGAZI, E.M. (1976) : Further studies on certain natural enemies attacking the cotton leafworm in Alexandria region. *Ph.D. Thesis, Fac. of Agric., Alexandria Univ.*

KAMAL, M. (1951) : The biological control of the cotton leafworm *(Prodenia litura* F.) in Egypt. *Bull. Sec. ent. Egypt, 35 :* 221 - 270.

KOLAIB, M.A. (1983) : Studies on certain natural enemies attacking some cotton pests. *Ph.D. Thesis, Fac. of Agric., Menoufia Univ.*

SHOREY, H.H. and R.L. HALE (1965) : Mass-rearing of the larvae of nine noctuid species on a simple artificial medium. *J. econ. Ent., 58 :* 522 - 524.