



Morphological characterization of antennal sensilla of *Earias vittella* (Fabricius) (Lepidoptera: Nolidae)

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ABSTRACT

The shoot and fruit borer, *Earias vittella* Fab. (Lepidoptera: Nolidae) is an important and most devastating insect pest on okra and cotton. The pest mainly responsible for causing significant direct damage to tender shoots and fruits of okra, flowers and green bolls of cotton causing net yield loss in both crops. Many non-chemical control strategies have been developed under the insect pest management program. A complete knowledge on the antennal morphology of *E. vittella* is essential for future electrophysiological and behavioural studies. In the present study, the antennal morphology and types of sensilla on the antennae of both sexes of *E. vittella* were examined using light and scanning electron microscopy. Nine distinct types of sensilla were identified on the antennae of both sexes: sensilla trichodea, sensilla basiconica, sensilla coeloconica, sensilla auricillica (multiporous), sensilla chaetica, uniporous peg sensilla (uniporous), sensilla styloconica, sensilla squamiformia and bohm bristles (aporous). Among all sensilla, the most widespread are multiporous sensilla trichodea with 42.90 ± 1.77 /flagellomere in male and 37.38 ± 1.38 /flagellomere in female. Sensilla basiconica were the second most common sensillum type in male antennae with 15.67 ± 1.92 /flagellomere. Other multiporous sensilla such as auricillica (11.90 ± 0.99) and coeloconica (4.57 ± 0.25) were significantly more abundant in female than in male antennae. Results of the study provide morphological evidence that *E. vittella* antennae possess microscopic cuticular structures that can play a role in perception of pheromones, plant odours and other chemical stimulants. This will open up opportunities to assess the possibility of using pheromones and plant-derived compounds for the monitoring or management of *E. vittella* moths in the agricultural landscapes.

1. Introduction

Earias vittella (Fabricius) (Lepidoptera: Nolidae) is a very common and major polyphagous insect pest of cotton and okra in India (Maha-patro and Gupta, 1998; Syed et al., 2011). The pest is widely distributed in Indo-Pakistan sub-continent, Bangladesh, North Korea, North Africa and Australia. It is the most devastating pest and mainly responsible for causing significant direct damage to tender terminal shoots, tender fruits of okra, flowers and green bolls of cotton (Pareek and Bhargava, 2003; Kranthi et al., 2004) causing direct losses in the marketable yield. The undue dependence on chemical insecticides and their indiscriminate use has led to the problem of pest resurgence, development of insecticide resistance, high level of pesticide residues, destruction of useful fauna and environmental pollution (Kranthi et al., 2002; Gautam et al., 2014; Kanher et al., 2014). Hence, there is requirement of an alternative pest

management tools to control this pest. In recent years, the pest management approach using behavioral manipulation, including mating disruption, feeding disruption, use of attractants, oviposition and feeding deterrents to combat pest damage has become the focus of research for pest control (Roitberg, 2007).

Semiochemicals offer selective method of pest control as they interfere with natural behavior of insects especially female sex pheromones in locating males for reproduction (Dharne and Kabre, 2009). Many authors have suggested that the antennae are the principal site of insect olfactory receptors (Schneider, 1964; Zacharuk, 1985; Na et al., 2008). There are many evidences obtained by electrophysiological experiments confirmed the flagellum as site of the olfactory sense organs that are involved in the detection of several important environmental stimuli (Schneider, 1957, 1962, 1963). Therefore, it is the most important to study the morphology of antennal sensilla of this pest.

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