



Scanning electron microscopy of eggs of *Georgecraigius fluviatilis* (Lutz) (Diptera: Culicidae, Aedini)

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Abstract

Scanning Electron Microscopy was used to describe the eggs of *Georgecraigius fluviatilis* (Lutz). Length is 722.8 ± 39.6 μm and width is 177.1 ± 9.8 μm . Diameter of the micropylar disk, surrounded by an irregular flattened collar, is 28 μm . The outer chorionic sculpture consists of cells of irregular shapes, containing tubercles with pitted surface. In the ventral region, tubercles of several diameters are irregularly distributed in chorionic cells, while in the dorsal region one larger tubercle is surrounded by several smaller ones. The eggs appear to lack structures for adhesion, certainly unnecessary due to the habit of laying eggs separately on water surfaces.

Key words: Egg, Ultrastructure, Morphology

Introduction

The study of egg morphology is useful for the identification of material from aquatic habitats. *Georgecraigius fluviatilis* (Lutz) (= *Aedes fluviatilis*) is widely distributed from southern Mexico to northern (Zavortink 1972, Pecor *et al.* 2002) and western Argentina (Almirón *et al.* 1996), and is also recorded in two southernmost Brazilian states, Rio Grande do Sul (Cardoso *et al.* 2005) and Santa Catarina (Marcondes *et al.* 2006).

Immature forms of *Gc. fluviatilis* have been found mostly in rock crevices situated near or in rivers (Forattini 1965, Marcondes *et al.* 2006). They can be found in artificial containers, like tyres and flower pots in cemeteries (Lopes 2002), sometimes with *Stegomyia aegypti* (Linnaeus) (= *Aedes aegypti*) (Lopes *et al.* 1993), which seems to displace them (Lopes 2002).

When the eggs of several groups of mosquitoes have finally been described, they can also be used in phylogenetic analyses. Due to the small number of eggs currently described, Motta *et al.* (2007) did not include egg characteristics in their phylogenetic analysis of *Wyeomyia* (Sabethini). Additionally, in Reinert *et al.*'s (2009) phylogenetic analysis of the Aedini, only four morphological characters of the 336 were from eggs, which were unknown for many species.

Georgecraigius fluviatilis seems to prefer biting birds (Consoli & Williams 1981), and in a study utilizing several baits (human, chicken, lizard and horse), horses seemed to be more attractive (Neves & Silva 1974), but the number of collected mosquitoes was very small.

The species is a very good experimental vector for *Plasmodium gallinaceum* (Camargo *et al.* 1983) and has been frequently utilized for experimental studies (e.g., Camargo *et al.* 1983, Rocha *et al.* 2004), having been shown to be a

Georgecraigius, *Gc. epactius* and *Gc. atropalpus*, that are distributed in Central and North America. Both have had their exochorial surface briefly described and illustrated (Burst, 1974), showing a quite different pattern of distribution of tubercles and cells compared to *Gc. fluviatilis*. Egg surface was added to crossings among species on this genus for the definition of species and subspecies, separating *Gc. epactius* from *Gc. atropalpus* and synonymizing *Ae. atropalpus nielseni* O'Meara & Craig Jr. and *Ae. atropalpus pericharis* Dyar with *Gc. epactius* (Burst 1974).

Munstermann (1980) observed enzyme variation among populations of *Gc. epactius* and *Gc. atropalpus*, and studies on their eggs and the eggs of *Gc. fluviatilis* could be very useful. Zavortink (1972) cited differences in male genitalia of *Gc. fluviatilis*, comparing mosquitoes from the Guianas, extreme south of Brazil (in reality, he examined material from states in the south-east, and not from any of three states of southern Brazil) and adjacent northern Argentina to those from other regions. Franca, state of São Paulo, south-east of Brazil, is the type locality of *Gc. fluviatilis*. Horsfall *et al.* (1970) cited variations between eggs of *Oc. sticticus* (Meigen) (= *Aedes sticticus*) and *Aedimorphus vexans* (Meigen) (= *Aedes vexans*) collected in different localities in North America. It would be advisable to check the variation in widely distributed species, like *Gc. fluviatilis*, utilizing egg characters as a tool for the characterization of possible species complexes.

Georgecraigius fluviatilis is easily reared in the laboratory (Consoli & Williams 1976, 1981), having been frequently used for studies of bird malaria, and it would be relatively easy to get eggs from several regions for comparative studies.

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