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Surveillance of sorghum armyworm *Mythimna separata* (Walker) and its natural enemies in transitional region of Dharwad

A. NAGANAGOUD and K. A. KULKARNI
College of Agriculture, Raichur 584 101
University of Agricultural Sciences, Dharwad, Karnataka, India

ABSTRACT: Surveillance studies conducted on the sorghum armyworm *Mythimna separata* (Walker) and its natural enemies revealed that the pest actively was from June to December during 1992 and up to October during 1993. The activity attained peak during September with 59.42 and 34.25 per cent incidence during 1992 and 1993, respectively. Nine parasitoids were recorded parasitizing 18.16 and 17.55 per cent larvae during 1992 and 1993, respectively. The parasitoids *Pseudogonia* sp., *Compsilura* sp. and *Goryphus* sp. were active in the early part of the season which were followed by *Cotesia ruficrus* and *Exorista xanthaspis* in the middle of the season (September - October). Correlation studies on parasitism indicated significant positive correlation with maximum temperature ($r = 0.645$) and significant negative correlation with minimum relative humidity ($r = -0.693$) during 1992 and non significant correlation with abiotic factors during 1993.

KEY WORDS : Armyworm, parasitoids, surveillance

The oriental armyworm, *Mythimna separata* (Walker) a serious defoliator on rice and wheat, is also becoming a major pest on sorghum. The pest appears in epidemic form occasionally causing serious damage on maize and sorghum (with a heavy incidence of 35 larvae/plant) in northern transitional belt of Karnataka (Hiremath *et al.*, 1992). Search for safer, cheaper and affective alternatives to insecticide needs a thorough knowledge of the pest population and its natural enemies in a particular locality. With this in view, the present investigations on the pest status and its natural enemies complex throughout the cropping period was studied in the

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* Professor of Entomology, College of Agriculture, UAS, Dharwad

transitional belt of northern Karnataka.

Studies on the surveillance of *M. separata* and its parasitoids were undertaken at the Department of Agricultural Entomology, Agricultural College, Dharwad during 1992 and 1993. Weekly observations on the extent of damage by *M. separata* and larval population / 100 plants were recorded on the general crop sown at different dates as well as in the plots sown for the purpose. Early incidence was recorded on maize crop sown in the month of May and June. The observations between May to December were recorded on sorghum crop till the pest disappeared. After each observation, 20-25 number of larvae were collected from the field and brought to the laboratory for recording the extent of parasitism by different parasitoids. The data collected on weekly basis were computed to monthly average. The observations recorded on larval load per 100 plants, per cent plant damage and per cent parasitism were computed for correlation studies to know the influence of temperature and humidity on the pest incidence, parasitoids and their interdependence.

Highest incidence (46.8%) and larval load (55.0 larvae/100 plants) were

Table 1. Surveillance of *Mythimna separata* and its parasitoids at Agricultural College Raichur

Pest/Parasitoid	Jun	Jul		Aug		Sept		Oct		Nov	Dec
	1993	1992	1993	1992	1993	1992	1993	1992	1993	1992	1992
Pest status											
a) Plant damage (%)	14.8	12.4	34.6	29.9	31.3	59.4	34.3	17.3	23.2	0.9	8.5
b) Larvae/100 plants	11.1	7.8	19.3	38.6	18.5	87.9	22.2	11.4	6.6	0.5	7.2
Parasitoids											
Pseudogonia sp.	60.9	3.0	11.4	0.0	0.4	0.3	0.0	0.7	0.0	0.0	0.0
Goryphus sp.	3.1	0.4	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Microplitis sp.	0.0	0.0	0.0	0.5	1.9	0.2	0.0	0.0	0.0	0.0	0.0
Cotesia ruficrus	0.0	0.0	0.0	3.4	5.7	12.0	14.7	16.3	9.4	9.3	22.0
Exorista xanthaspis	0.0	0.0	0.0	1.1	0.5	11.7	0.0	10.4	0.0	1.6	20.8
Compsilura sp.	1.6	0.0	4.6	0.9	1.0	2.4	2.9	0.7	0.0	0.0	1.5
Campoletis chlorideae	0.0	0.0	0.0	0.3	2.0	0.7	0.3	0.0	0.0	0.0	0.0
Aleiodes sp.	0.0	0.0	0.0	0.4	0.3	0.0	0.3	0.0	0.0	0.0	0.0
Ecto parasitoid (Unidentified)	0.0	0.0	0.0	0.0	0.0	1.6	0.0	3.6	0.0	1.1	0.0
Total parasitism	65.6	4.4	6.6	6.6	11.8	28.9	18.2	31.7	9.4	11.4	44.3

