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Research Note

Prevalence, prey preference and predatory potential of *Paederus fuscipes* Curtis and *Ophionea* sp. in rice

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ABSTRACT: **Field-cum-laboratory studies were carried out on the prevalence, prey preference and predatory potential of staphylinid beetle, *Paederus fuscipes* Curtis, and carabid beetle, *Ophionea* sp., in rice. The predatory beetle population was significantly higher in *rabi* compared to that of *kharif* season and *P. fuscipes* population was higher than that of *Ophionea* sp. in both the seasons. Within the season, both the beetles were significantly more abundant at reproductive stage compared to vegetative stage. The two predators preferred brown planthopper and white backed planthopper nymphs to other prey species tested. The predatory potential was 9.5 BPH nymphs and 7 WBPH nymphs per day for *P. fuscipes*, and 10.2 BPH nymphs and 9 WBPH nymphs per day for *Ophionea* sp.**

KEY WORDS: Carabid, predatory potential, preference, prey, rice, staphylinid beetle.

Rice suffers heavy losses (18.6%) due to infestation by insect pests and diseases accounting to monetary loss worth 55120 million rupees (Madhuban Gopal *et al.,* 2006). Integrated pest management (IPM) is the best approach in the present context to check pest damage and to sustain yields without any adverse impact on the environment. Biological control forms an important component of the IPM. In rice, polyphagous beneficial arthropod predators can effectively reduce the populations of some insect pests (Barrion *et al.,* 1991). The present study was conducted to know the prevalence, prey preference and predatory potential of two commonly occurring predators, *viz.,* (staphylinidae) , *Paederus fuscipes* Curtis and (carabidae), *Ophionea* sp.

Field-cum-laboratory studies were conducted at Directorate of Rice Research, Hyderabad, during *rabi* and *kharif* seasons of 2005. Population of *P. fuscipes* and *Ophionea* sp. was assessed in the field sown with cv Taichung Native 1 (TN 1). One square meter area was marked at nine spots in the field, each representing a replication. Observations on the number of predators present were recorded at weekly intervals. Insect pests found in the field included brown plant hopper, green leaf hopper and leaf folder.

The prey preference was evaluated under both choice and no choice tests in the laboratory. In choice tests, mixed population of different prey species, *viz.*, brown planthopper (BPH) adults, BPH

nymphs, white backed planthopper (WBPH) adults, WBPH nymphs, green leafhopper (GLH) adults, GLH nymphs, second and third instar larvae of leaf folder (five each) were provided in a glass vial (15x2.5cm) containing one adult predator and each such vial represented a replication. There were ten replications. After 24h of release, all the prey species were removed and number consumed was counted. Fresh prey was provided every day for five days. In no choice tests, ten field collected adults of both *P. fuscipes* and *Ophionea* sp. were placed individually in glass vials (9.5x2cm) and each vial was considered as one replication. Ten individuals of each prey species were provided in each vial and the number consumed was recorded after 24h. The beetles were pre-starved for 4h before providing the prey. Fresh individuals of prey were provided every day for up to five days. The prey preference was evaluated based on their predatory potential.

Table 1. Seasonal prevalence of predatory beetles in rice

Stages	Mean number per square meter		t - test
	P. fuscipes	*Ophionea* sp.	
Kharif season			
Vegetative stage	3.0 ± 0.75#	1.66 ± 0.35	1.17*
Reproductive stage	7.83 ± 0.36	6.67 ± 0.56	0.9NS
t-test	3.26**	5.67**	
Rabi season			
Vegetative stage	6.55 ± 0.77	4.22 ± 0.69	0.93NS
Reproductive stage	14.16 ± 1.5	9.33 ± 0.66	8.3**
T-test	3.42**	3.64**	

* indicates t - value statistically significant at P = 0.05; ** indicates t – value statistically significant at P = 0.01; NS= Not significant; # = Mean ± SE

