

SCIENTIFIC NOTES

ABERRANT SOUTH AFRICAN MOSQUITOES (DIPTERA: CULICIDAE): GYNANDROMORPHS AND MORPHOLOGIC VARIANTS

PETER G. JUPP

Special Pathogens Unit, National Institute for Virology, Department of Virology, University of Witwatersrand, Private Bag X4, Sandringham, 2131, South Africa

ABSTRACT. Two polar gynandromorphs are described, one of *Culex* (*Culex*) *neavei* Theobald and the other of *Culex* (*Culex*) *pipiens*. These are the first gynandromorphs of these 2 species collected in South Africa. A single variant of *Aedes* (*Stegomyia*) *metallicus* and 16 variants of *Aedes* (*Stegomyia*) *ledgeri* are also described, all of which have variation in scutal morphology.

KEY WORDS Gynandromorphs, *Culex neavei*, *Culex pipiens*, morphologic variants, *Aedes metallicus*, *Aedes ledgeri*

During 33 years of mosquito collecting in South Africa, the author has encountered 2 gynandromorphs and 2 species having morphologic variants. These unusual mosquitoes were preserved at the time of collection and recently an opportunity arose to study them.

The first gynandromorph is a *Culex* (*Culex*) *neavei* Theobald, collected in the Mkusi Game Reserve in the northern KwaZulu-Natal coastal lowlands on March 16, 1967. The mosquito entered a miniature lard-can trap ("Number 6 trap") with pigeon bait set overnight in a fig tree forest. A total of 350 *Cx. neavei* were collected in 3 of these traps, among which was the gynandromorph. The second gynandromorph is a *Culex* (*Culex*) *pipiens* Linnaeus collected on February 22, 1981, in the S.A. Lombard Nature Reserve, which is located near Bloemhof in highveld savanna on the southern border of the North West Province. This mosquito was among 99 *Cx. pipiens* taken in 6 CO₂-baited suction traps set overnight.

An external examination of the 2 pinned specimens revealed that they are both polar gynandromorphs (Hall 1988). The heads, antennae, and maxillary palps are exactly as in the female, whereas the abdomens are male, including the genitalia. Permanent slide mounts were prepared from the genitalia, which were compared with similar mounts made from normal males of the same 2 species; no differences were detected. The tarsal claws of the fore- and midlegs are either male or female. In the *Cx. neavei* gynandromorph the left midleg is broken off but the right legs are female and the left foreleg is male. In the *Cx. pipiens* gynandromorph the right fore- and midlegs are male and the left is female.

Three other gynandromorphs have previously been reported from South Africa in the literature but they all differ from the 2 described above. Bedford (1915) collected a *Culex* (*Culex*) *theileri* Theo-

bald at Onderstepoort (Gauteng Province) that had the right antenna and palp typical of the male, whereas the left antenna and palp were typically female. The remainder of the insect was all female in structure, apparently including the genitalia. The 2nd specimen was a *Toxorhynchites* (*Toxorhynchites*) *brevipalpis* Theobald (reported as *Megarhinus brevipalpis*) reared in a laboratory colony by Muspratt (1951). This specimen was asymmetrical, with the right side of the body typically female and the left side typically male except in the genitalia. In the genitalia, the left side was female and the right was male in structure, which was due to only about 90° of rotation having occurred. The 3rd specimen was an *Aedes* (*Skusea*) *pembaensis* Theobald encountered by Paterson and Brooke Worth (1961) that was completely female except for the possession of plumose male antennae.

Two other gynandromorphs, which were identified by Van Someren (1969), have been reported from Africa in Kenya. One was a *Culex* (*Culicomyia*) *cinereus* Theobald with male genitalia but a head bearing a mixture of male and female appendages. In the United States, several *Culex* (*Culex*) gynandromorphs have been collected, including some of the polar type as reported in the present paper (Rigby and Blakeslee 1964, Blakeslee and Rigby 1965, Taylor et al. 1966, Hall 1988).

A single variant male *Aedes* (*Stegomyia*) *metallicus* (Edwards) was reared from eggs deposited in a bamboo ovitrap ("bamboo pot") that was hung in trees during the 1997 summer in wooded savanna at Skukuza in the Kruger National Park, Northern Province. This mosquito was one of 36 *Ae. metallicus* reared from the same pot and one of 1,931 specimens collected from pots that season. A dorsal view of the normal male scutum is shown in Fig. 1a and of the variant male in Fig. 1b. In the variant, a pair of thin bilateral stripes extends from the rear borders of the large silver patches located in the

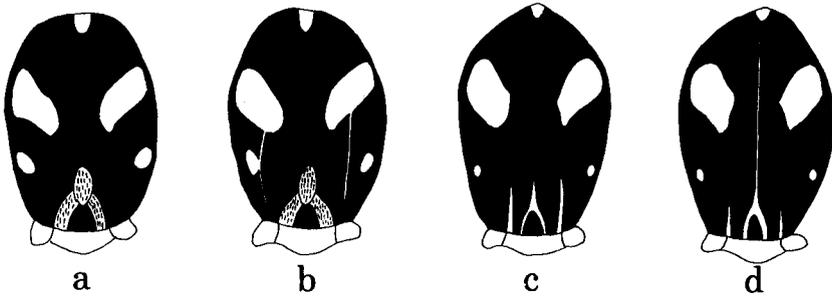


Fig. 1. Morphologic variants. a. Scutum of normal male *Aedes metallicus*. b. Scutum of variant male *Ae. metallicus*. c. Scutum of normal female *Aedes ledgeri*. d. Scutum of variant female *Ae. ledgeri*.

fossal areas. These stripes extend posteriorly almost reaching the lateral scutellar areas but are entirely absent in the typical *Ae. metallicus* specimen. The scutum of the variant is quite dissimilar in morphology to any other *Stegomyia* species so misidentification would be very unlikely.

Sixteen morphologic variants out of a total of 3,654 *Aedes (Stegomyia) ledgeri* Huang were reared from bamboo pot ovitraps exposed through the 1994, 1995, and 1997 summers in wooded savanna in the Northern Province. One female specimen came from a farm near Mica, a single male came from Skukuza in the Kruger National Park, and 7 females and 7 males were obtained from pots exposed at Pafuri in northern Kruger National Park. A typical female scutum is shown in Fig. 1c and the variant female scutum in Fig. 1d. In the former, a median thin white stripe normally occurs on the posterior 0.2 of the scutum, matching the length of the 2 adjacent posterior dorsocentral stripes. However, among the variant mosquitoes, the median stripe is longer, varying from slightly over 0.2 up to a complete stripe that extends up to the median spot located on the anterior promontory of the scutum. A variant with a complete stripe might be confused with other *Stegomyia* species including *Aedes demeilloni* Edwards, *Aedes dendrophilus* Edwards, and *Aedes contiguus* Edwards, but can be distinguished according to the leg markings, with a useful distinguishing feature in *Ae. ledgeri* being the anterior white spot about half way on the hind femur. Recent unsuccessful attempts by the author to colonize *Ae. ledgeri* have shown that the species is eurygamous, which precludes it from mating inside small cages. This means that a study of morphologic variation within families would not be practical unless adult female mosquitoes could be collected directly in the field and their progeny reared.

However, biting females of *Ae. ledgeri* are very rarely encountered. In the future, specimens could be preserved in 75–95% ethanol immediately after collection and held at 4°C until DNA was extracted for analysis (Post et al. 1993).

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