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Feeding potential of *Mallada boninensis* (Okamoto) [Neuroptera : Chrysopidae] on aphids and neonate noctuids

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During the last two decades or so, the role of chrysopids as a predator of pest of different crops has been appreciated all over the world. Several Chrysopid species are included among the most important aphidophagous predators. The most of adult chrysopids are non predatory, but their larval instars are predatory in nature. The influence of prey on the development of insect predator has been evaluated for several predatory species (Tauber and Tauber, 1987). They attack and consume a wide variety of pests including aphids, chinch bugs, mealy bugs, scales, whiteflies, leaf hoppers, lepidopterous eggs and larvae and mites (Krishnamoorthy and Mani, 1989; Mani and Krishnamoorthy, 1999; Canard, 2001; Sujatha and Singh, 2003; Syed *et al*., 2008; Alasady *et al*., 2010). Among these, chrysopids have been recorded as important natural enemies in suppressing especially soft bodied insects and lepidopterous pests (Canard *et al*., 1984). Narindah and Indrayani (1989) recorded *Mallada boninensis*(Okamoto) on *Helicoverpa armigera* infesting cotton in Indonesia for the first time. The chrysopids have emerged as strong and potent bio-control agents and the result oriented researches are further needed to conclusively ascertain their efficiency in the integrated pest management program. The natural population of this bio agent in the field is not adequate to suppress the pest population of their own. It is concluded that biological control would be best achieved by mass rearing and seasonal colonization of the aphid lion, *M. boninensis* for which the evaluation of its feeding potential is a prerequisite. Hence, the present investigations were taken up to know the feeding potential of *M. boninensis* on nymphs of aphids and neonates of lepidopteran pests for better pest management.

The present investigations were carried out in the parasite breeding laboratory of Entomology Section, College of Agriculture, Nagpur in the insectary premises during the year 2011-2012. The rearing of the host insect and predator has been done under controlled room temperature and relative humidity conditions ranging between 24 ± 2°c and 60 ± 5% respectively, for knowing the feeding potential of predator on different hosts. The initial culture was obtained from National Research Centre on Citrus (NRCC), Nagpur and it was further multiplied on the standard laboratory host, the eggs of *Corcyra cephalonica* Stainton. The aphids *viz., Aphis craccivora, Aphis gossypii* and *Rhopalosiphum maidis* were collected from the field of Department of Entomology, College of Agriculture, Nagpur from different crop hosts *viz.,* cowpea, cotton, sorghum. The crops sown plots were maintained untreated and the aphids were collected daily from those plots with the help of camel hair brush in plastic vials

which were further utilized for feeding. The larvae and pupae of *Helicoverpa armigera* Hub., *Spodoptera litura* Fab. and *Earias vitella* (Fab.) were collected from biocontrol laboratory of Central Institute of Cotton Research (CICR), Nagpur. These larvae and pupae were reared in the laboratory to obtain F1 progeny and neonates thus obtained were utilized for feeding.

The clean and well sterilized plastic vials were utilized for rearing the larvae of *M. boninensis* on different hosts. A set of ten plastic vials were used for a treatment which was replicated three times. In each plastic vial a single egg of *M. boninensis* with known age were transferred. After hatching, the individual larva was provided with known number of fresh host every day, hosts were provided twice, once during morning and evening. The number of prey consumed and non-consumed were recorded as daily feeding potential. The data was then subjected to one way analysis of variance (ANOVA) under completely randomized design with three replications for determining the 5% LOS (Gomez and Gomez, 1984).

The present experiment was conducted with a view to study the effect of various hosts namely nymphs of *Aphis craccivora*, nymphs of *Aphis gossypii*, nymphs of *Rhopalosiphum maidis*, neonate of *Helicoverpa armigera*, neonate of *Spodoptera litura*, neonate of *Earias vitella* and eggs of *Corcyra cephalonica* on the feeding potential of *Mallada boninensis*.

Influence of *different* prey hosts on feeding potential of *M. boninensis*:

In the present study, there was a significant difference in feeding potential and larvae consumed with respect to aphids and noctuids. The high consumption was observed with respect to aphids than noctuids. Among the aphids, the nymphs of *A. gossypii* (265.04 nymphs/larva) were most preferred followed by *R. maidis* (165.08 nymphs/larva) and *A. craccivora* (162.73/larva). The treatment with *S. litura* was found to be superior (79.93 neonates/larva) over *E. vitella* and *H. armigera*, where the feeding potential was 71.11 neonates/larva and 66.14 neonates/larva, respectively (Table 1 and Fig. 1).