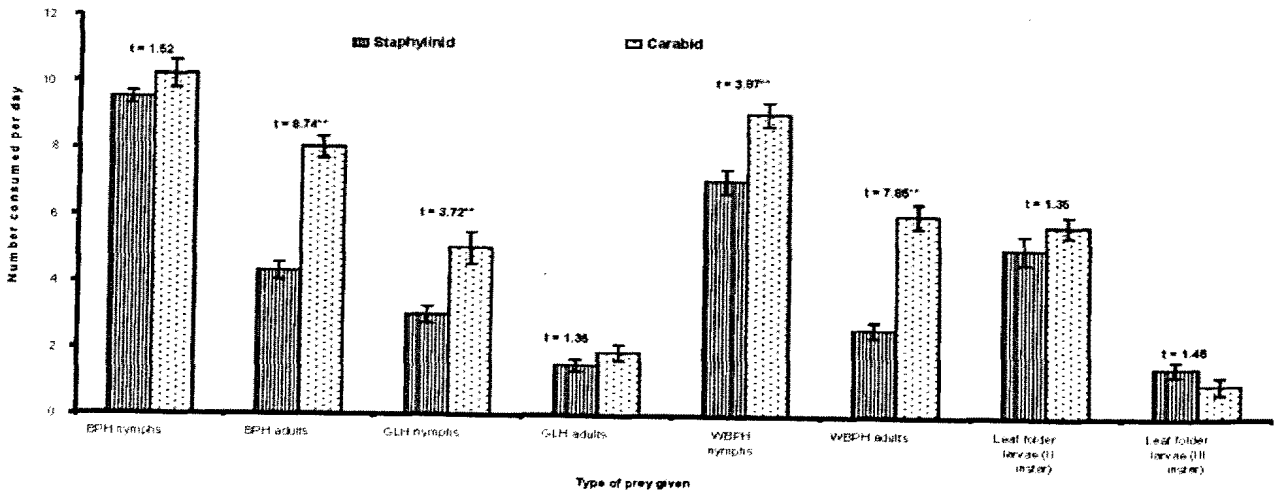

Fig. 1. Predatory potential of *Paederus fuscipes* and *Ophionea* sp. (Vertical bars represent standard error of mean ; ** indicates t- value statistically significant at P = 0.01)

The number of predatory beetles was significantly higher in *rabi* (4.22 to 14.16 per sq.m) compared to *kharif* season (1.66 to 7.83 per sq.m). The population of *P. fuscipes* was significantly higher (3 to 14.16 per sq.m) than that of *Ophionea* sp. (1.66 to 9.33 per sq.m) at all the stages of crop growth in both seasons (Table 1). Within the season, number of predatory beetles was significantly higher at reproductive stage (6.67 to 14.16 per sq.m) than at vegetative stage (1.66 to 6.55 per sq.m) conforming to the observation of Luong (1987).

In both choice and no-choice tests, *P. fuscipes* preferred BPH nymphs> WBPH nymphs > leaf folder II instar larvae> BPH adults> GLH nymphs> WBPH adults > GLH adults > leaf folder III instar larvae, while the order of preference for *Ophionea* sp. was BPH nymphs> WBPH nymphs> BPH adults> WBPH adults> leaf folder larvae (second instar)> GLH nymphs> GLH adults> leaf folder larvae (third instar).

In the no-choice tests, the predatory potential of *P. fuscipes* was 9.5 BPH nymphs and 7 WBPH nymphs per day (Fig. 1). Consumption of leaf folder larvae, both nymphs and adults of GLH, and only adults of BPH and WBPH was relatively less (1.5 to 5.0 per day). The mean prey consumption of *Ophionea* sp. was 10.2 BPH nymphs, 9 WBPH nymphs, 8 BPH adults and 6 WBPH adults (Fig. 1). Leaf folder larvae and GLH were consumed in less numbers (1.0 to 5.7 per day). Rajendran and Gopalan (1988) reported predatory potential of *P. fuscipes* as 8.7 adults of BPH, 8.3 adults of WBPH and 8.4 adults of GLH per adult per day. Luo *et al.* (1990) reported *P. fuscipes* consumed a mean number of 4.2 to 6.1 adults of WBPH per day. Though the predation of *P. fuscipes* on the larvae of leaf folder was reported, the number consumed was not quantified (Mun and Yuen, 1982).

The study indicated that both the predators preferred BPH and WBPH nymphs to other prey species. Their predatory potential indicated the scope for utilizing them to effectively bring down the population of planthoppers and also leaf folder to a certain extent. Hence, conservation of natural populations of these predators should receive special emphasis in rice IPM.

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