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Short Communication

Egg morphology and chorion fine structure of Lepidopteran pest species *Nausinoe geometralis* (Guenée) (Crambidae: Spilomelinae)

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Abstract

The eggs of a species of subfamily Spilomelinae i.e., *Nausinoe geometralis* (Guenée) belonging to family Crambidae, commonly known as jasmine leaf webworm were examined through Scanning Electron Microscope (SEM) and studied their surface ornamentation displayed on the egg chorion to raise a taxonomic key for more accurate identification. Surface texture of the chorion considered in combination with overall shape was enough to distinguish all the species examined. The surface textures of egg shells can be used to describe, classify and identification of the species from taxonomic view point. The egg surface have a gap like structure denoted as micropyle which further contains rosettes, cross ribs and aeropyles which differs in higher taxonomic groups. In the species i.e., *Nausinoe geometralis* (Guenée), the egg chorion sculpture appeared as irregular ridges join the rosettes which surrounds the micropyle.

Keywords: Chorion SEM, Egg, Micropyle

Introduction

The insect egg chorion forms a barrier to shield the eggs and the embryo from ailing effects of environmental influences such as water loss, bodily destruction, bacterial infection and dehydration. It also regulates the exchange of gases and maintains humidity. The egg shells are species specific. The egg contains a micropylar aperture surrounded by rosettes at its anterior end (Scoble, 1995). Depending upon the insect species, the number and position of micropylar aperture may vary from two to one hundred. The present study purposed to inspect the morphometric and external morphological characteristics of the egg chorion sculpturing containing grooves and ridges.

Material and Methods

The eggs of *Nausinoe geometralis* (Guenée) were fixed in aldehyde fixative i.e., 2.5% glutaralhyde minimum for a period of one hour. Afterwards, the eggs were rinsed repetitively with PBS (Phosphate Buffered Saline) for a period of fifteen minutes and then dehydrated by using a series inutes and 3 changes of 100% for 10 minutes each). For post fixation process, the eggs were fixed in 1% Osmium tetroxide in 0.1M Phosphate Buffer for one hour. By using Polaron quorum technology, material was allowed to dry up to considerable point using. After drying, the eggs were mounted on aluminum stubs with adhesive tapes and sputter coated for three minutes by means of a Polaron (Model no.-Hitachi E 1010). Subsequently,

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the eggs thus processed were examined significantly and photographed under the Scanning Electron Microscope (Hitachi S 3400N).

Results

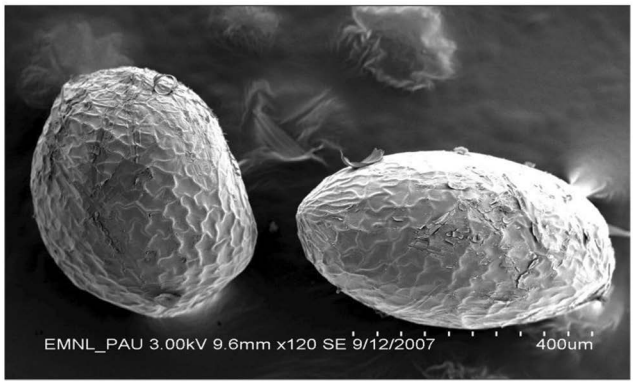
The surface of the Pyralid eggs shows structural elements like aeropyles and micropylar rosettes around the micropyle (Hinton, 1981). The adult of *Nausinoe geometralis* (Guenée) was collected with the help of light trap fixed near the Jasmine orchard in twilight from June to August (2008-2010) by using mercury bulbs. For ex-situ rearing, the collected specimens shifted to insect rearing cages which charged with the fresh Jasmine plant leaves and twigs for egg laying. Female laid eggs singly and in small groups of 5-6 eggs on leaf lamina. The freshly laid eggs were found spherical and yellowish green in colour. The egg capsule contains vitelline membrane and the chorion in both the species. When laid, the egg capsule becomes harder and typical polygon like structures become apparent on its surface. The average dimensions of the eggs were 0.52±0.02 mm in length and 0.47±0.01 mm in width (in the widest section) respectively as seen and calculated through Scanning Electron Microscope (SEM). The egg chorion found to have irregular ridges which join the 10-12 somewhat irregular rosetts surrounding the micropyle opening.

Discussion

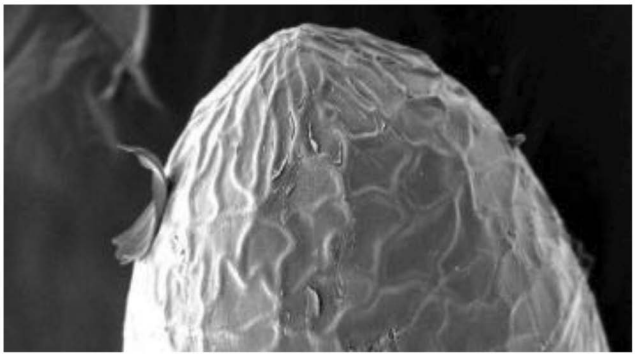
The egg chorion sculptured with irregular ridges and grooves in the species *Nausinoe geometralis* (Guenée) of subfamily Spilomelinae studied presently. Horak (1991) has reported that the Tortricid egg surface may be irregularly reticulate with pronounced ridges. The eggs of *Chilo auricillia* Dudgeon in comparison to *Chilo infuscatellus* Snellen of subfamily Crambinae show irregular reticulation on the egg surface which is near to similar with the egg ornamentation of species under consideration (Deep *et al.*, 2018). Deep and Rose (2014) described during the studies on eggs of maize borer, *Chilo partellus* (Swinhoe) that besides the egg chorion texture, the micropylar end was surrounded by nine rosettes like primary cells. A similar pattern on egg chorion to above said is covering the egg capsules of many insect species such as *Thermobia domestica, Leptoperla bifida, Isoper larivulorum, Perla marginata and Leptotusmar moratushas* reported by many workers viz., Cobben, 1958; Gaino *et al.*, 2008; Kubrakiewicz *et al.*, 2005; Poprowa and Rost, 2004 and Rosciszewska, 1991a respectively. Dolinskaya (2010) studied that cellular sculpture, ridged cellular sculpture and ridged sculpture remained classic and species specific though studying egg chorion of subfamily Hadeninae of family Noctuidae. Slightly elevated longitudinal ridges coupled by the transverse ridges are the most fundamental pattern of sculpturing. Skudlik *et al.*, (2005) investigated that the poorly developed sculpturing patterns in *Melitaeatran scaucasica*. According to Gaino *et al.*, (2008), the number of micropylar openings in Lepidopteran eggs varies from 1 to 20. A rosette of petal like primary cells surrounds the micropylar pits and each of the rosettes is outlined by fine walls. But in *C. auricillia* Dudgeon, six micropylar openings were there as seen in SEM images. The number

Plate 1

(a) Adult of *Nausinoe geometralis* (Guenée).



(b) Egg of *Nausinoe geometralis* (Guenée).



(c) Micropyler view of *Nausinoe geometralis* (Guenée).

of micropylar openings considered to be species specific character (Simiczyjew, 1999). In 1980, Arbogast and co-workers suggested that although there is often significant intraspecific deviation in the shape and the number of primary cells but still this rosette like pattern always remained an essential investigative character.

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