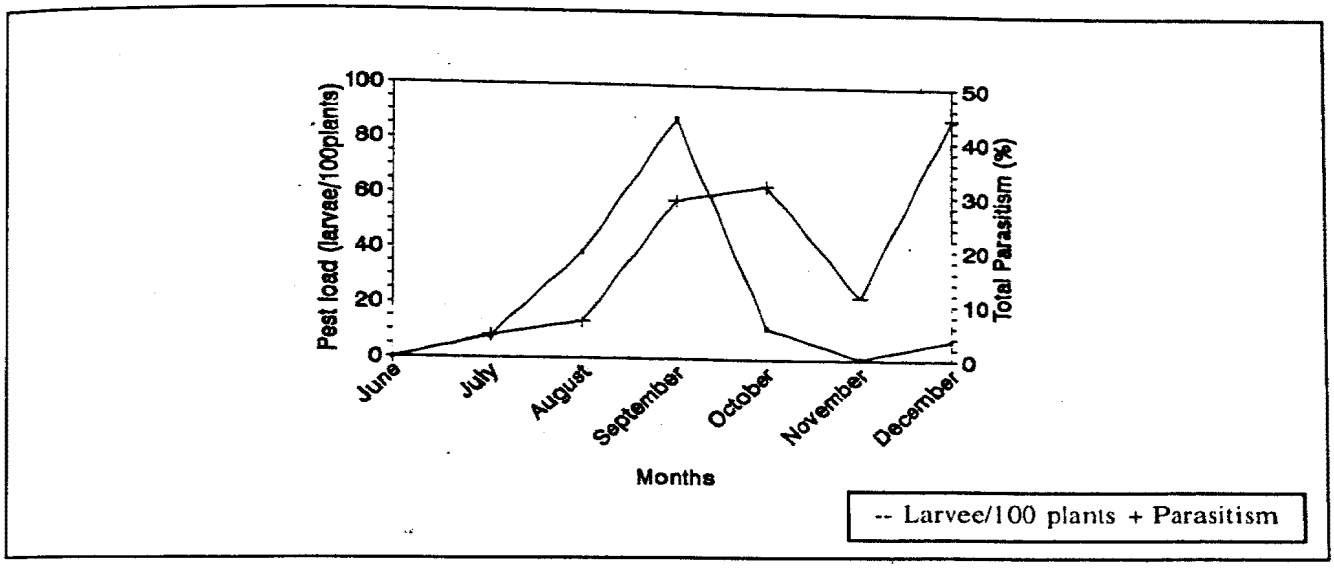

Fig.1 : Pest incidence and extent of parasitism (1992)

recorded in September (Table 1, Fig. 1&2). Though, there was variation in pest incidence between two years, the incidence started from the June and reached peak in September and declined thereafter. During 1992, the pest incidence in the field was recorded till December, whereas, incidence was not noticed from November onwards during 1993. Our observations on pattern of incidence is in variation with that of Mallapur (1993), Kulkarni *et al.* (1974) and Giraddi (1982) who have reported the peak occurrence in August. However, the present investigations are in close agreement with Singh and Rai (1977) and Hiremath *et al.* (1992) who recorded pest activity between July to November.

