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Natural Enemies of Groundnut Leafminer, *Aproaerema modicella* Deventer (Lepidoptera : Gelechiidae) and their Impact on its Infestation at Anand (Gujarat)

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ABSTRACT

Natural enemies of groundnut leafminer *Aproaerema modicella* **Deventer were recorded at Anand (Gujarat). The larvae of** *A. modicella* **were found parasitised by** *Bracon gelechiae* **Ashm.,** *Apanteles sp. laevigatus* **group.,** *Chelonus* **sp.** *Goniozus* **sp.** *Stenomesius japonicus* **Ashm., and an unidentified hymenopteran and the pupae were parasitised by a chalcid,** *Brachymeria* **sp. Of these,** *Apanteles* **sp.** *Goniozus* **sp. and** *S. japonicus* **were the important ones. They accounted for a maximum of 38.21, 50.00 and 79.16% parasitisation. These parasites were very effective and did not allow the pest to build up pestiferous population to call for any chemical treatment. Conservation of these natural enemies is suggested.**

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INTRODUCTION

The groundnut leafminer *Aproaerema modicella* Deventer is a serious pest of groundnut and soybeans in many Asian and South-East Asian countries (Reddy, 1978). In India, it has been reported as serious pest from Andhra Pradesh (Channabasavanna 1957; Krishnamurthy Rao *et al.*, 1962) Karnataka (Channabasavanna, 1951, Krishnamurthy and Appanna 1951, Usman and Puttarudraiah 1955), Maharashtra (Khan and Raodeo 1979) and Tamil Nadu (Cherian and Basheer 1942). Apart from infesting groundnut, it has been reported infesting soybean and lucerne from Madhya Pradesh and Punjab (Gujarati *et al.*, 1973, Gangrade, 1974 and Sandhu, 1978). Recently it has attained a status of serious pest of groundnut in Gujarat also. Since no information is available on its natural enemies in Gujarat, studies were undertaken in Anand during 1983 and 1984 and the results obtained are presented in this paper.

MATERIAL AND METHODS

Surveys were conducted in leafminer infested groundnut fields in and around Anand. Infested leaves were collected and held in the laboratory to study the emergence of parasites. The parasites reared, their period of activity and percentage parasitism are given in Table-1.

In order to study the impact of the naturally occurring parasites on *A. modicella* infestation, observations on the leaflet damage were recorded at fortnightly intervals in rainfed as well as irrigated crops.

TABLE 1

Parasites of groundnut leafminer, their intensity and period of activity at Anand (Gujarat).

Parasite	*Perod of activity*	*% Parasitism*	*Remarks*
Apanteles sp. *laevigatus* group	July-Oct.	1.02–27.27	Solitary, endoparasite
Bracon gelechiae	July-Oct.	0.01–50.00	Gregarious, ectoparasite
Chelonus sp.	July-Oct.	0.83– 2.22	Egg-larval, solitary parasite
Goniozus sp.	March-May July-Oct.	0.54–50.00	Gregarious, ectoparasite
Stenomesius japonicus	March-May July-Oct.	0.20–79.16	Solitary
Brachymeria sp.	July-Oct.	2.03– 6.38	Solitary
Elasmus sp.	April-May	9.90–13.64	Solitary
Idris sp.	April-May	Negligible	—
Unidentified hymenopteran	April-June	4.17–25.00	Internal solitary

RESULTS AND DISCUSSION

The survey revealed that larvae of *A. modicella* are parasitised by three braconids, *Bracon gelechiae* Ashm., *Apanteles* sp. *laevigatus* group and *Chelonus* sp., one bethylid, *Goniozus* sp. one eulophid, *Stenomesius japonicus* Ashm. and an unidentified hymenopteran. The pupae were parasitised by a chalcid, *Brachymeria* sp. The important species were *Apanteles* sp. *Goniozus* sp. and *Stenomesius japonicus*. The percentage parasitism by parasites varied from 1.02 to 27.27, 0.54 to 50.00 and 0.2 to 79.16 respectively. The percentage parasitism by *B. gelechiae*, *Chelonus* sp., *Brachymeria*, *Elasmus* and an unidentified hymenopteran varied from 0.01 to 50.00, 0.83 to 2.22, 2.03 to 6.38, 9.90 to 13.64 and 4.17 to 25.00 respectively. It was observed that all these parasites were active more or less simultaneously in the field.

