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EMERGENCE PROFILE AND RELATIVE ABUNDANCE OF PARASITOIDS ASSOCIATED WITH INDIAN LAC INSECT, *KERRIA LACCA* (KERR)

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ABSTRACT

Relative abundance and emergence profile of parasitoids associated with Indian lac insect, *Kerria lacca* (Kerr) has been worked out. Fourteen species of parasitoids under 13 genera representing ten families were found associated with lac insect. Of these, *Aprostocetus (Tetrastichus) purpureus* (Cam.) and *Tachardiaephagus tachardiae* (How.) constituting 55.82 and 28.37%, respectively of the total population of parasitoids, were the most abundant. Among the beneficial fauna, only *Bracon greeni* Ashm. was of some significance, accounting for 5.37% of the total population. No significant differences in relative abundance and emergence pattern on the basis of variety, host and the location were observed but the two strains of lac insect showed some differences in relative abundance of the parasitoids.

KEY WORDS: *Kerria lacca*, parasitoids, abundance, emergence profile

THE losses in lac cultivation due to various insect predators and parasitoids are known to be far greater than what is usually met in other agricultural crops (Malhotra *et al.*, 1976). Earlier work done on relative abundance of parasitoids associated with lac insect provides fragmentary and inconsistant data (Srivastava *et al.*, 1976; Varshney, 1976; Srivastava and Mehra, 1980). The only study on seasonal abundance of insects associated with lac insect was carried out more than ten years ago (Srivastava *et al.*, 1984) and subsequently an early maturing variety of *kusmi* strain of lac insect has also been developed. Hence the present study was initiated with lac insect.

MATERIAL AND METHODS

The study was carried out on two strains, i.e., *rangeeni* and *kusmi* of lac insect during rainy season. *Rangeeni* was cultured on *palas (Butea monosperma* (Lam.) Taub.) while *kusmi* was reared on *kusum* (*Schleichera oleosa* (Lour.) Oken.) and *bhalia* (*Flemingia macrophylla* (Willd.) Prain) at institute plantation, Namkum. The early maturing variety of *kusmi* strain was cultivated on *kusum*, simultaneously at Namkum and Hesal (about 20 km from Namkum).

One metre equivalent lac bearing shoots were collected at random from the fields at weekly intervals, from the Ist week of September, the period coinciding with emergence of parasitoids irrespective of date of inoculation of the crops. The samples were kept separately in wooden boxes (20x20x30 cm) fitted with glass tubes and total number of each parasitoid species emerging from cages was recorded daily for 21 days. Thus at any time, observations from three boxes were recorded except for the first two and the last two weeks of observation period. Average values were used to analyse the data.

RESULTS AND DISCUSSION

Relative Abundance of Parasitoids

The data on abundance of parasitoids affecting lac insects (Table1) showed 14 species representing 13 genera and ten families. The incidence of beneficial fauna was only 7.78 per cent of the total parasitoids. Among the harmful parasitoids, *Aprostocetus* (*Tetrastichus*) *purpureus* (Cam.) was the most abundant species followed by *Tachardiaephagus tachardiae* (How.) and these together constituted 84.19 per cent of the population. *Parechthrodyinus clavicornis* (Cam.) and *Coccophagus tschirchii* Mahd., the other two harmful parasioids, were also present in significant numbers. *Bracon greeni* Ashm., a beneficial parasitoid alone was found in significant number and consituted 69.09 per cent of beneficial fauna. Other beneficial fauna of significance, found were *Eurytoma pallidiscapus* Cam., *Elasmus claripennis* Cam., and *Apanteles tachardiae* Cam. in that order.

No significant difference in relative incidence of different parasitoids was observed between the two varieties, hosts and locations. However, the two strains of lac insect, seemed to differ in this respect. *C. tschirchii* was the third most abundant parasitoid in *rangeeni* strain while it was negligible in *kusmi*. *Erencyrtus dewitzii* (Mahd.) also behaved similarly. Srivastava and Mehra (1980) have reported similar observations. Fluctuations in the number and relative abundance of beneficial fauna could be attributed to the fact that these are the parasitoids of predators of lac insect and any change in the incidence of predators affects the population of beneficial parasites also.

B. greeni which is the most abundant beneficial parasitoid at Ranchi (Bihar) was found in negligible number in Madhya Pradesh, whereas, *A. tachardiae* and *A. fakhrulhajiae* Mahd. outnumbered other parasitoids in that area (Sah and Das Gupta, 1983; Sah, 1988). Lack of significant differences in parasitism and relative abundance of different parasitoids reported in the present study is probably due to the fact that both locations fall within the same agroclimatic area and the broodlac used to grow lac cultures at both the places originated from the same source.

