

Occurrence of Natural Enemies of the Groundnut Leaf Miner, *Aproaerema modicella* Deventer (Lepidoptera : Gelechiidae)

D. RAJAGOPAL, S. MALLIKARJUNAPPA AND JAVARE GOWDA

Department of Entomology, University of Agricultural Sciences, G.K.V.K. Campus, Bangalore 560 065

Groundnut (*Arachis hypogea* Linnaeus) is subjected to the attack of several insect pests among which, the leaf miner, *Aproaerema modicella* Deventer is serious on both groundnut and soybean in many South Asian and South East Asian countries.

Cherian and Kylasam (1941) reported that *Microbracon hebetor* Say parasitised this leaf miner at Coimbatore. Later Cherian and Basheer (1942) reported two pupal and four larval parasites of the leaf miner in the Madras Presidency. Van Der Laan and Ankersmit (1951) observed a parasite, *Apanteles* sp. near Bogor (Indonesia) parasitising upto 60 per cent of the larvae. Subba Rao *et al.* (1965) recorded twelve larval and egg parasites from all over India. Khan and Raodeo (1978) reported 38 to 83 per cent parasitization of the groundnut leaf miner during the months of August and September. Shetgar and Thombre (1984) recorded 5 larval parasites of the leaf miner from Parbhani (Maharashtra). Yadav *et al.* (1987) recorded four larval parasites of leaf miner and their impact on its infestation. Considering the importance of natural enemies in controlling the attack of leaf miner and severeness of the pest on groundnut, the present study was undertaken on the occurrence of various natural enemies and their extent of parasitization on this pest.

Studies were conducted at the Main Research Station of Gandhi Krishi Vignana Kendra (GKVK), Campus of the University of Agricultural Sciences, Bangalore, during Kharif 1988. Field observations were made on groundnut (Variety Dh. 3 - 30) for the occurrence of natural enemies from July - October 1988. The leaf miner-infested fields were visited at 15 days interval. Observations were initiated one month after sowing and continued up to harvest. At each observation, 250 caterpillars were collected randomly. They were later examined under a Stereo-binocular microscope for the occurrence of natural enemies. Weather parameters such as mean maximum and minimum temperatures, total rainfall and mean relative humidity were recorded from the adjoining meteorological

observatory during the study period. Simple and multiple correlations were worked as outlined by Snedecor and Cochran (1967).

The results clearly showed the occurrence of *Bacillus thuringiensis* Berliner, *Beauveria bassiana* (Balsmo), an unidentified virus and a Hymenopteran parasite, *Bracon gelechiae* Ashm. on the caterpillars of *A. modicella*. The larvae which were infected by *B.thuringiensis*, showed lack of mobility, rectal and oral discharge and the body colour changed rapidly from brown to black. The larvae which were infected by *B.bassiana* - infected larvae became limp and lost the elasticity. The body, hardened in a day or two after death, was covered with white mycelia. The virus - infected larvae showed swelling of inter-segmental region. The skin became fragile and ruptured upon disturbance. The smears from the dead larvae when examined under the microscope revealed the presence of polyhedra. The larvae attacked by the parasite, *B.gelechiae* were sluggish in movement and feeding.

Since the pest was not observed during first three weeks of the crop (20th July to 15th August, 1988), the natural enemies were not recorded on the larvae of *A. modicella*. Cumulative incidence of natural enemies varied from 30.80 to 83.20 per cent. Maximum incidence was observed during the first week of August and the minimum incidence during the second week of September. The per cent incidence of *B. thuringiensis*, *B. bassiana*, virus and *B. gelechiae* varied from 5.60 to 36.40, 11.60 to 30.80, 1.20 to 5.20 and 5.20 to 33.30 per cent respectively (Table 1). The maximum incidence of the above were observed during the third week of August, second week of September, third week of September and first week of September respectively. Whereas, minimum incidence was observed during the fourth week of September, second week of September, second week of August and third week of August.

