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Effect of parasitoid density on parasitism of *Mythimna separata* fab. by *Dolichogenidea mythimna S. and B. (Braconidae : Hymenoptera)*

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ABSTRACT : Parasitism potential of a parasitoid can count the success of the biocontrol programme. Thus, parasitism plays an important role in mass rearing of parasitoids. Keeping in view the above facts, present work was undertaken in a host-parasitoid model, *Mythimna separata* Fab.and *Dolichogenidea mythimna* S. & B. (Braconidae: Hymenoptera). Optimum parasitoid density was 5 for maximum progeny production of parasitoids. Parasitoid densities, 1, 5, 10, 15 and 20 were exposed to a constant host density, 50 in the experiments at laboratory conditions (24 ± 1^0 C, 65 -70 % R. H., 12 hr photoperiod).

Keywords : *Dolichogenidea mythimna, Mythimna separata,* parasitoid density, parasitism, biocontrol agents.

INTRODUCTION

In introduction, colonization and mass production of parasitoids factors such as host specificity, host age, host density, parasitoid density and parasitoid behavior plays an important role. Parasitism potential of a parasitoid can count the success of the biocontrol programme. Hence, keeping in view the importance of such studies in biocontrol programme, the present work was undertaken. Kajita & Drake, (1969); Hassell, (1970); Yeargan & Latheef, (1976); Nikam & Basarkar, (1982); Sathe (1984, 1985, 1986), etc. attempted such studies.

MATERIAL AND METHODS

Rearing of host and parasitoids was carried out in the laboratory (24 ± 1° C, 65-70 %R. H., 12 hr photoperiod) by collecting host larvae / parasitoid cocoons from the Jowar fields. Newly emerged mated *D. mythimna* females were exposed with 1, 5, 10, 15 and 20 densities in the cage of size, 30 × 30 × 30 cm. 50 *M. separata* larvae of age 7 – 8 day old were provided to each lot. After 24 hr exposure, host larvae were isolated in specimen tubes for further development. Hosts and parasitoids were fed with Jowar leaves and 50% honey respectively. Five replications (each consist 50 host larvae) per parasitoid density were made.

RESULTS AND DISCUSSION

The data presented in the table 1 reveals that the rate of parasitization was higher (94 % and 76 %) with 5 and 10 parasitoid density but reduced considerably with density, 1, 15 and 20 (6%, 70% and 74% respectively).

Table 1 : Parasitoid density and parasitization by *D. mythimna.*

ParasitoidDensity	Number of host larvae exposed	Number of adults emerged		Total parasitism (%)
		Parasitoids	Moths	
1	250	5250 (150)	100	60 %
5	250	8225 (235)	15	94 %
10	250	6650 (190)	60	76 %
15	250	6125 (175)	75	70 %
20	250	6475 (185)	65	74 %

*Number in parenthesis indicates the number of parasitized larvae.

Kajita and Drake (1969) studied parasitoid density influence on parasitism by *Cotesia* (=*Apanteles) chilonis* (Munakata), an internal larval parasitoid of *Chilo suppressalis* Walker and found that the greatest number of parasitoids emerged at the density of 5 parasitoids to 5 host larvae.

Nikam and Basarkar (1982) observed maximum (55.6%) parasitism by 10 females of *Campoletis chlorideae* Uchida to 50 *Helicoverpa* (=*Heliothis) armigera* (Hubn.) larvae. In confined experimental system such as the present one, an inverse relationship between parasitoid density and average number of parasitized hosts per parasitoid density was expected (Hassell, 1970), but it did not prove correct with *Hypera postica* (Gyllenhal) (Yeargan and Latheef, 1976). Yeargan and Latheef (1976) noted that increase in

Bathyplectes curculionis (Thom.) density from 1-16 gives increased rate of successful parasitism. Parasitoid density when increased to 10-20 the number of adult parasitoids produced decreased to that parasitoid density 5. Cause for decrease in number of parasitoid density may be due to superparasitism which agrees with earlier study (Nikam & Basarkar, 1982).

Sathe (1984) studied parasitoid density relationship between *E. atomosa* (Wal.) and *Cotesia orientalis* C. & N. and reported that rate of parasitism increased up to 10 parasitoid densities and later decreased onwards. He further reported that minimum parasitism occurred 30 % at 1 host density. Sathe (1985) studied host parasitoid density relationship between *Exelastis atomosa* (Wal.) and *Cotesia durunii* C. & R. (Hymenoptera: Braconidae). He reported maximum 55 % parasitism with 10 *C. durunii* females and 40 *E. atomosa* larvae. Parasitism increased with 1, 5 and 10 parasitoid density to 40 hosts each but decreased with 15 and 20 parasitoid density.

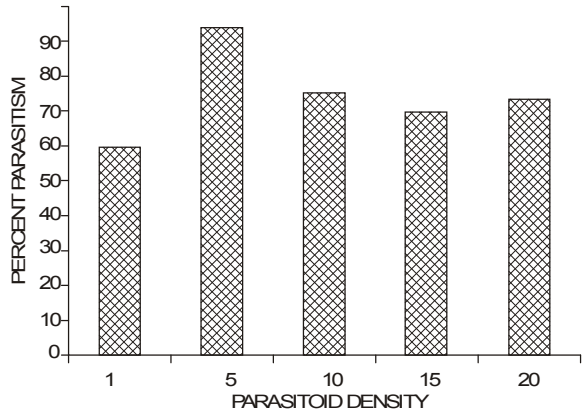

Fig.1. Percent parasitism and parasitoid density relationship in *D. mythimna*.

Sathe (1986) studied effect of parasitoid density on parasitism by *Diadegma trichoptilus* (Cameron) to Tur plume caterpillar *E. atomosa*. He reported that the rate of parasitization was higher, 53.6% and 49.25 with 5 and 10 parasitoid densities respectively but reduced considerably with densities 1, 15 and 20 as 26.6%, 36 % and 33.6% respectively. He concluded that the cause for decrease in number of parasitoid density may be due to superparasitism which agrees with earlier study. In the present study maximum 92 %, 78 %, 74% parasitism was noted with 5, 10, 20 parasitoids and 50 hosts.

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