

Biology and life history of *Cotesia ruficrus* (Hymenoptera: Braconidae) a potential parasitoid of *Hyposidra talaca* (Lepidoptera: Geometridae) larvae, a major tea pestSuman Sarkar^{*1}, Azariah Babu¹, Kaushik Chakraborty² and Bhabesh Deka¹**ABSTRACT**

The black inch looper, *Hyposidra talaca* is considered as a major pest in tea in northern part of West Bengal and North East India. Among the natural enemy reported, *Cotesia ruficrus* is considered as one of the most gregarious endo-parasitoid wasps. In order to assess the potential of this natural enemy, a study on the biological parameters of *C. ruficrus* was evaluated on the different developmental stages (second, third and fourth instars) of the host larvae, *H. talaca*. The results indicated that, the mean duration of larval development was 12.0 ± 0.32 , 11.0 ± 0.45 and 9.2 ± 0.37 days in second, third and fourth instar host larvae respectively. The pupal period of *C. ruficrus* was found to be significantly different among the different larval stages of *H. talaca*. The successful parasitism of *C. ruficrus* and the number of cocoon formation of the parasitic wasp was reliant on the stage, body size and the physiological conditions of host larvae that it parasitizes. A maximum of 65.2 ± 1.85 cocoons were formed when the fourth instar host larvae parasitized, followed by 27.2 ± 3.04 in the third instar and 4.6 ± 0.68 in the second instar host larvae. The number of females and males hatched out from each clutch was compared to the different host stages. .

Key words: Black inch looper, *Hyposidra talaca*, Parasitic wasp, *Cotesia ruficrus*, Tea, Parasitism.

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INTRODUCTION

The black inch looper, *Hyposidra talaca* (Lepidoptera: Geometridae), considered as a major tea pest, which causes considerable damage to tea plantations leading to loss in yield and the quality of manufactured tea as well. In general, chemical insecticides are being used for the control of tea pests including this black inch looper (Hazarika *et al.*, 2009) by the tea planters. Hence the use of chemical pesticides has many negative impacts such as development of resistance in insects, abolition of natural enemies, imbalance in natural ecosystems and increasing environmental contamination besides causing ill-health to human beings. Therefore, non-chemical control measures are extremely

important for the management of this destructive pest (Deka *et al.*, 2017; Nguyen *et al.*, 2018). Biocontrol agents play a vital role for the management of pests, especially lepidopteran pests with a well-balanced ecological systems, by helping in the reduced use of pesticides in major agricultural crops, including tea.

The tea ecosystem, which is considered as a semi-forest ecosystem, harbor more than 1034 arthropod species associated within (Hazarika *et al.*, 2009). Among the diversity of arthropod natural enemies in sub-Himalayan tea growing region of northern part of West Bengal, parasitoid groups belonging to the families such as Braconidae and Ichneumonidae are dominant ones. Among the parasitoids,

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