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Paratrechina longicornis (Hymenoptera: Formicidae), a predator of *Helicoverpa armigera* (Lepidoptera: Noctuidae) eggs

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Several ant species are reported to be important predators of insect pests (Way and Khoo, 1992; Veeresh *et al.*, 1995). In East Africa, ants were found to be important natural enemies of *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) (Van den Berg and Cock, 1993a, b), one of the most serious pests in the Old World (Reed and Pawar, 1982). From India, only four ant species have been reported as predators of *H.armigera: Cataglyphis bicolor* (Fabricius) (Khan and Sharma, 1972), *Dorylus labiatus* Shuckard (Mehto *et al.*, 1986), *Tapinoma melanocephalum* (Fabricius) (Musthak Ali, 1981) and *Solenopsis geminata* (Fabricius) (Dhandapani *et al.*, 1994). In addition, Manjunath *et al.* (1976) reported *Camponotus sericeus* (Fabricius) as a predator of *Heliothis peltigera* (Denis & Schiffermüller) (Lepidoptera: Noctuidae), and it is likely that this species also preys on *H.armigera*.

We observed two ant species, *Pheidole* sp. and *Paratrechina longicornis* (Latreille) carrying away *H.armigera* eggs from pigeonpea (*Cajanus cajan* (L.) Millspaugh) plants in the greenhouse. Species belonging to the genus *Pheidole* are reported as egg predators of several insect pests, including *H.armigera* (Way and Khoo, 1992). The present study evaluated *P.longicornis* as an egg predator of *H.armigera* on pigeonpea.

The experiments were carried out at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), located near Hyderabad, Andhra Pradesh, in a controlled environment chamber (26 ± 2^{0}C) where *P.longicornis* was regularly found during the summer months. No other predators were found in the chamber. Pots with up to four greenhouse grown pigeonpea (cultivar ICPL 87) plants were placed in the chamber and *H.armigera* eggs (<24h old) were artificially attached to each plant using water and a camel hair brush. A replication consisted of ten eggs on leaves, pods, buds or flower-petals. Different numbers of replications were used for each plant structure (see Table 1). One plant in each pot was kept as control and similarly infested with eggs. Ants were prevented from climbing the control plant with a barrier of insect glue (Tanglefoot, Tanglefoot Company, Michigan, USA) around the stem. After 24 h, the remaining eggs on each plant were counted. Differences in the mean number of missing eggs were compared between plant structures and between test and control plants using Student's t-test.

P.longicornis were observed foraging on pigeonpea stems and leaves, and carrying away *H.armigera* eggs. No individuals were observed on buds, flowers or pods. This is the first

Table 1. Number of *Helicoverpa armigera* eggs removed from different pigeonpea plant structures by *Paratrechina longicornis* (n = number of replications)

Plant structure	test plant		control plant		
	n	($\bar{x}$ ± SE)	n	($\bar{x}$ ± SE)	p (0.05)
leaves	22	5.4 ± 0.95 a	8	0.9 ± 0.35 a	*
pods	14	1.2 ± 0.59 b	6	0.0 ± 0.00 b	n.s.
buds	17	1.7 ± 0.43 b	8	0.6 ± 0.38 ab	n.s.
flower-petals	14	0.8 ± 0.43 b	6	0.2 ± 0.17 ab	n.s.

* means within a column followed by different letters are significantly different (p<0.05; Student's t-test)

report of *P.longicornis* attacking eggs of *H.armigera*. This species has been reported as an egg predator of the coconut caterpillar *Opisina arenosella* Walker (Lepidoptera:Xyloryctidae) in Sri Lanka (Way *et al.*, 1989) and was found to be associated with different sap sucking insects in India (Chelliah and Basheer, 1965; Rawat and Modi, 1969; Venkataramaiah and Rehman, 1989)

Significantly more eggs ($p<0.05$) were missing from leaves than from other plant structures on the test plants (Table 1). Similarly, on the control plants, from which predators were excluded, the largest number of eggs were lost from leaves. The reason for both higher egg predation and greater non-predator egg loss from leaves may be related to the low concentration of glandular trichomes on leaves relative to other plant structures. The exudates produced by these trichomes provide a good adhesive for eggs, but may interfere with ant searching behaviour.

The green surfaces of pigeonpea are covered with at least five types of glandular and nonglandular trichomes (Shanower *et al.*, 1996). The density of glandular trichomes is much greater on buds and pods than on leaves. Leaves are covered with a dense mat of short, nonglandular trichomes, which are appressed to the leaf surface (Shanower *et al.*, 1996) *P.longicornis* appeared to avoid foraging on the green portions of the reproductive structure which are covered with glandular and erect, nonglandular trichomes. Ant movement, and hence foraging behaviour, was easier on leaves since the ants can walk on top of the appressed, nonglandular trichomes. It is widely recognized that plant trichomes not only mediate the behaviour of phytophagous insects, but can also have negative effects on arthropod natural enemies (Boethel and Eikenbarry, 1986). The dense layer of trichomes on pigeonpea reproductive structures also contributes to the low occurrence of the egg parasitoid *Trichogramma chilonis* Ishii (Hymenoptera: Trichogrammatidae) in *H.armigera* eggs on this crop (Shanower *et al.*, 1996). The difficulty in accessing eggs and small larvae of *H.armigera* which are usually found on the reproductive structures, may also partly explain the low population of other predatory groups such as chrysopids, coccinellids and anthocorids in pigeonpea (Duffield, 1995).

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KEY WORDS : *Paratrechina lognicornis*, *Helicoverpa armigera*, *pigeonpea*, egg predator

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