

# COMPARATIVE STUDIES OF MEMBER SPECIES OF THE *ANOPHELES MACULATUS* GROUP WITH SPECIAL REFERENCE TO THEIR VECTORIAL STATUS

Y. RONGSRIYAM, Y. AUDWIN, E. PONGPONRATANA, A. ASAVANICH,  
N. KOMALAMISRA, K. SURATHINTH AND C. APIWATHNASORN

Insecticide Research Unit, Department of Medical Entomology, Mahidol University, Bangkok 10400, Thailand

Morphoanatomical studies have already revealed the existence of at least eight species in the *Anopheles maculatus* group. However, members of the group possess overlapping morphological characteristics – a natural and inherent feature of species complexes, thus resulting in some of the species bearing no clear cut diagnostic characteristics. In this light, more detailed studies of the species group were carried out employing more powerful means such as the use of a scanning electron microscope to observe the details of the egg stage; the use of isozyme/allozyme electrophoresis to study and analyse the banding patterns of enzymes present in the mosquitoes; and as a follow-up, the experimental infection of the mosquitoes by *Plasmodium falciparum* in order to assess their vectorial capacity.

Scanning electron microscopy revealed differences in specific parts rather than in the overall characteristics of the egg. The completeness or incompleteness of the frill was most evident and readily observable. The variation in the number of decks, although a case of polymorphism in only one of the species, was also quite clear. The ultra structure of the deck tubercles also revealed very distinct and specific differences, and the same can be said of the plastron network or outer chorionic sculpture. Other structures such as the flat and the lobed tubercles are quite variable in structure and failed to show diagnostic features for each species.

Vertical polyacrylamide gel electrophoresis revealed interesting differences in the zymograms of both adults and larvae, using alkaline phosphatase, peptidase, and esterase for larvae and isocitrate dehydrogenase, esterase, xanthine dehydrogenase, glucose phosphate isomerase, and peptidase for adults. Separate biochemical keys for both larvae and adults were proposed. Also interesting was the reflection of geographic isolation in the zymograms, as in the case of *An. dispar* from the Philippines against the rest of the species tested which are from the mainland (Thailand).

Induced experimental infections showed that all the species tested were susceptible to *Plasmodium falciparum* although some of them differed in the degree of susceptibility. Based on the oocyst rate and sporozoite rate, the most susceptible was *An. pseudowillmori*, followed by *An. willmori*, *An. maculatus s.s. form E*, *An. maculatus s.s. form B*, *An. dispar*, and *An. sawadwongporni*. The discrepancy between these results and data gathered from wild caught mosquitoes was thought to be due to environmental factors as well as other biological factors. It can be concluded that except for *An. maculatus s.s. form E* (the real vector), the other members of the group can only be considered as potential vectors, although they can always be suspected if outbreaks or sporadic cases occur.