The parasite activity was more during the third week of August to middle of September. The para-

Table 1. Per cent mortality of groundnut leaf miner, *Aproaerema modicella* Deventer due to natural enemies

Period	Natural enemies						Weather parameters				
	Number of larvae examined	% Healthy larvae	<i>B. thuringiensis</i>	<i>B. bassiana</i>	Virus	<i>B. gelechiæ</i>	Total % mortality	Mean minimum temperature (°c)	Mean maximum temperature (°c)	Total rainfall (mm)	Mean relative humidity (%)
II Week of Aug. 88	250	100.00	0.00	0.00	0.00	0.00	0.00	18.98	28.10	127.00	73.55
IV -do- 88	250	30.00	36.40	27.20	1.20	5.20	70.00	19.40	27.18	47.40	75.70
II -do- Sept. 88	250	16.80	18.00	30.80	1.20	33.20	83.20	18.74	26.64	158.80	77.35
IV -do- 88	250	38.80	7.20	27.60	5.20	21.20	61.20	19.05	27.36	314.20	74.38
II -do- Oct. 88	250	69.20	6.00	11.60	2.80	10.10	30.80	18.48	26.72	125.70	73.87
IV -do- 88	250	66.80	5.60	14.40	3.20	10.00	33.20	16.43	28.71	4.00	65.30
Range	—	—	5.60-36.40	11.60-30.80	1.20-5.20	5.20-33.80	—	—	—	—	—

sitism reached 83% in mid September which brought down the larval population (Khan and Raodeo, 1978). Parasitization has been observed from the second week of August with its peak (84%) during last week of August (Shetgar and Thombre, 1984). In the present study, maximum parasitization by *B. gelechiæ* (33.20%) was noticed during the first week of September.

The relationship of natural enemies with mean maximum and minimum temperatures, total rainfall and mean relative humidity showed non-significant relationship.

The maximum and minimum temperature around 30°C and 22°C respectively, and with the relative humidity of 50 per cent was most conducive for the build up of the parasite population as reported by Khan and Raodeo (1978). During the study, maximum parasitization by *B. gelechiæ* was recorded when mean maximum and minimum temperature were around 26.64°C and 18.74°C respectively, with the relative humidity of 77 per cent.

KEY WORDS : *Aproaerema modicella*, natural enemies, *Bracon gelechiæ*, polyhedrosis virus, *Bacillus thuringiensis*, *Beauveria bassiana*

REFERENCES

- Cherian, M.C. and Basheer, M. 1942. Studies on *Stomopteryx nerteria* Meyer. a pest of groundnut in the Madras Presidency. *Madras Agric. J.*, 30, 379-381.
- Cherian, M.C. and Kylasam, M.S. 1941. Preliminary notes on parasites of the spotted and pink bollworms of cotton in Coimbatore. *Proc. Indian Acad. Sci.*, 14, 517-528.
- Khan, M.I. and Raodeo, A.K. 1978. Importance of larval parasites in the control of *Stomopteryx subsecivella*. *J. Maharashtra Agric. Univ.*, 3, 261-263.
- Shetgar, S.S. and Thombre, U.T. 1984. Occurrence of natural enemies on soybean leaf miner and relative susceptibility of some soybean varieties to its attack. *J. Maharashtra Agric. Univ.*, 9, 218-219.
- Snedecor, O.W. and Cochran, W.C. 1967. *Statistical Methods* Oxford and IBH Publishing Co., New Delhi, 593 pp.
- Subba Rao, B.R., Kundu, G.G. and Sharma, V.K. 1965. New records of parasites of groundnut leaf miner *Stomopteryx nertaria* Meyrick (Gelechiidae: Lepidoptera). *Indian J. Entomol.*, 28, 299-304.
- Van Der Laan, P.A. and Ankersmit, G.W. 1951. Chemical control of the *Arachis* leaf miner (*Stomopteryx subsecivella* Zell.) *Contr. Gen. Agric. Res. Stn. Bogor.*, 119, 1-13.
- Yadav, D.N., Patel, R.R. and Patel, R.C. 1987. Natural enemies of groundnut leaf miner, *Aproaerema modicella* Deventer (Lepidoptera: Gelechiidae) and their impact on its infestation at Anand. *Gujarat Agric. Univ. Res. J.*, 13, 13-16.