The results presented in Table-2 show that the parasites were quite abundant in irrigated crop during 1983 season parasitising as many as 75% of the larvae. The impact of this high percentage parasitism permitted only 5.56% leaflet damage. Similarly, in the presence of parasites, the leafminer infestation was generally low in rainfed crop during 1983 (Table-3) where the maximum leaflet damage was 11.38% in the fourth week of August. In 1984 season, the irrigated crop was totally free from leafminer infestation. The pest, however, appeared in rainfed crop in the second week of August and could inflict only 4.20% leaflet damage. This was largely due to heavy mortality of *A. modicella* larvae by hymenopterous parasites which accounted for 47.66 to 89.70% parasitism. Other workers reported parasitism of *A. modicella* by no less than 25 hymenopterous parasites (Charian and Kalayasam, 1941; Cherian and Basheer, 1942; Krishnamurthy and Usman 1954; Subba Rao *et al.* 1965; Subba Rao and Sharma 1966; Atma Ram and Subba Rao 1967; Nayar *et al.* 1976; Khan and Raodeo 1978; Bhatnagar and Davies 1979). The information on the ecology of the parasites and quantitative data on their effectiveness was lacking. Only Khan and Raodeo (1978) from Maharashtra reported similar impact of 6 larval parasites on *A. modicella* infestation in ground-

TABLE 2

Extent of leaflet damage by *A. modicella* in irrigated groundnut in presence of its larval parasites during 1983.

Period of observation	*No. of larvae collected*	*% Parasitised by*				*Total*	*%*
		Goniozus	*Apanteles*	*S. japonicus*	*Others**	*Parasitism*	*Leaflet damage*
March IV Week	44	15.91	25.00	11.36	13.64	65.91	5.56
April II Week	48	50.00	0.00	25.00	0.00	75.00	0.00
April IV Week	16	31.25	18.75	0.00	25.00	75.00	0.00
May II Week	No infestation						

*1. *Bracon gelechiae*
2. *Elasmus* sp.
3. Unidentified hymenopteran

TABLE 3

Extent of leaflet damage by *A. modicella* in rainfed groundnut in presence of its larval parasites during 1983 and 1984.

Period of observation	*No. of larvae collected*	*% parasitised by*				*Total parasitism*	*% Leaflet* damage*
		Apanteles	*Goniozus*	*S. japonicus*	*Others*		
July IV WK	112	14.17	0.00	4.17	4.13	22.47	11.15
Aug. II WK	85	38.21	1.41	7.06	0.00	46.68	7.09
	(12)**	(16.66)	(16.66)	(50.00)	(0.00)	(83.32)	(0.30)
Aug. IV WK	110	27.27	0.00	10.90	2.72	40.89	11.38
	(120)	(2.22)	(0.83)	(79.16)	(7.49)	(89.70)	(2.26)
Sept. II WK	176	20.49	9.09	0.00	0.00	29.58	7.16
	(44)	(4.54)	(4.54)	(34.09)	(4.49)	(47.66)	(4.20)
Sept. IV WK	33	12.12	0.00	12.12	0.09	33.33	6.74

**Elasmus*, unidentified hymenopteran and *Bracon*.

**Figures in parenthesis indicate data collected during 1984.

nut. Ayyar (1963) reported that parasites are rarely effective as natural check against groundnut leafminer, however, our studies clearly show that parasites exerted appreciable check and did not allow the pest to build up pestiferous population to call for any chemical treatment. It is suggested that, when natural enemies are active, care should be taken to conserve them by all means. *Apanteles* sp. and *Stenomesius japonicus* merit trial introduction against groundnut leafminer in other areas where they are not available.

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