Emergence Profile of Parasitoids

Emergence pattern of *T. tachardiae* and *A. purpureus* which were the most abundant inimical parasitoids was similar. The emergence peaks of both coincided

Table 1.Relative abundance* of harmful parasitoids associated with lac insect (per metre shoot length)

Strain (variety) Host (location)	Aphelinidae	Encyrtidae			Eulophidae		Eupelmidae	Total
	Ct	Ed	Pc	Tt	Ts	Ap	Et	
Kusmi (early) *Kusum* (Namkum)	4.0 (1.15)	0.5 (0.14)	8.1 (2.34)	111.9 (32.27)	1.2 (0.35)	184.8 (53.29)	0.6 (0.17)	311.1 (89.71)
Kusmi (late) *Kusum* (Namkum)	3.1 (1.30)	- -	5.9 (2.47)	62.3 (26.07)	3.7 (1.55)	143.1 (59.87)	1.0 (0.42)	219.1 (91.67)
Kusmi (early) *Kusum* (Hesal)	2.8 (0.90)	0.3 (0.10)	16.0 (5.14)	97.7 (31.40)	5.3 (1.70)	171.1 (55.00)	3.9 (1.25)	297.1 (95.50)
Kusmi (late) *Bhalia* (Namkum)	- -	- -	11.1 (3.73)	70.2 (23.57)	- -	185.6 (62.32)	0.3 (0.10)	267.2 (89.72)
Rangeeni *Palas* (Namkum)	29.6 (12.32)	11.6 (4.83)	3.7 (1.54)	65.0 (27.05)	2.3 (0.96)	116.4 (48.44)	0.3 (0.12)	228.9 (95.26)
Total	39.5 (2.75)	12.4 (0.86)	44.8 (3.12)	407.1 (28.37)	12.5 (0.87)	801.0 (55.82)	6.1 (0.43)	1323.4 (92.22)

* Figures in parentheses represent per cent values

AP- *Aprostocetus* (*Tetrastichus*) *purpureus*; Ct- *Coccophagus tschirchii*;
Ed - *Erencyrtus dewitzi*; Et- *Eupelmus tachardiae*; Pc- *Parechthrodryinus clavicornis*;
Ts- *Tachardiaephagus somervilli*; Tt- *T. tachardiae*

and were recorded at 2nd, 5th, 8th, 11th, and 14th weeks after beginning of observations. (Figs. 1, 2, 3 & 4). The higher magnitude of first few peaks indicated increased abundance of the parasitoids. The gradual decrease in height of the peaks and increasing time interval between two successive peaks was the result of onset of the winter. Srivastava *et al.* (1984) have reported only two peaks, one at the time of sexual maturity and another at crop maturity stage of lac insect. Differences in the number of discernible peaks is due to better resolution as the data in the present study have been analysed on weekly basis instead of fortnightly interval.

If peaks are any indication of the life period of the parasitoids, the lac insect may have been parasitised after less than a month of crop inoculation so that the emergence of parasitoids could begun in the first week of September, i.e., when lac insects were one and half months old. The high flattened peak in case of *rangeeni* strain of lac insect (Fig. 5) is indicative of overlapping generations and

