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Paralysis and parasitisation potential of *Bracon hebetor* on various Lepidopteran hosts

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ABSTRACT

Bracon hebetor is a Lepidopteran parasitoid which is used in IPM program as biological control agents. *Corcyra cephalonica* is fictitious host for mass rearing of *B. hebetor* in laboratory, rest hosts reared on their respective hosts i.e. *Corcyra cephalonica, Plodia interpunctella, Ephestia kuehniella* were reared on wheat flour, *Galleria mellonella* on its artificial diet, *Helicoverpa armigera* on chickpea pods, *Earias vitella* on okra fruits, *Spodoptera litura* and *Spodoptera littoralis* on castor leaves. The results of this study showed that the paralysis and parasitisation potential of *B. hebetor* were found higher on *C. cephalonica* followed by *G. mellonella, E. kuehniella, P. interpunctella* while it was shortest on *S. litura* and *S. littoralis*.

Key words: *Bracon hebetor*, Lepidopteran hosts, Paralysis, Parasitisation.

Biological control of insect pest is an eco-friendly, economic and safest approach in integrated pest management. *Bracon hebetor* Say (Hymenoptera: Bracon idae) is a highly polyphagous, gregarious, idiobiont and cosmopolitan ecto-parasitoid of various species of order Lepidoptera including *C. cephalonica*, *Sitotroga cerealella*, *G. mellonella*, *H. armigera* and *S. litura* (Dabhi *et al*., 2013; Mansour and Saber, 2017). For success of any biological control programs, it is also essential to understand the association of host-parasitoid and reproductive performance of parasitoid. In view of its potential importance to biological control programmes, an attempt was made in the present study to determine the suitable host for mass culture of *B. hebetor*.

Initial culture of *B. hebetor* and its hosts *C. cephalonica, P. interpunctella, E. kuehniella and G. mellonella* were collected from Biocontrol laboratory, Indian agricultural research institute, New Delhi, India, while rest hosts *H. armigera, E. vitella, S. litura* and *S. littoralis* have been collected from their respective host plants from farmer fields. *Bracon hebetor* and their hosts were reared in BOD at 27 ± 1°C, 65 ± 5% RH and 14L: 10D hrs.in laboratory on their respective hosts and host plants. 20-25 days old host larvae with 40 density of each species have been placed in a petri plates (90 mm diameter) and released mated females of *B. hebetor* for 24 hours for parasitization (Dabhi *et al*., 2013; Alam *et al.,* 2016). The parasitized hosts were isolated from petri plates and then percent parasitism and paralysis of each host species has been recorded. The experiments were replicated for three times for confirmation of results.

Our experiment showed that all selected insect hosts in this experiment were accepted by the *B. hebetor* female to paralysis and oviposition. The highest frequency of paralysis and percent parasitism were found on *C. cephalonica* followed by *G. mellonella, E. kuehniella, P. interpunctella* while it was shortest on *S. litura* and *S. littoralis*. However, a significant difference was found in paralysis and oviposition on various insect host species ($F = 136.65$; $df = 7, 23$; $P = 0.00$) and ($F = 143.87$; $df = 7, 23$; $P = 0.00$) (Fig. 1). Before oviposition, the adult female paralyze their host larvae by injecting the venom through the host cuticle with the ovipositor and lay eggs on or near body surface of paralyzed host larvae (Ghimire, 1991). In the present study, *Bracon hebetor* female were able to paralyze and parasitize to all host species which were offered to them. This study showed a higher paralyzes and percentage parasitism was found of pyralid (*C. cephalonica, E. kuehniella, P. interpunctella and G. mellonella*) host larvae compared to noctuid (*H. armigera, E. vitella, S. litura and S. littoralis*) host species. These results are in agreement with the earlier work by Heimpel *et al.* (1997).

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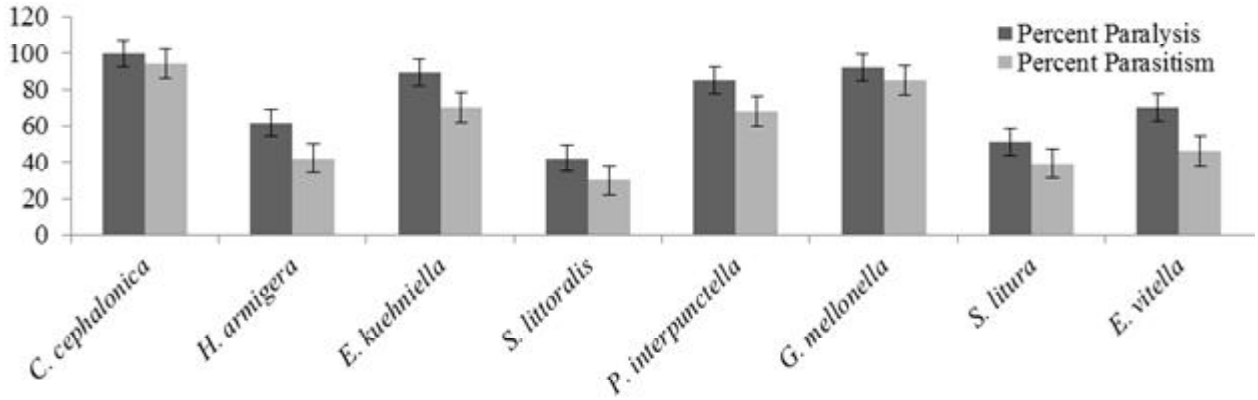


Fig-1: Percent parasitization and paralysis of various Lepidopteran hosts by *Bracon hebetor*.

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