

***PSEUDALBUGINOSUS*, A NEW SUBGENUS OF *AEDES*, AND A
REDESCRIPTION OF *AEDES (PSEUDALBUGINOSUS) GRJEBINEI*
HAMON, TAUFFLIEB, AND MAILLOT (DIPTERA: CULICIDAE)**

YIAU-MIN HUANG AND LEOPOLDO M. RUEDA

(YMH) Department of Entomology, P.O. Box 37012, MSC C1109, MRC 534, Smithsonian Institution, Washington, D.C. 20013-7012, U.S.A. (e-mail: huangy@si.edu); (LMR) Walter Reed Biosystematics Unit (WRBU), Smithsonian Institution, Museum Support Center, Suitland, MD 20746, U.S.A. (e-mail: ruedapol@si.edu) and Entomology Branch, Walter Reed Army Institute of Research, Silver Spring, MD 20910 USA

Huang: urn:lsid:zoobank.org:author:FC2D8237-F023-4D80-BED5-7BDA54D4C467
Rueda: urn:lsid:zoobank.org:author:D8DB81FA-C54D-45AF-962E-8FEF493FB3A7

Abstract.—*Pseudalbuginosus*, a new subgenus of *Aedes* Meigen, is characterized and diagnosed. *Aedes grjebinei* Hamon, Taufflieb, and Maillot is removed from the subgenus *Aedimorphus* Theobald and placed in the new monotypic subgenus *Pseudalbuginosus* on the basis of a critical study of all known specimens. The adult male and the male genitalia of *Ae. (Pseudalbuginosus) grjebinei* are described, with the illustration of the genitalia and images of the proboscis and maxillary palpi. Its affinity to other subgenera of the genus *Aedes* is discussed. Information on type data, distribution, bionomics, medical importance and a taxonomic discussion of this species are presented.

Key Words: *Pseudalbuginosus*, new subgenus, *Aedes grjebinei*, characteristics, systematics, Culicidae, Gabon

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Hamon, Taufflieb and Maillot (1957: 695) described *Aedes grjebinei* from specimen collected in Forêt de Bangou, Gabon and placed it in the subgenus *Aedimorphus* Theobald. Reinert (1987: 307) noted that “Adults of *Ae. grjebinei* also were not available for examination, but there is no doubt this species should be included in *Albuginosus* based on the information provided in the original description.” After critical study of all known

specimens, it is obvious that *Ae. grjebinei* should not be included in the subgenus *Albuginosus*, as we noted previously (Huang and Rueda 2015). This paper formally deals with this taxonomic change for *Ae. grjebinei* with the description herein of *Pseudalbuginosus*, a new monotypic subgenus of the genus *Aedes* Meigen. The new subgenus is very distinct from other subgenera of the genus *Aedes*. The original descriptions of *Ae. grjebinei* by

Hammon *et al.* (1957) are incomplete, lack morphological details and provide no illustrations. The adult male and the male genitalia of *Ae. grjebinei* are herein redescribed, with the illustration of the genitalia and images of the proboscis and maxillary palpi. Huang (2001) and Huang and Rueda (2015) provided the pictorial keys for the identification of this species, including images of the head, thorax and legs for morphological diagnosis. Information on the type data, distribution, bionomics, medical importance, and a taxonomic discussion of this species are presented. The suggested abbreviation for the subgenus *Pseudalbuginosus* is *Pal.*

MATERIALS AND METHODS

This study is based on specimens in the mosquito collection of the Department of Entomology, National Museum of Natural History (USNM), Smithsonian Institution. Other specimens were borrowed from the individuals and institutions noted in the acknowledgments. The terminology follows Harbach and Knight (1980, 1982) with the exception of “tarsal claws,” which is retained for “ungues.” Terminology for wing venation follows Belkin (1962).

Genus *Aedes* Meigen

Pseudalbuginosus Huang and Rueda,
new subgenus

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Type species: *Aedes grjebinei* Hamon, Taufflieb, and Maillot, 1957, by present designation.

Aedes (*Aedimorphus*) *grjebinei* of Hamon, Taufflieb, and Maillot, 1957: 695 (M).

Characteristics.—The subgenus *Pseudalbuginosus* is characterized by the following combination of characters: *Adults*: (1) Vertex with erect forked scales numerous, not restricted to occiput and with

