Journal of Veterinary Research and Medicine

Extended Abstract
Vol. 1 Iss. 1
2019

Scanning Electron Microscopic Observations of Eggs of Anopheles Fluviatilis (T) Mosquito (Diptera: Culicidae)

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Abstract

In the present investigations, Scanning Electron Microscopy of eggs of An. fluviatilis is carried out to differentiate the An. fluviatilis significantly from other mosquito species in egg size, float size, structure of lobed tubercles, pattern of deck tubercles, pattern of chorionic cells and structure of tubercles on under float area. The shape and size of tubercle is different in An. fluviatilis as compared to An. culicifacies, An. nyssorhynchus, An. nuneztovary and An. apicimacula. The eggs of An. fluviatilis are similar to An. culicifacies in micropylar rays but different from An. darlingi, An. rangeli and An. dunhami. These characters along with different shapes present on different surface and/or ends of egg were used to differentiate various mosquito species.

Keywords
Anopheles fluviatilis, SEM, Eggs, mosquito species, Chorionic.

Introduction

Anopheles species which transmit malaria in India have distinct biological characters and specific distribution pattern. Out of the 60 Anopheles species reported from India 9 species are considered to be transmitting malaria- *Anopheles culicifacies, Anopheles dirus, Anopheles fluviatilis, Anopheles minimums, Anopheles stephensi* and *Anopheles syndics* are major vectors and *Anopheles annularis*, *Anopheles philippinensis* and *Anopheles vicuna* are of local importance and play a secondary role.

Anopheles fluviatilis is one of the primary vector of malaria in India and contributes around 15% of the total malaria cases in the country. Rest of the malaria is caused by *Anopheles culicifacies* and *An. stephensi*. Studies of egg morphology of several Anophelines species with scanning electron microscope (SEM) have been documented (Damrongphol *et al.,* 1989; Linley *et al.,* 1996; Rodriguez *et al.,* 1992,1996 &1999; Forattion *et al.,* 1997 & 1998; Lounibos *et al.,* 1997; Junkum *et al.,* 2004; Chaudhry & Gupta, 2003 & 2004; Gupta & Chaudhary, 2005), because they provide better description of fine structures.

To overcome the inherent limitations of above techniques in identifying *Anopheles fluviatilis* from other mosquito species SEM of eggs could be an important alternative. In addition, the present study could help to understand the structure of chorion in *Anopheles fluviatilis* to prepare eggs for microinjection after chorion removal for development of transgenesis technology for this mosquito.We present herein a detailed description of the eggs of this species by SEM.

Material And Methods

Adults of *Anopheles fluviatilis* were obtained from Nation Institute for Malaria Research, New Delhi. The gravid females laid eggs in the small plastic containers lined with filter paper. For forced egg laying, the

This work is partly presented at the International Conference on Livestock Nutrition August 11-12, 2015 Frankfurt, Germany

complete dark condition was provided by wrapping the container with black cloth/chart paper. The gravid females oviposited their egg on the wet filter paper. The egg were collected with the help of fine point brush and fixed in Carnoy's fixative for 36 hr. After that, fixed eggs transferred to phosphate buffer for further use. Eggs were initially examined under a dissecting microscope for measurements of length, shape, width etc. For SEM, the eggs were air dried and mounted on aluminum stubs with double stick tape. The specimens then coated with gold in a sputter-coating apparatus and examined in a HitachiS -510 Scanning Electron Microscope.

Results

The scanning electron microscopic observations of the *An. fluviatilis* are shown in fig. 1-9. The diagnostic differences have been summarized in Table-1. However, the general and common characters of the species are described below-

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