A NEW VARIETY OF THE *ANOPHELES PSEUDOPUNCTIPENNIS* COMPLEX IN ECUADOR (DIPTERA: CULICIDAE)

ROBERTO LEVI-CASTILLO
University of Ecuador, Guayaquil

Following publication of the work of Hackett and Missiroli (1935), evidence has been developed of the existence of distinct varieties within groups of mosquitoes usually considered species. These groups have been termed "complexes"; and several have been studied among the anophelines of America. These include the *maculipennis,* the *tarsimaculatus,* the *crucians* and the *pseudopunctipennis* complexes.

The eggs of *Anopheles pseudopunctipennis* Theobald have been studied by Herms and Freeborn (1920), by Freeborn and Frost (1932, and by Rozeboom (1937). Many studies (see "Literature Cited" below) have been made on the eggs of this complex, and authors have described varieties based on morphological characters of the egg.

The author (1944) has recently described the variety *Anopheles pseudopunctipennis levi-castilloi.* The eggs used in description included 220, deposited by two females in Bucay; all eggs showed the characters used. Larvae and adults reared from some of these eggs were studied carefully. All adults were typical *A. pseudopunctipennis* except that they were smaller in size than the "typicus" variety of Rozeboom.

The egg observed under the microscope in fluid is usually on its side because of the placing of the floats. It is boat-shaped, longer than wide, about 520 microns in length. The floats are easily observed, and occupy the center portion of the egg; each has about 45 to 47 small air-chambers that come radially into a central frill. The floats are about 300 microns in length. Observing the egg from the dorsal position it is divided into two portions by a median line. In the center are the floats attached to a very thin central frill formed of the exochorion. The form of the endochorion gives the rest of the egg a hollow boat-like appearance, the floats being located in the hollow surface formed by the walls of the endochorion. The egg has a light-brownish color, and the floats are white, with margins of air chambers darker. Since this variety had not been before observed, the writer (l. c.) has described it; specimens are deposited with the National Institute of Hygiene in Guayaquil and with the University of Ecuador. The egg is illustrated in Figures 1 and 2.

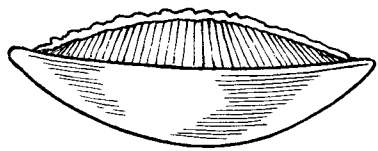

Fig. 1

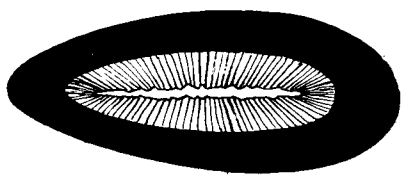

Fig. 2

Fig. 1. Egg of *Anopheles pseudopunctipennis* var. *levi-castilloi,* side view.

Fig. 2. Egg of *Anopheles psuedopunctipennis* var. *levi-castilloi,* upper surface.

Adults, as stated, are smaller in size than the *typicus* variety; they have more white on the mesonotum, and 4 instead of 6 "leaflets" on the mesosome. The variety is largely confined to the coastal plain of Ecuador, not quite reaching the shore, and extending only a little way into the foothills. It is often associated with *A. albimanus. A. pseudopunctipennis typicus,* on the other hand, occurs in the highlands. It

is interesting to note that *typicus* is a known malaria vector, while *levi-castilloi* has not so far been discovered to transmit malaria.

The *pseudopunctipennis* complex is so widely distributed along the western shores of America, and so variable, that we may probably expect future recognition of several species among its members.

Literature Cited

Aitkin, T. H. G. 1939. *The Anopheles* complex in California. Proc. VI Pac. Sci. Cong. 4: 463-484.

Hackett, L. W. 1937. Malaria in Europe—Oxford University Press—New York.

..... and Missiroli, A. 1935. The varieties of *Anopheles maculipennis* and their relation to the distribution of malaria in Europe. Riv. di Malar. 14: 1-67.

Herms, W. B. 1939. Medical Entomology. Macmillan—New York.

..... and Freeborn, S. B. 1920. Egg laying habits of California anophelines. Jour. Parasit. 7 (2): 69-79.

..... and Frost, F. M. 1932. A comparative study of the eggs of Californian anophelines. Jour. Parasit. 18 (4): 240-244.

Leví Castillo, R. 1944. El complejo "pseudopunctipennis" en el Ecuador (Diptera: Culicidae). Ann. Univ. Ecuador, Sept. 1944. Guayaquil.

Rozeboom, L. E. 1937. The egg of *Anopheles pseudopunctipennis* in Panama. Jour. Parasit. 23 (5): 538-539.

THE ANAL GILLS OF MOSQUITO LARVAE

WILLIAM E. BICKLEY,
U. S. Public Health Service, Malaria Control in War Areas, Norfolk, Virginia

The length of the anal gills is a useful and usually reliable character for separating salt water mosquito larvae from those of similar but fresh water species. Recently it has been found that in identifying anopheline larvae this character is especially valuable. Larvae of *A. atropos* and *A. bradleyi* which breed in salt water have gills which are much shorter than the anal (ninth visible abdominal) segment, while those of *quadrimaculatus, georgianus, crucians,* and *punctipennis* usually have gills as long or longer than the anal segment. In the last named species the gills are frequently twice the length of that segment. When the length of the anal gills is considered, the task of distinguishing larvae of *A. bradleyi* from those of *punctipennis* and *quadrimaculatus* becomes less perplexing.

The anal gills, which are also known as blood gills, tracheal gills, anal lobes or anal papillae, are of little importance in respiration. Wigglesworth (1939) states that their most important function appears to be the taking up of chloride ions to maintain the normal salt concentration of the haemolymph which is .3 per cent in *Culex*. To illustrate, he points out that larvae of *C. pipiens* which normally breed in fresh water and have long anal gills, will have the gills greatly reduced when reared in water of a relatively high salt content. Conversely, King et al. (1939) have reported that larvae of *Aedes sollicitans* and *A. taeniorhynchus* which normally occur in salt water and have the anal gills short and budlike, will develop long anal gills when reared in fresh water.

Literature Cited

Wigglesworth, V. B. 1939. The principles of insect physiology. E. P. Dutton & Company, New York.

King, W. V., Bradley, G. H., & McNeal, T. E. 1939. The mosquitoes of the southeastern states. U. S. Dept. Agric. Misc. Publ. No. 336.