

Original Research Article

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Occurrence of Natural Enemies of Fruit Flies in Mango Ecosystem

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ABSTRACT

Keywords

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The work was carried out in the year 2018 from May to August on natural enemies of fruit flies viz., *Bactrocera dorsalis* (Hendel), *Bactrocera zonata* (Saunders), *Bactrocera correcta* (Bezzi) and *Bactrocera caryeae* (Kapoor) in mango ecosystem. The results of the studies indicated that among the natural enemies occurring on fruit flies. The mean per cent parasitism of Braconid parasitoid, *Diachasmimorpha longicaudata* species complex was an average mean (8.81) with highest per cent parasitism was found in the month of July (13.70) followed by June. The per cent parasitism of Diapriids was average mean (5.22) the highest per cent parasitism was found in the month of July (9.54) followed by August and no parasitism. There is no significance difference between the pooled mean of Braconid and Diapriid parasitoid.

Introduction

India has nearly 200 species of fruit flies, which is about 5 per cent of known tephritid fauna of the world. In the family tephritidae, the subfamily dacinae has a maximum number of economically important species and the tribe dacini with the genus, *Bactrocera* is occurring more abundantly in India. From an economic point of view, *Bactrocera dorsalis* (Hendel), *B. zonata* (Saunders), *B. correcta* (Bezzi) and *B. caryeae* (Kapoor) are important

(Verghese *et al.*, 2002). The important host plants of *B. dorsalis* and *B. zonata* are mango, guava, peach, citrus, pear, ber and loquat (Singh *et al.*, 2016). Due to their polyphagous nature of feeding behaviour, they are gaining more importance in agriculture.

It is difficult to manage fruit fly simply through the application of chemicals since egg, maggot and pupal life stages are hidden in either in the fruits or in the soil. The present scenario warrants the need of integrated

approach for eco-friendly management of fruit flies (Singh and Kaur, 2016) with more emphasis on biological approach as fruits harbouring these pests are mainly consumed raw. Hence, keeping these points in view present experiment was undertaken to study the natural parasitism in mango ecosystem.

Materials and Methods

The studies were carried out to understand natural enemies of fruit flies in mango ecosystem from April to August 2018. During mango fruiting season ten fallen fruits infested with fruit flies were collected and brought to the laboratory at weekly interval. The collected fruits were kept in rearing cages provided with a thin layer of sand for pupation. After the pupation, pupae were collected and kept in glass vials to observe for the emergence of natural enemies as well as fruit flies. After the emergence of natural enemies per cent parasitism was calculated by following formula:

$$\text{Parasitism (\%)} = \frac{\text{Number of natural enemies emerged from fruit fly pupae kept for observation}}{\text{Total number of fruit fly pupae kept for observation}} \times 100$$

Results and Discussion

Results of the studies indicated that among the natural enemies occurring on fruit flies (*B. dorsalis*, *B. zonata*, *B. correcta* and *B. caryeae*), the Braconid and Diapriid parasitoid, found through observation period (Table 1). Per cent parasitism of *Diachasmimorpha longicaudata* species complex belong to family Braconidae, ranged from 3.05 to 13.70 with an average mean of 8.81. The highest per cent parasitism was found in the month of July (13.70) followed

by June (12.40), August (6.10), May (3.05) (Table 2 and Fig. 1). Similarly, the parasitoids *Trichorpia* sp., *Spilomicrus manii* and *Copterabharatvarshus* belong to family Diapriidae was found throughout the observation period from May to August 2018. The per cent parasitism of Diapriids ranged from 1.38 to 9.54 with an average mean of 5.22. The highest per cent parasitism was found in the month of July (9.54) followed by August (7.49), June (2.49), May (1.38) (Table 2 and Fig. 1).

Parasitoids are density defenders, the population are depended on the availability of host and fruiting season. The highest per cent parasitism of Braconidae and Diapriidae was found in the month of July (13.74 and 9.54) which can be attributed to ripening season of mango which leads to increased incidence of fruit fly.

The present findings are in line with findings of Mala (2013) and Singh (2016) noticed the occurrence of *D. longicaudata* (Ashmead) on *Bactrocera* spp. and *B. caryeae* (Kapoor) from Punjab and Kodagu (Karnataka) respectively. Laskar *et al.*, (2017) observed that there was 33.47 per cent parasitism of *Diachasmimorpha* spp. on melon fruit fly and also they confirmed *Diachasmimorpha* spp. is a larval-pupal parasitoid. Aneeldev (2018) was observed in the period from May to October, 2017 ranging from 8.98 to 13.52 per cent parasitism of *Diachasmimorpha* spp. on *Bactrocera* spp. Ovruski *et al.*, (2000) reported Diapriid *Copterahaywardi* in Argentina, Brazil, Venezuela and Mexico, while *Trichopria anastrepha* is present only in Brazil and Argentina. Aneeldev (2018) was observed in the period from May to October 2017 ranging from 2.20 to 10.82 per cent parasitism of Diapriids on *Bactrocera* spp (Fig. 2).

