

Host and brood size of an egg-larval polyembryonic parasitoid, *Copidosoma floridanum* (Ashmead) (Hymenoptera: Encyrtidae) on *Helicoverpa armigera* (Hübner) from India

S. Manickavasagam* and R. Kanagarajan

*Department of Entomology, Faculty of Agriculture, Annamalai University
Annamalainagar 608 002. Tamil Nadu, India

E-mail: manickslatha@satyam.net.in

ABSTRACT: A total of 1893 *Copidosoma floridanum* (Ashmead), an egg-larval polyembryonic encyrtid parasitoid, has been recorded on *Helicoverpa armigera* (Hübner) in tomato from Tamil Nadu, India, for the first time. The brood size and sex-ratio of the parasitoid are discussed.

KEY WORDS: *Copidosoma floridanum*, Encyrtidae, polyembryony, sex-ratio

Helicoverpa armigera (Hübner) (Lepidoptera: Noctuidae) is one of the most serious polyphagous insect pests (Manjunath *et al.*, 1989). Annual losses due to this insect in pigeonpea and chickpea have been estimated to exceed US\$ 600 million (ICRISAT, 1992). Romeis and Shanower (1996) summarised the arthropod natural enemies of *H. armigera* in India and listed parasitoids from over 10 families of Diptera and Hymenoptera. *Copidosoma floridanum* (Ashmead), an egg-larval polyembryonic parasitoid was recorded on *H. armigera* in tomato during June, 2000. *Copidosoma* spp. on lepidopteran hosts have been reported already from many other parts of the world.

When the parasitoid larvae attained maturity, the body of the host became much distended. It is frequently distorted with a mummified appearance. Strand (1989) also reported that *Trichoplusia ni* (Hübner) parasitized by *C. floridanum* attained significantly larger final weights and head capsule width than un-parasitized control.

A total of 1893 parasitoids were recorded from a single *H. armigera* larva. In general the brood may arise from a single egg or many eggs. Clausen (1940) reported that in many species several eggs are laid at one insertion of ovipositor. El Heneidy *et al.* (1983) reported only 615 adults of *C. floridanum* from a single larva of *H. armigera* from Egypt whereas Grbic *et al.* (1992) reported that it produces 1000-1400 offspring per host. Baehrecke *et al.* (1993) reported that as many as 3000 embryos are formed from a single *C. floridanum* egg and its embryo must develop for 9 days before acquiring the competence to undergo morphogenesis.

Out of the 1893 adult parasitoids emerged, only 23 were males and the rest females, showing a highly female biased sex ratio. Walker and Clark (1992) reported a similar sex-ratio in an undetermined species of *Copidosoma* and stated that this cannot be explained by local mate competition theory. Clausen (1940) observed that the parasitoid brood emerging from a single host may all be of the same sex or they may be mixed.

ACKNOWLEDGEMENT

The authors are grateful to Dr. Mohammad Hayat, Aligarh Muslim University for the identification of the parasitoid.

REFERENCES

- Baehreke, E. H., Aiken, J. M., Dover, B. A. and Strand, M. R. 1993. Ecdysteroid induction of embryonic morphogenesis in a parasitic wasp. *Developmental Biology*, **158**: 275 – 287.
- Clausen, C. P. 1940. Entomophagous insects. Mc Graw Hill Book Co., Inc., New York and London, 688 pp.
- *El-Heneidy, A. H. and Abbas, M. S. T. 1983. Biological notes on *Copidosoma* sp. (Hymenoptera: Encyrtidae), an egg-larval parasite of *Heliothis armigera* (Hub.) (Lepidoptera: Noctuidae) in Egypt. *Zeitschrift-fur-Angewandte-Entomologie*, **96**: 74 –77.
- Grbic, M., Ode, P. J. and Strand, M. R. 1992. Sibling rivalry and brood sex ratios in polyembryonic wasps. *Nature*, **360**: 254 –256.
- ICRISAT. 1992. The medium term plan, vol. 1. ICRISAT. Patancheru, Andhra Pradesh, India.
- Manjunath, T. M., Bhatnagar, V. S., Pawar, C. S. and Sithanatham, S. 1989. Economic importance of *Heliothis* spp. in India and an assessment of their natural enemies and host plants, pp. 197–228. In: King E. G. and Jackson, R. D. (Eds.), *Proceedings of the Workshop on Biological Control of Heliothis: Increasing the effectiveness of natural enemies*. Far Eastern Regional Research Office, United State Department of Agriculture, New Delhi.
- Romeis, J. and Shanower, T. G. 1996. Arthropod natural enemies of *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) in India. *Biocontrol Science and Technology*, **6**: 481–508.
- Walker, G. H. and Clarke, A. R. 1992. Unisexual broods and sex ratios in a polyembryonic encyrtid parasitoid (*Copidosoma* sp.) (Hymenoptera: Encyrtidae). *Oecologia*, **89**: 147–149.