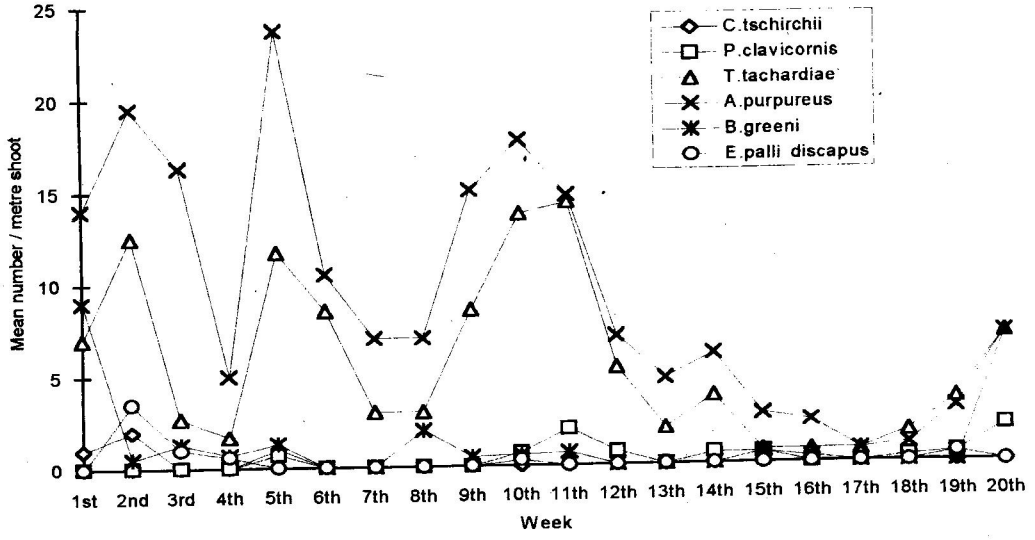

Fig.1 Weekly emergence profile of parasites associated with lac insect during winter season crop of *kusmi* (early) strain cultured on *S.oleosa* at Namkum

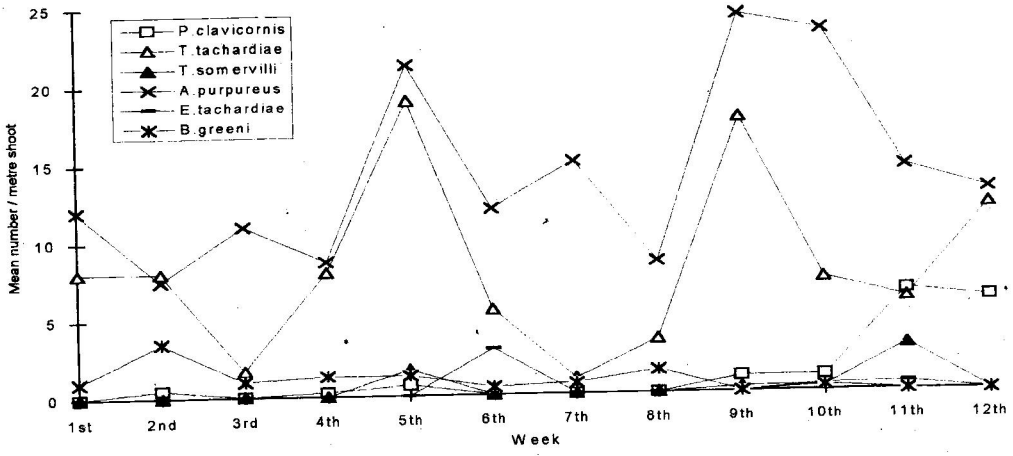

Fig.2 Weekly emergence profile of parasites associated with lac insect during winter season crop of *kusmi* (early) strain cultured on *S.oleosa* at Hesal

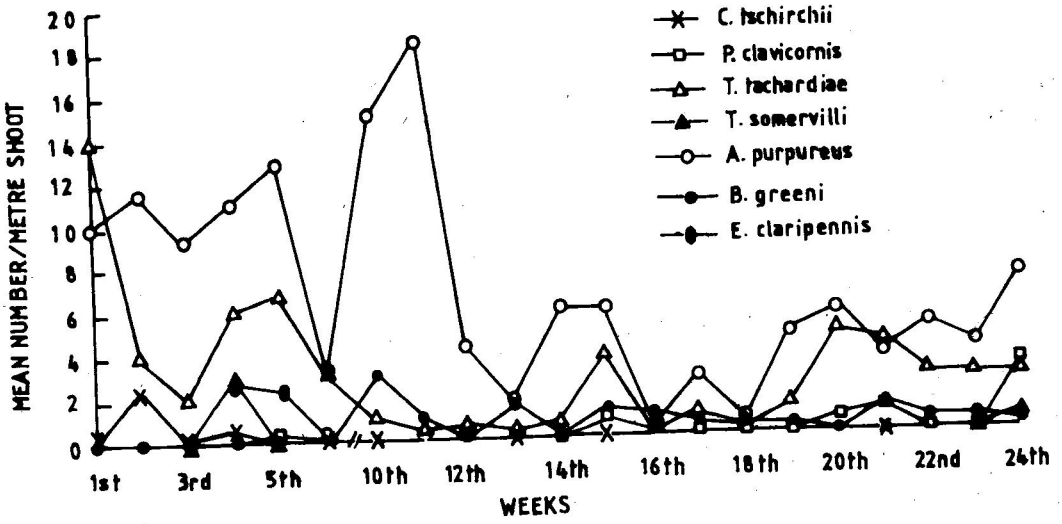

Fig.3 Weekly emergence profile of parasitoids associated with lac insect during winter season crop of *kusmi* (latu) strain cultured on *S. oleosa* at Namkum

