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EFFICACY OF *Trichogramma* SPECIES AGAINST *LEUCINODES ORBONALIS* GUEN. UNDER LABORATORY CONDITIONS

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The vegetable brinjal, *Solanum melongena* Linn. (Solanaceae), is often referred to as eggplant or aubergine in other regions of the world and is grown for its fleshy fruit. *S. melongena* is a delicate, tropical perennial often cultivated as a tender or half-hardy annual in temperate climates. The Eggplant Fruit and Shoot Borer or Brinjal Fruit and Shoot Borer (FSB) is a moth species in the genus Leucinodes. It is found throughout the tropics in Asia and Africa and is a minor pest in the Americas.. Larvae bore inside an eggplant fruit and feed until they pupate. Fruit feeding is the major cause of damage. The larvae may also bore into tender shoots causing wilting and dieback of the branch terminals. This reduces the fruit-bearing capacity of plant. Larval stage of this pest causes the damage ranging from 11 to 93 per cent in India. The excessive dependence on pesticide usage threatens the health of farmers and consumers, besides making brinjal fruit more costly to consumers. The insect also develops resistance to these chemicals and making it more difficult to control. Keeping the above facts in view, biological control of this pest which fits into IPM strategy which will be much safe, cheap as well as selective for control of brinjal shoot and fruit borer.

Experiment on parasitization of different age eggs of *L. orbonalis* by *Trichogramma* spp was conducted at Biocontrol laboratory, Entomology section, College of Agriculture, Nagpur during 2011-12 in FCRD design with two factors and three replications. Infested brinjal fruits were collected from field and the larvae of *L. orbonalis* were reared in plastic containers by providing the natural diet till the pupal stage. Pupae of *L. orbonalis* thus obtained from soil kept in cage which were kept in large sized plastic jars and then emerged adults were transferred into oviposition chamber, for mating and oviposition. Adults of *L. orbonalis* were released into oviposition chamber by providing 40 percent honey diet in hanging cotton swab and folded centurary paper for oviposition. Upper opening of oviposition chamber was closed by muslin cloth with rubber band. All these materials were disinfected by using Sodium hypo chloride 0.05 per cent before the experiment. Eggs of *L. orbonalis* having 24, 48 and 72 hrs old age were exposed to two gravid females of *Trichogramma* spp. twenty eggs of each of the ages were exposed to the parasitoid. The same set was replicated thrice. The desired size empty cards were smeared with gum and required quantity of eggs i.e. 20 eggs on each card were sticked on them. These cards were then kept in the polythene bags (14 x 22 cm). For identification of females of *Trichogramma* spp. a strip of untreated Corcyra eggs were placed in separate polythene bags in which a strip of parasitized trichocard was inserted. The adults of *Trichogramma* spp. which emerged out from the eggs were observed. The females after mating and lapse of waiting period were attracted towards the eggs of Corcyra for oviposition, such females were picked up with fine camel brush and two females were placed into each polythene bag containing the *L. orbonalis* eggs of different ages. In this way *L. orbonalis* eggs were exposed to two gravid females of *T. chilonis* and *T. japonicum* under laboratory condition. The observations on parasitized eggs of *L. orbonalis* of different ages were recorded and per cent parasitization was calculated.

Effect of *Trichogramma* spp. on percent parasitization of *L. orbonalis* eggs (Factor "A") : The data as regards the host egg preference presented in table indicated that the eggs of L. orbonalis were parasitized by *Trichogramma* spp. The maximum per cent parasitization to the extent of 62.78 per cent was observed by *T. chilonis* which was significantly higher as compared to per cent parasitization of *T. japonicum* (53.27 per cent). The present findings are similar with results of (1) wsho reported that the parasitoids preferred freshly laid fruit and shoot borer eggs. Parasitism rates ranged from 66 to 78 per cent.

Table-1 : Efficacy of *Trichogramma* spp. and age of *L. orbonalis* eggs on per cent egg parasitization.

Treatment	Interaction (AXB)			Factor 'A'
	24hrs	48hrs	72hrs	
T. chilonis	83.33 (66.26)	63.33 (52.74)	41.67 (40.16)	62.78 (53.06)
T. japonicum	70.00 (57.00)	51.67 (45.97)	38.33 (38.16)	53.27 (47.04)
Factor 'B'	76.67 (61.63)	57.50 (49.36)	(40.00) 39.16	
	Factor 'A'	Factor 'B'	Interaction AXB	
F test	Sig	Sig	N.S.	
SE(M) ±	1.69	2.07	2.92	
CD at 5%	5.20	6.37		

(Figures in parentheses are arc sin transformation)

Effect of *Trichogramma* spp. on per cent parasitiza tion of different age of *L. orbonalis* eggs (Factor "B") : The data presented in the table revealed that age of the *L. orbonalis* eggs significantly influenced the parasitization by *Trichogramma* spp. Among the different age groups, the maximum per cent parasitization was observed in 24 h old eggs (76.67 per cent) followed by 48 h old eggs (57.5 per cent) and minimum per cent parasitization was observed in 72 h old eggs (40.00 per cent). All these treatments were significantly superior over each other. These results are comparable with the findings of Tiwari and Khan (2003) who reported that freshly laid eggs (0 hr old) of Spilosoma obliqua were most preferred with mean per cent parasitization of 71.03 while 24 and 48 h old eggs had insignificant differences regarding parasitism level.

Interaction effect of *Trichogramma* spp. and age of L. orbonalis eggs on percent parasitization (Factor AxB) : The results presented in table indicated that interaction effect of *Trichogramma* spp. and age of *L. orbonalis* eggs was found to be non significant. Among all treatment combinations, 24 h old eggs of *L. orbonalis* was most preferred by *T. chilonis* which recorded 83.33 per cent parasitization and was followed by *T. japonicum* at 24 h old eggs of *L. orbonalis* (70.00 per cent). Whereas the remaining treatment combinations viz., T. chilonis (48 h), *T. japonicum* (48 h), *T. chilonis* (72 h) and *T. japonicum* (72 h) recorded parasitization in the range of 63.33 to 38.33 per cent.

CONCLUSION

In present study the efficacy of *Trichogramma* spp. against *L. orbonalis* under laboratory conditions recorded significant results. In present findings *T. chilonis* effectively parasitized the eggs of *L. orbonalis* (62.78 per cent) compared to *T. japonicum* (53.27 per cent). In contrast the parasitization of eggs of L. orbonalis by Trichogramma spp. was decreased with increased age of eggs. It was found to be maximum in 24 hrs age eggs of *L. orbonalis* (76.67 per cent) followed by 48 hrs (57.5 per cent) and 72 hrs (40.00 per cent).

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