Zootaxa 2268: 23–40 (2009)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

Description and comparison of morphological structures of the eggs of *Anopheles* hyrcanus group and related species (Diptera: Culicidae) from the Republic of Korea

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Abstract

The eggs of six *Anopheles* Hyrcanus Group (*An. sinensis* Wiedemann, *An. kleini* Rueda, *An. belenrae* Rueda, *An. pullus* M. Yamada, *An. lesteri* Baisas and Hu, *An. sineroides* S. Yamada) and related species (*An. koreicus* S. Yamada and Watanabe, *An. lindesayi japonicus* S. Yamada), were described from scanning electron micrographs of specimens collected from different localities of the Republic of Korea. Morphometric measurements of egg samples of the eight species were compared and relationships analyzed by multivariate statistics. About 27 characters were selected and used as a basis for principal and discriminant function analyses. Scanning electron micrographs of various parts of the eggs were selected to illustrate interspecific differences for particular morphological features (e.g. anterior and posterior tubercles, decks, plastron, micropyles, floats).

Key words: Culicidae, *Anopheles*, mosquito eggs, morphology, Republic of Korea

Introduction

Anopheles Hyrcanus Group comprises several species which are vectors of malaria and other mosquito borne-diseases in the Oriental and Palearctic Regions. The group, as currently defined, includes about 42% of the species that comprised the Myzorhynchus Series of genus *Anopheles* Meigen subgenus *Anopheles* Meigen (Harbach 2004, Rueda 2005, Rueda *et al.* 2005). The group includes about 30 known species world-wide. Twenty eight of these species are found in the Oriental and Eastern Palearctic Regions and three in the Western Palearctic Region.

In the Republic of Korea (ROK), all eight known *Anopheles* species are under the subgenus *Anopheles* of genus *Anopheles*. Six of these species belong to the Hyrcanus Group, namely *An. belenrae* Rueda, *An. kleini* Rueda, *An. sinensis* Wiedemann, *An. sineroides* Yamada, *An. pullus* M. Yamada, and *An. lesteri* Baisas and Hu (Rueda 2005, Rueda *et al.* 2006). The other two species belong to the Barbirostris Group (*An. koreicus* Yamada and Watanabe) and the Lindesayi Group (*An. lindesayi japonicus* Yamada) (Tanaka *et al*. 1979). *Anopheles sinensis* is the most commonly collected anopheline throughout the ROK, followed by *An. kleini*, *An. pullus*, and *An. sineroides* (T.A. Klein, unpublished data). Preliminary data suggest that *An. pullus* and *An. kleini* are the primary vectors of *Plasmodium vivax* malaria near the demilitarized zone (DMZ) while *An.*

Accepted by G. Courtney: 2 Oct. 2009; published: 20 Oct. 2009