a pair of white patches of broad, flat scales, one on either side of the dorsal midline above eye margins; (2) maxillary palpus (Fig. 1) of male about as long as proboscis, with five palpomeres, dark, with a broad white band at base of last palpomere; palpomeres 4 and 5 subequal in length, short (the total length of palpomeres 4 and 5 shorter than palpomere 3), somewhat downturned and hairy; (3) proboscis of male with a complete pale (white) band in middle; (4) antennal pedicel with a patch of broad overlapping white scales on mesal surface; (5) scutum with a large silvery-white patch of broad scales on anterior scutal fossal area; (6) acrostichal setae present; (7) paratergite with broad white scales; (8) postspiracular setae present; (9) lower prealar scale-patch absent; (10) subspiracular area without scales; (11) postprocoxal membrane without scales; (12) lower mesepimeral setae absent; (13) scutellum with broad white scales on all lobes; (14) hindfemur with an apical white spot; (15) hindtibia with an apical white spot; (16) hindtarsus with an apical white band on tarsomeres 1-4, tarsomere 5 all white. Male Genitalia: (17) Aedeagus strongly toothed; (18) claspette developed as short, narrow, plaque bearing two short setae at apex; (19) gonostylus attached at apex of gonocoxite, long, basal 0.6 narrow, distal part broader with a few fine setae, and with a slender branch externally towards tip; (20) gonostylar claw a short, broad, leaf-like appendage attached on the stouter terminal portion; (21) paraproct long, apex bluntly rounded, with three cercal setae; (22) tergum IX slightly concave medially, with four to five setae on each side. This combination of characters distinguishes *Pseudalbuginosus* from all other subgenera of *Aedes*.

Systematics.—*Aedes grjebinei* shows a number of similarities with species in the *Apicoannulatus* group of subgenus

Aedimorphus Theobald and *Albuginosus* Reinert. The adult of *Ae. grjebinei* shares more important characters with the subgenus *Albuginosus* than with the *Apicoannulatus* group in having the vertex with a pair of white patches of broad, flat scales, one on either side of the dorsal midline above eye margins, with erect forked scales numerous, not restricted to the occiput; the pedicel with a patch of broad overlapping white scales on the mesal surface; and the scutum with a silvery-white patch of broad scales on the anterior scutal fossal area. However, adults of *Ae. grjebinei* can be easily distinguished from those of *Albuginosus* by the subspiracular area without scales. On the other hand, this character is shared with species of *Apicoannulatus* group. In the *Apicoannulatus* group, the pedicel has a few setae and scales on the mesal surface (see the figure of the head on Page 47a of Huang 2001). The male genitalia of *Ae. grjebinei* are strikingly different from all the known species of the subgenus *Albuginosus*, in having the gonostylus with a short, broad, leaf-like gonostylar claw that is attached on the stouter terminal portion. Because of these differences, we propose that a distinct subgenus, *Pseudalbuginosus*, be recognized for this species.

The subgenus *Pseudalbuginosus* possesses some rather important basic characters in common with the subgenera *Aedimorphus*, *Albuginosus*, *Diceromyia* Theobald and *Stegomyia* Theobald of the genus *Aedes*: male maxillary palpus with 5 palpomeres; aedeagus strongly toothed; claspette developed. These shared characters indicate the affinity of *Pseudalbuginosus* to these 4 subgenera.

The adult males of *Pseudalbuginosus* are very similar in some characters to those of *Stegomyia*, such as having the paratergite with broad white scales, the lower prealar scale patch absent, and the scutellum with broad scales on all lobes. It

can easily be distinguished from those of *Stegomyia* by the vertex with numerous erect forked scales, not restricted to the occiput; the acrostichal setae present; the subspicular area without scales; and the hindtarsus with an apical white band on tarsomeres 1-4, tarsomere 5 all white.

The males of *Pseudalbuginosus* are very similar to those of *Stegomyia* in having the maxillary palpus about as long as the proboscis, with five palpomeres, dark, with a broad white band at base of the last palpomere. Palpomeres 4 and 5 short (the total length shorter than palpomere 3), subequal in length, somewhat downturned and hairy (Fig. 1). In *Stegomyia*, the maxillary palpus of males has palpomeres 4 and 5 long (total length longer than palpomere 3), subequal in length, slender, upturned, and with only a few short setae (see Fig. 1B, on page 518 of Huang 2005).

The maxillary palpus of the *Pseudalbuginosus* male is very similar to males of subgenus *Diceromyia*. In *Diceromyia*, the maxillary palpus of males has very short, swollen and downturned, palpomeres 4 and 5 (total length shorter than palpomere 3), with a few short setae; palpomere 4 swollen, with a few short stiff setae at apex; and palpomere 5 much shorter than palpomere 4, or palpomere 5 minute (see Fig. 1C, on page 518 of Huang 2005).

Adult males of *Pseudalbuginosus* can be distinguished from those of *Diceromyia* by having the pedicel with a patch of broad overlapping white scales on the mesal surface. In *Diceromyia*, the pedicel has setae mixed with many broad, flat scales on the mesal surface (see 2 figures of the head on Page 46a of Huang 2001). In *Stegomyia*, the pedicel has broad overlapping white scales on both the mesal and lateral surfaces.

The male genitalia of *Ae. grjebinei* have the gonostylus with a slender branch externally towards the tip, the stouter terminal

portion bearing a short, broad, leaf-like gonostylar claw, which distinguishes it from all the known species in the subgenus *Albuginosus* (see the description above of the male genitalia of *Ae. grjebinei*) as well as from other subgenera of *Aedes*.

