



Population Density and Natural Enemies of *Papilio polytes polytes* L. (Lepidoptera: Papilionidae)

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ABSTRACT : The eggs and pupae were parasitized by *Trichogramma chilonis*, *Pteromalus puparum* and Tachinid fly. The highest population density was recorded with an average of 25 larvae/curry leaf plant and 19.75 larvae/acid lime plant in the month of July. The lowest average of 1 larva/curry leaf plant was recorded in April and May and 1 larva/acid lime plant in March and April. The curry leaf plants are more infested by the pest *P. p. polytes* and its population was highest during rainy season followed by winter and summer. The study may be useful in the formulation of control strategy of this pest.

Keywords : Population, natural enemies, common mormon.

INTRODUCTION

Among the various insect pests that attack lemon, curry leaf, orange and other plants of rutaceae, the *Papilio polytes polytes* is a serious and regular pest (Wynter - Blyth 1957; Antram 1986 and Gunnathigalraj 1998). The caterpillars feed voraciously and cause extensive damage to nurseries and young seedlings. They are foliage feeders, prefer blossoms and young nurseries of citrus and curry leaf. Severe pest attack resulted in entire defoliation of the tree and leads to retardation of plant growth.

Determination of population dynamics is prerequisite for the implementation of control strategy against certain insects. Now days, pest population can be controlled by introducing natural enemies of pest as biocontrol agents. Biological pest control method was first used by Chinese Citrus growers by introducing predatory ants (Liu, 1939). The most common enemies of butterflies are lizards, birds, spiders and predatory insects in the earlier stages of its life cycle and all stages of butterflies except the adult are attacked by parasitoids, mainly by Hymenoptera and Diptera reduces their population (Haribal, 1992). Information on the population density and natural enemies of *P. p. polytes* will be useful to formulate effective management strategy against this pest. Therefore, the present study was undertaken.

MATERIAL AND METHODS

Surveys of natural enemies of the *P. p. polytes* were done for a period of (2003-2006) in the laboratory and field. The observations on population density were recorded in and around Kolhapur city, Maharashtra, India. Population density was determined on randomly selected plants of curry leaf and acid lime (10 each) at weekly interval and recorded on the basis of number of larvae per plant for a period of two years (2006-2007).

RESULTS AND DISCUSSION

Natural enemies

During study (2003 - 2006), it was observed that the life stages of *P. p. polytes* were attacked by natural enemies. The eggs were attacked by hymenopteran parasitoid *Trichogramma chilonis* and the average number of parasitoids per egg was 4. The pupa was also found parasitised by *Pteromalus puparum* (Fig. 1& 2). The average number of *Pteromalus puparum* parasitoids was 120 per pupa. The puparium of Tachinid fly (Fig. 3 & 4) was also found in the dissected pupa of *P. p. polytes* along with pupae of *Pteromalus puparum*.



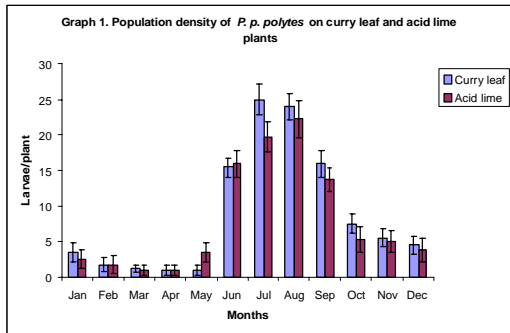
Plate : Parasitism in Pupa of *Papilio polytes polytes*.

Fig. 1. Parasitised pupa showing exist, 2. Parasitoid, *Trichogramma chilonis*, 3. Puparium of tachinid fly (in situ), 4. Parasitoid, Tachinid fly.

Both *Trichogramma chilonis* and *Pteromalus puparum* came out from egg and pupa of *P. p. polytes* by making exit holes, single in egg and three to four in pupa. The pupae were more parasitized than eggs and parasitism was

observed in the period of August to December. In field, various surveys were conducted to collect eggs and larvae during study and it was observed that ants are the major natural predators to destruct the eggs and pupae of *P. p. polytes*. It was also observed that Praying mantis and common garden lizards *Calotes versicolor* are the natural predators on larvae and pupae of species under study.

Population density. During the present study (2006-2007) it was found that the pest *P. p. polytes* is found throughout the year. The results on population density of *P. p. polytes* are presented graphically in Graph 1. The population density was at the peak during June to September i.e. in rainy season. The maximum population density was recorded with an average of 25 larvae/ curry leaf plant and 19.75 larvae/ acid lime plant in the month of July. The population density declined gradually till the end of May with an average population density of 24, 16, 7.5, 5.5, 4.5, 3.5, 1.75, 1.25, 1 and 1 larvae/ curry leaf plant respectively (Table 1).



On acid lime plant it was also declined till the end of April with an average of 22.25, 13.75, 5, 5.25, 3.75, 2.5, 1.8, 1 and 1 larvae/ acid lime plant respectively but in contrast to curry leaf plant, population density was increased in the

month May with an average of 3.5 larvae/ acid lime plant. The lowest average population was recorded in April and may on curry leaf plant (1 larva/ plant) and in March and April on acid lime plant (1 larva/plant). The data indicates that the curry leaf plants are more infested by the pest *P. p. polytes* and its population was highest during rainy season followed by winter and summer.

In the present study, it was found that ants are the predatory insects on eggs of *P. p. polytes*. The results shows similarity with Owen's (1971) findings, who reported more than 90% eggs of *Papilio demoleus* L. a closely related species to *P. p. polytes* are eaten by ants. According to Krishnamoorthy and Singh (1980) two species of parasitoids *Trichogramma chilonis* and *Telonomus spp.* are found in eggs of *P. polytes* and *P. demoleus*. During present study, only *Trichogramma chilonis* was found in the eggs of *P. p. polytes*. In the present study, the parasitoid *Pteromalus puparum* was found in the pupae of *P. p. polytes*. This result showed similarity with the findings of Rafi *et al.*, (1989), who reported hymenopteran parasitoid *Pteromalus puparum* is a parasitoid of *P. demoleus* pupae which is closely related species of *P. p. polytes*. In the present study the puparium of Tachinid fly was found in the pupa of *P. p. polytes* supporting the observations of Atwal (1976) who reported parasitism of tachinid fly *Erycia nymphalidaephaga* on *P. demoleus*. Rajashekhar (1955) reported that *P. polytes* were abundant during the month of March - November in India. More or less similar results were recorded in the present study. Roberts (2001) recorded occurrence of *P. polytes* is common during and after monsoon in Sindh and Punjab. The present investigations are almost similar to the findings of Robert (2001).

Table 1: Population density of butterfly *P. polytes polytes* on Curry leaf and acid lime plants.

Plants	Months											
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Curry leaf	3.5	1.75	1.25	1	1	15.5	25	24	16	7.5	5.5	4.5
Acid lime	2.5	2.25	1	1	3.5	16	19.75	22.25	13.75	5	5.25	3.75
	±1.29	±0.95	±0.5	±0.81	±0.81	±2.58	±3.10	±1.82	±1.82	±1.29	±1.29	±1.29

Mean of 4 observation/ month

± Standard deviation

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