

# DEVELOPING REARING METHODS FOR *TETRASTICHUS PLANIPENNISI* (HYMENOPTERA: EULOPHIDAE), A LARVAL ENDOPARASITOID OF THE EMERALD ASH BORER (COLEOPTERA: BUPRESTIDAE)

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## ABSTRACT

Classical biological control efforts against emerald ash borer (EAB) (*Agrilus planipennis* Fairmaire) in North America primarily have focused on introduction and releases of exotic parasitoid species collected from northern parts of China. Recently, field surveys in Michigan, Pennsylvania, Ohio, and Ontario also indicate that some existing parasitoids in North America (either indigenous or inadvertently introduced) have already become associated with EAB and may play a supplementary role in suppressing the populations of EAB. *Balcha indica* (Hymenoptera:Eupelmidae) is one such parasitoid, recently recovered from various stages of EAB larvae, prepupae, and pupae collected in Michigan, Pennsylvania, and Maryland, and found to reproduce thelytokously (i.e., virgin female reproducing daughters). In the present study, the longevity, oviposition rate, and fecundity of adult females, as well as development time of immature

stages were determined in the laboratory. *Balcha indica* is a solitary ectoparasitoid attacking larvae, prepupae, and pupae of EAB. Lifetime fecundity of 27 females averaged 36 eggs with a maximum of 94 eggs, and adult longevity averaged about 59 days. Mean adult survivorship was 8.58 weeks with lower and upper 95-percent confidence intervals of 6.95 and 10.21 weeks, respectively. It is important to note that one female lived 98 days without laying a single egg. Throughout exposure bouts, parasitism averaged 30.9 percent (range from 0 to 100 percent). Under the normal rearing condition ( $25\pm^{\circ}\text{C}$  and D: L 14:10 hour photoperiod), *B. indica* took approximately 89 days to complete its life cycle (from egg to adult emergence), with a short development time for egg (less than 2 days) and first instar larvae (less than 4 days), and a prolonged development time for the remaining larval stages (56 days) and pupal stage (27 days).