Even peak occurrence of the pest has been reported elsewhere during October -

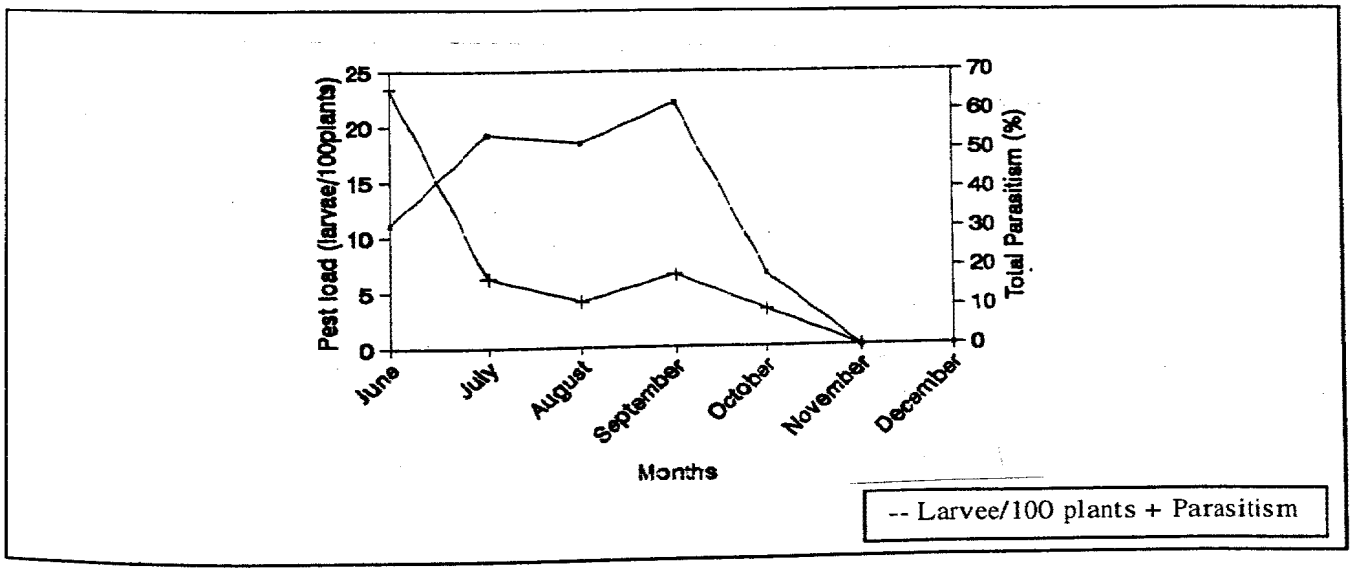

Fig. 2 : Pest incidence and extent of parasitism (1993)

November (Puttarudraiah and Usman, 1957; Patel *et al.*, 1981).

Of the several parasitoids recorded on *M. separata*, *Pseudogonia* sp., *Goryphus* sp. and *Microplitis* sp. were active in the early part of the season (July), whereas *Compsilura* sp. *and Campoletis chlorideae* (Uchida) were recorded during August and September along with the predominant parasitoids *Cotesia ruficrus* (Hal.) and *Exorista xanthaspis* (Weid.). The parasitoid *Pseudogonia* sp. and *E. xanthaspis* were observed erratic in their parasitism. *Pseudogonia* sp. parasitized up to 60.93 per cent larvae during June 1993 but there was no parasitism in June 1992. Similarly, *E. xanthaspis* appeared till December during 1992 (20.80% larval parasitism), but did not appear in 1993.

Cotesia ruficrus was observed as one of the potential natural enemy on *M. separata*. The parasitization started in August and reached peak during December (22.0%) in 1992 and during September (14.69%) in 1993. Rest of the parasitoids recorded in the negligible form. Mallapur (1993) attributed death of *M. separata* larvae to the tune of 44.0, 60.0, 8.0 per cent by *C. ruficrus*, *Pseudogonia* sp. and *E. xanthaspis*, respectively.

The data of 1992 on parasitism revealed significant positive correlation (r = 0.645) with maximum temperature and significant negative correlation with minimum relative humidity (r = - 0.693). The data of 1993 on parasitism indicated no significant correlation with weather parameters. Therefore, present studies revealed that parasitism by various parasitoids differ from season to season based on the time of sowing the crop, pest incidence and agroclimatic conditions.

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