The feeding potential of *M. boninensis* with eggs of *C. cephalonica* was recorded superior to all hosts (695.97 eggs/larva). Joshi and Yadav (1990) reported that the feeding potential of *M. boninensis* was found to be 628.75 eggs/larva on eggs of *C. cephalonica*. Unnikrishnan (1995) and Ramkumar *et al.* (2005) reported that the feeding potential of *M. boninensis* to the extent of 700 to 730 and 724.70 eggs/larva, respectively, when reared on eggs of *Corcyra cephalonica*. Nehare *et al.* (2004) reported that the feeding potential of *M. boninensis* was 471.60, 445.00 and 734.66 prey hosts/larva on *Aphis gossypii*, *A. craccivora* and inactivated eggs of *C. cephalonica* respectively, at 26 ± 2°C temperature and 65 ± 5 percent relative humidity.

The feeding potential of *M. boninensis* on *Aphis gossypii* was 265.04 nymphs/larva, which is in line with the reports of Kabissa *et al.* (1995), where the feeding potential of *M. desjardinsi* on nymphs of *Aphis gossypii* was 189.00 ± 4.74 prey hosts/larva. The present results on feeding potential of *M. boninensis* with respect to *Aphis craccivora* slightly varies from Sirimachan *et al.* (2005), who reported that the predatory potential of first, second and third instar *M. boninensis* larvae on nymphs of *Aphis craccivora* was to the extent of 18.33 ± 7.33, 44.85 ± 16.80 and

223.08 ± 77.23, respectively at 25 ± 2°C temperature and 75 ± 5 percent relative humidity.

CONCLUSION

The study revealed that the feeding potential of *M. boninensis* was undoubtedly high on the factitious host, eggs of *Corcyra cephalonica* and was found most suitable for rearing *M. boninensis.* However, the field hosts namely nymphs of *Aphis gossypii, Aphis craccivora* and *Rhopalosiphum maidis* also have good effect on its development and its multiplication. Among the noctuids, *S. litura* was better preferred than that of *H. armigera* and *E. vitella* which can form a substitute for rearing of *M. boninensis* in the laboratory.

Table 1: Influence of different prey hosts on feeding potential of *M. boninensis* (prey hosts/larva)

Treatments	Instar wise feeding potential of *Mallada boninensis* (preyhosts/larva)			
	I instar	II instar	III instar	Total
Nymphs of *Aphis craccivora*	18.10	52.56	92.07	162.73
Nymphs of *Aphis gossypii*	31.71	88.28	145.05	265.04
Nymphs of *Rhopalosiphum maidis*	13.80	38.57	112.71	165.08
Neonate of *Helicoverpa armigera*	11.53	22.42	32.19	66.14
Neonate of *Spodoptera litura*	15.04	27.38	37.51	79.93
Neonate of *Earias vitella*	13.20	21.11	36.80	71.11
Eggs of *Corcyra cephalonica*	140.47	228.58	326.92	695.97
S.E.(m)±				2.6
C.D. Values (0.05)				7.96

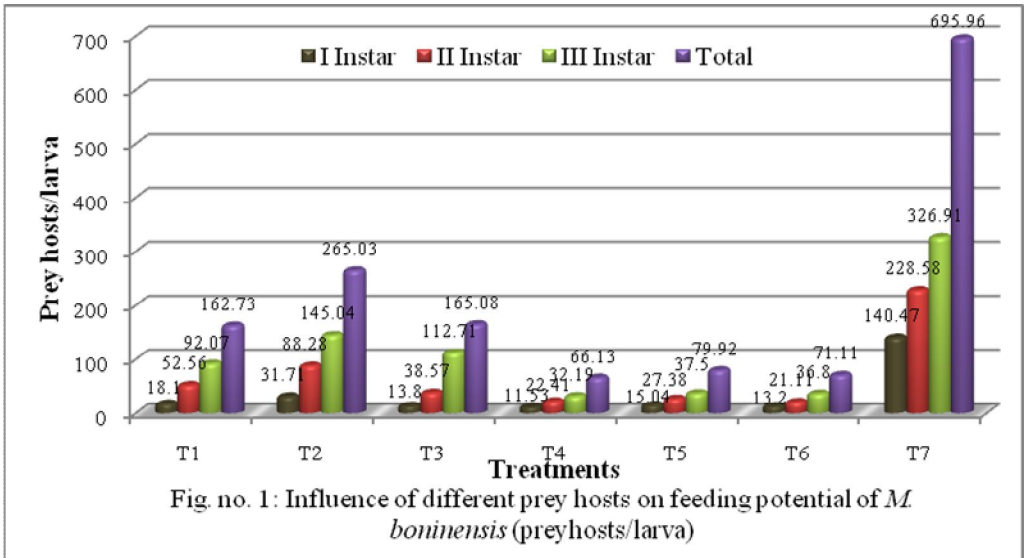

Fig. no. 1: Influence of different prey hosts on feeding potential of *M. boninensis* (preyhosts/larva)

T1: Nymphs of *Aphis craccivora* T2: Nymphs of *Aphis gossypii* T3: Nymphs of *Rhopalosiphum maidis*
T4: Neonate *of Helicoverpa armigera* T5: Neonate of *Spodoptera litura* T6: Neonate of *Earias vitella*
T7: Eggs of *Corcyra cephalonica*

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