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Biological parameters of *Bracon hebetor* (Hym.: Braconidae) parasitizing *Ephestia kuehniella* (Lep.: Pyralidae): effect of host diet

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Abstract: The effect of host diet on developmental time, fecundity and life-table parameters of *Bracon hebetor* (Say) (Hymenoptera: Braconidae) against the Mediterranean flour moth *Ephestia kuehniella* (Zeller) was studied in the laboratory conditions at 26 ± 1 °C, $65 \pm 5\%$ relative humidity and a photoperiod of 16L:8D h. The diets used were rice, barley, corn and wheat flours. The developmental time (egg to adult) of the first and second generations ranged from 9.90 to 14.00 days on barley flour and wheat flour, respectively. The survival of immature generations 1 and 2 ranged from 27 to 63%. The sex ratio of wasp progeny (females/total) ranged from 36.72 to 57.83% on wheat flour and rice flour, respectively. In the first and second generations, the fecundity of *B. hebetor* reared on barley and rice flours was greatest. Life table parameters varied significantly with host diets. In generation 2, *B. hebetor*-parasitized larvae reared on rice flour showed the highest net reproduction rate ($R_0 = 106.13$) and the highest intrinsic rate of increase ($r_m = 0.269$) of parasitoids. Based on the life-table analyses, rice flour was found the best diet for rearing the parasitoid. The results of this study can be used to improve mass-rearing programs of *B. hebetor*.

Keywords: *Bracon hebetor*, host diet, developmental time, fecundity, life table parameters.

Introduction

Biological control has come to have a significant role in integrated pest management (IPM) because of its advantages over chemical methods, pest resistance to conventional pesticides and compatibility with other IPM methods (DeBach and Rosen, 1991; Dent, 2000). Non chemical control methods have gained important in IPM, as a policies aiming to minimize the application of residual chemical insecticides such as methyl bromide (Fields and White, 2002) and greater restrictions on the use

of dichlorvos (Scholler, 2010). The control of stored product pests needs the control of large number of pest hidden in large amounts of product or structurally complex building (Scholler, 2010). So, biological control is especially true with regard to stored product facilities (Scholler *et al.*, 1997; Scholler and Flinn, 2000).

Bracon hebetor (Say) (Hymenoptera: Braconidae) is a gregarious, idiobiont, cosmopolitan ectoparasitoid that attacks lepidopteran larvae, mainly moths in the family Pyralidae, including the Indian meal moth *Plodia interpunctella* (Hubner), Mediterranean flour moth *Ephestia kuehniella* (Zeller) and dried fruit moth *Vitula edmansae* (Packard) (Brower *et al.*, 1996; Hagstrum and Smith, 1997). It also attacks a number of non-pyralid

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