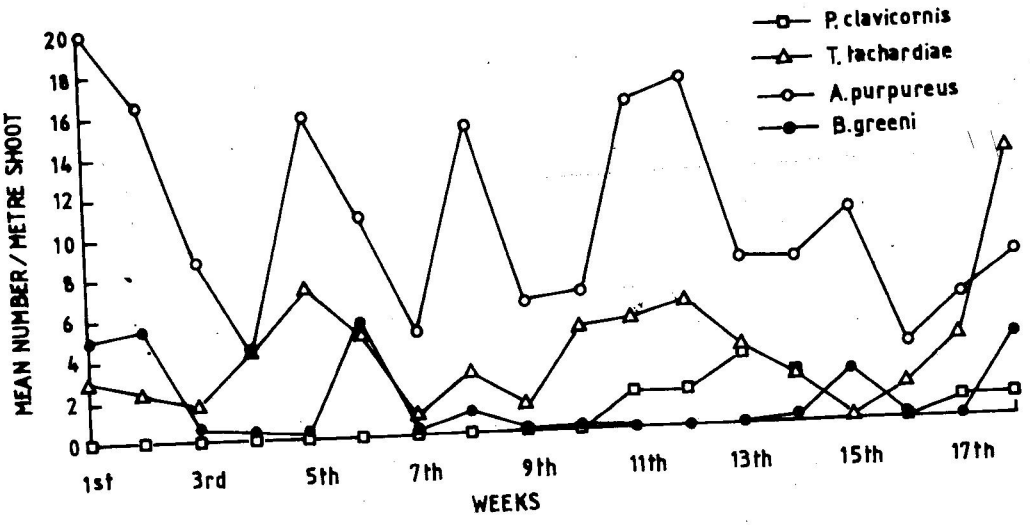

Fig.4 Weekly emergence profile of parasitoids associated with lac insect during winter season crop of *kusumi* (later) strain cultured on *F. macrophylla* at Namkum

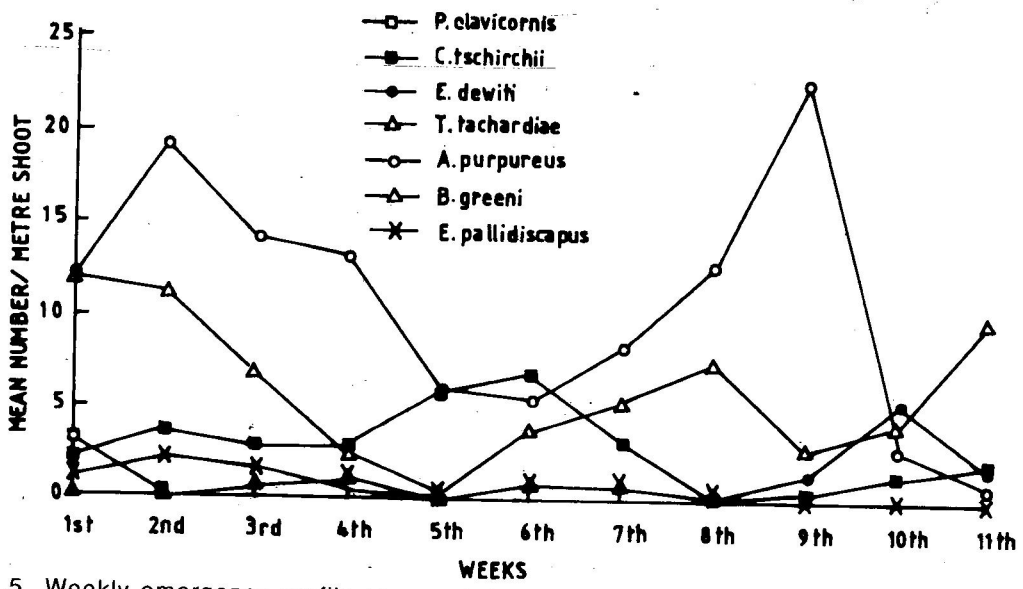

Fig.5 Weekly emergence profile of parasitoids associated with lac insect during winter season crop of *rangeeni* strain cultured on *B. monosperma* at Namkum

higher incidence of the parasitoids. The emergence profile of parasitoids provides basic ecological information which could be effectively used in improving pest management techniques in lac culture.

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