EFFECTS OF *COTESIA VESTALIS* PARASITIZATION ON FEEDING, GROWTH, AND DEVELOPMENT OF *TRICHOPLUSIA NI* LARVAE

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Abstract

Trichoplusia ni (Lepidoptera: Noctuidae) is a major cabbage pest in Sri Lanka, and the negative impacts of insecticides highlight the need for biological control. Field surveys in major cabbage-growing areas in the Kandy, Matale, Nuwara-Eliya, and Badulla districts identified *Cotesia vestalis* (Hymenoptera:Braconidae) as the predominant larval parasitoid associated with *T. ni.* This study evaluated the effects of *C. vestalis* parasitization on the feeding, growth, and development of *T. ni* under laboratory conditions at 26 ± 2 °C and RH 79 ± 5%. In each of 11 replicates, 15 five- to six-day-old larvae were exposed simultaneously to one mated *C. vestalis* female for 24 h, after which the larvae were placed individually and monitored until parasitoid or adult host emergence. Five control replicates were maintained without parasitoid exposure. Larval weight, length and food consumption were recorded daily in five exposed and five control replicates, while six exposed replicates remained unmeasured to minimize handling. Successful parasitoid emergence did not differ between measured and unmeasured replicates ($p>0.05$), indicating no selection bias. The consumption index (CI) and weight-to-length ratio were then calculated. The mean successful parasitoid emergence rate was 41.21 ± 2.35%, while the adult host emergence rate was 24.24 ± 1.89%. Control larvae showed substantial growth and food consumption, whereas parasitized larvae showed limited increase in body weight (5.90 ± 0.28-10.00 ± 0.37 mg) and length (4.77 ± 0.10-9.83 ± 0.40 mm), with food consumption declining from 91.7 ± 3.52 to 0 mg. A zero-inflated Tweedie generalized linear mixed model showed that CI declined over time in both groups, as expected, with a significantly steeper decline in parasitized larvae ($z=-7.11$, $P<0.005$). A log-transformed linear mixed model further confirmed that parasitisation significantly suppressed the weight-to-length ratio over time ($t=-25.40$, $p<0.005$), with parasitized larvae showing ~3 times lower ratio than controls ($t=18.16$, $p<0.005$). These findings demonstrate that *C. vestalis* suppresses *T. ni* development and feeding, highlighting its potential as a biological control agent.

Keywords: *Trichoplusia ni*, Cabbage pests, Larval parasitoids, Biological control, Parasitisation rate