Table.1 List of natural enemies' species recorded in mango ecosystem during fruiting period (May to August, 2018)

Sl. No.	Parasitoid	Family	Order
1	<i>Diachasmimorpha longicaudata</i> species complex (Ashmead)	Braconidae	Hymenoptera
2	<i>Trichorpia sp.</i> (Ashmead)	Diapriidae	
3	<i>Spilomicrus manii</i> (Rajmohana and Narendran)		
4	<i>Copterabharat varshus</i> (Sharma)		

Table.2 Per cent parasitism in fruit fly by parasitoids during mango fruiting season (May to August, 2018)

Month	Per cent parasitism	
	Braconidae	Diapriidae
May	3.05	1.38
June	12.40	2.49
July	13.70	9.54
August	6.10	7.49
Pooled Mean	8.81	5.22
t_(cal) value	1.498*	
t_(tab) value	3.182	

*no significant difference

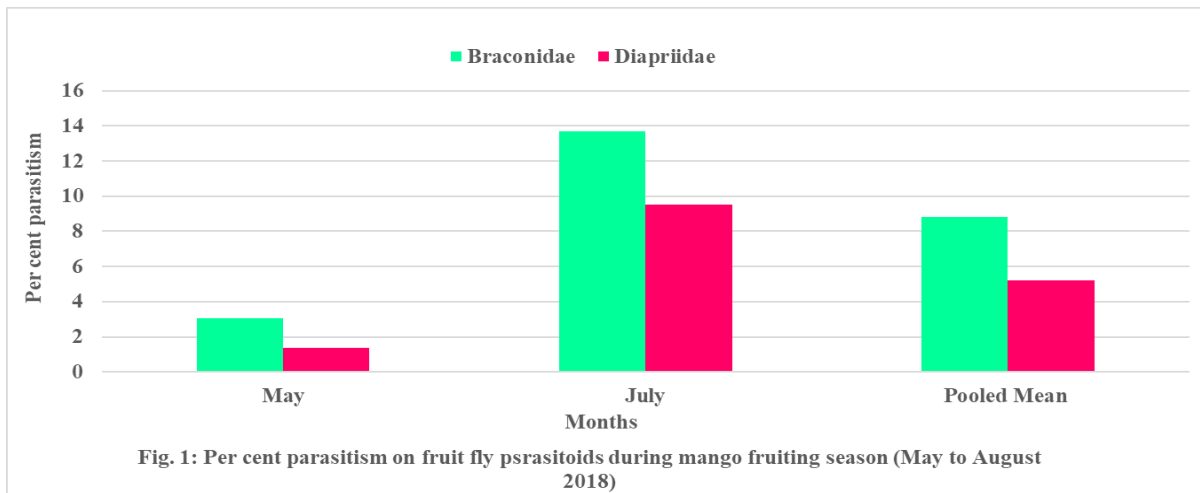
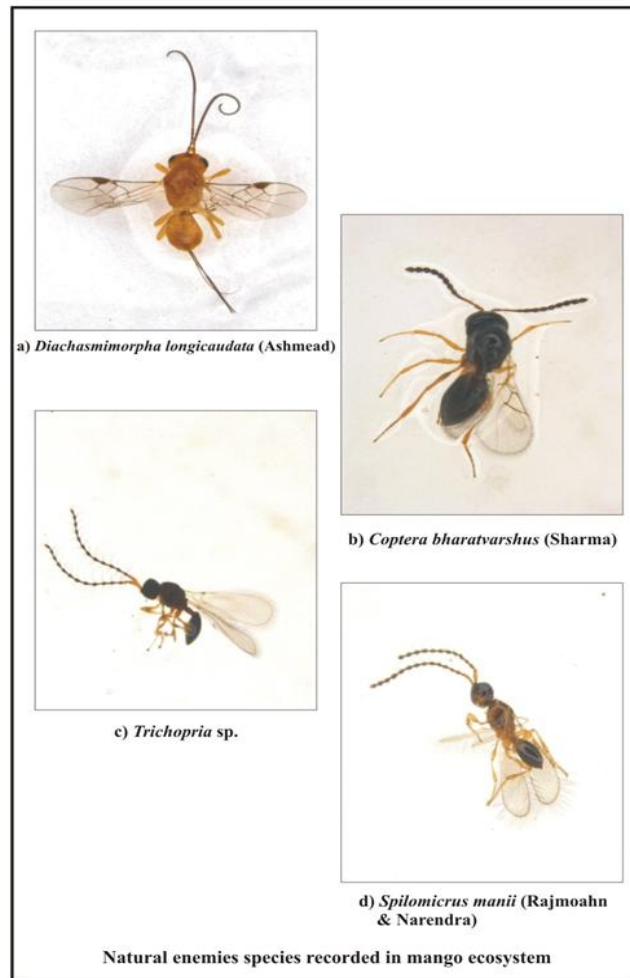


Fig.2



Diachasmimorpha longicaudata species complex, *Trichopria* sp., *Spilomicrus manii* and *Coptera bharat varshus*, were mass reared and used in augmentative releases against important fruit fly species in tropical and subtropical countries. The extent of distribution of this species complex is all over India. More studies are needed for mass rearing and augmentative releases of this parasitoids in India. Since the usage of pesticides on fruit is a nagging issue in the present context, emphasis should be given on the eco-friendly tools that could be successfully employed in the management of fruit flies, so that hazardous impact of chemicals on the environment and human health can be minimized.

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