Etymology.—*Aedes grjebinei* shares more important characters in adults with *Albuginosus* than with the adults of any other subgenus. Because of this similarity, Reinert (1987: 307) concluded that "there is no doubt this species should be included in *Albuginosus*". Therefore, we choose *Pseudalbuginosus* for this species. The subgenus name is derived from *pseud* (Gk., false, deceptive) and *Albuginosus*, the name of the subgenus it most closely resembles.

Aedes (Pseudalbuginosus) grjebinei
Hamon, Taufflieb, and Maillot

(Figs. 1, 2)

Aedes (Aedimorphus) grjebinei of Hamon, Taufflieb, and Maillot, 1957: 695 (Male).

Redescription of adult male of *Ae. grjebinei*.—As described for the subgenus, exhibiting the following additional features. — **Head:** Antennae shorter than proboscis, plumose, setae directed primarily dorsally and ventrally; vertex with broad and narrow dark or light scales mesally, pale narrow curved scales on lateral areas and on occiput, and broad flat decumbent scales on sides.

Thorax: Scutum with narrow curved dark scales, with a pair of small white spots of broad scales in middle; dorso-central setae present; antepnotum with broad white scales; postpronotum with a few narrow dark scales on upper area; prespiracular setae absent; patches of broad white scales on proepisternum, upper and lower areas of mesokatepisternum and upper mesepimeron; metameron and

mesopostnotum bare. **Wing:** With narrow dark scales on all veins except for minute basal spot of white scales on costa; wing membrane not clouded on crossveins r-m and m-cu; remigial setae absent; upper calypter fringed with hair-like setae; alula with a row of fringe scales; vein 1A ending well beyond base of fork of vein Cu; vein R₂₊₃ shorter than vein R₂. **Halter:** With white scales. **Legs:** Coxae with patches of white scales; fore- and mid-femora with apical white spot (white knee spot); fore- and midtibiae with apical white spot; foretarsomere 1 with a small apical pale spot, tarsomeres 2-5 all dark; mid-tarsomeres 1-5 all dark. Foreleg with tarsal claws unequal, both toothed; midleg with tarsal claws unequal, large one simple, smaller one toothed; hindleg with tarsal claws equal, both simple. **Abdomen:** Tergum I with white scales on laterotergite; tergum II with lateral white spot; terga III-VI each with basal white band and lateral white spots not connecting with basal white band.

Male.—**Genitalia** (Fig. 2): Gonocoxite 2.2 times as long as wide (width measured 0.5 from base), without basal dorsomesal and apical dorsomesal lobes, with setae scattered on dorsomesal surface and on mesal margin of ventral surface; mesal membrane from base to apex.

Females, pupae, larvae and eggs.—Unknown.

Type data.—Holotype male, with genitalia on microscope slide (T. 1085), in Institut de Recherche pour le Développement (IRD); type locality: GABON. — Forêt de Bangou, Moyen, Congo, cercle MAYAMA, 16-5-1957 (J. Hamon ORSTOM).

Other materials examined.—Three males from Cameroun: Male (#1458), with 3 data labels: (1) Cameroun, Mt. Eloumden, 18-9-64, A. Rickenbach ORSTOM; (2) No. 1458; and (3) *Ae. (Aed.) grjebinei* Rickenbach det. Genitalia on microscope



Fig. 1. *Aedes (Pseudalbuginosus) grjebinei* Hamon, Taufflieb, and Maillot, maxillary palpus and proboscis of the male, lateral view.

slide: No. 1458; *Ae. (Aed.) grjebinei* H.T.et M.; Rickenbach det. Male (#1457), with 3 data labels: (1) Cameroun, N'Kolbisson, 9-9-64, A. Rickenbach ORSTOM; (2) No. 1457; and (3) *Ae. (Aed.) grjebinei* Rickenbach det. Genitalia on microscope slide: No. 1457; *Ae. (Aed.) grjebinei* H.T.et M.; Rickenbach det. Male (#2212), with 3 data labels: (1) Cameroun, N'Kolbisson, 30-12-64, A. Rickenbach ORSTOM; (2) No. 2212; and (3) *Ae. (Aed.) grjebinei* Rickenbach det. Genitalia on microscope slide: No. 2212; *Ae. (Aed.) grjebinei* H.T.et M.; Rickenbach det. All specimens in the Institut de Recherché pour le Developpement (IRD).

Distribution.—Presently known from Gabon and Cameroon. Taxonomic discussion. — *Aedes grjebinei*, formerly placed in the subgenus *Aedimorphus*, differs

significantly from all other species in the *Apicoannulatus* group of subgenus *Aedimorphus* and subgenus *Albuginosus* and is excluded from those subgenera. This species, therefore, should be in subgenus *Pseudalbuginosus* (see the discussion mentioned under the Systematics of *Pseudalbuginosus*).

Bionomics.—The holotype male was collected in Forêt de Bangou, Gabon and three other male specimens were from N'Kolbisson, (Cameroun) Cameroon.

Medical importance.—Unknown.

Remarks.—Edwards' (1932) classification of the genus *Aedes* is currently still the only completed classification that we are able to follow for this paper. To avoid confusion, we are using Edwards' (1932, 1941) classification of the genus *Aedes*.

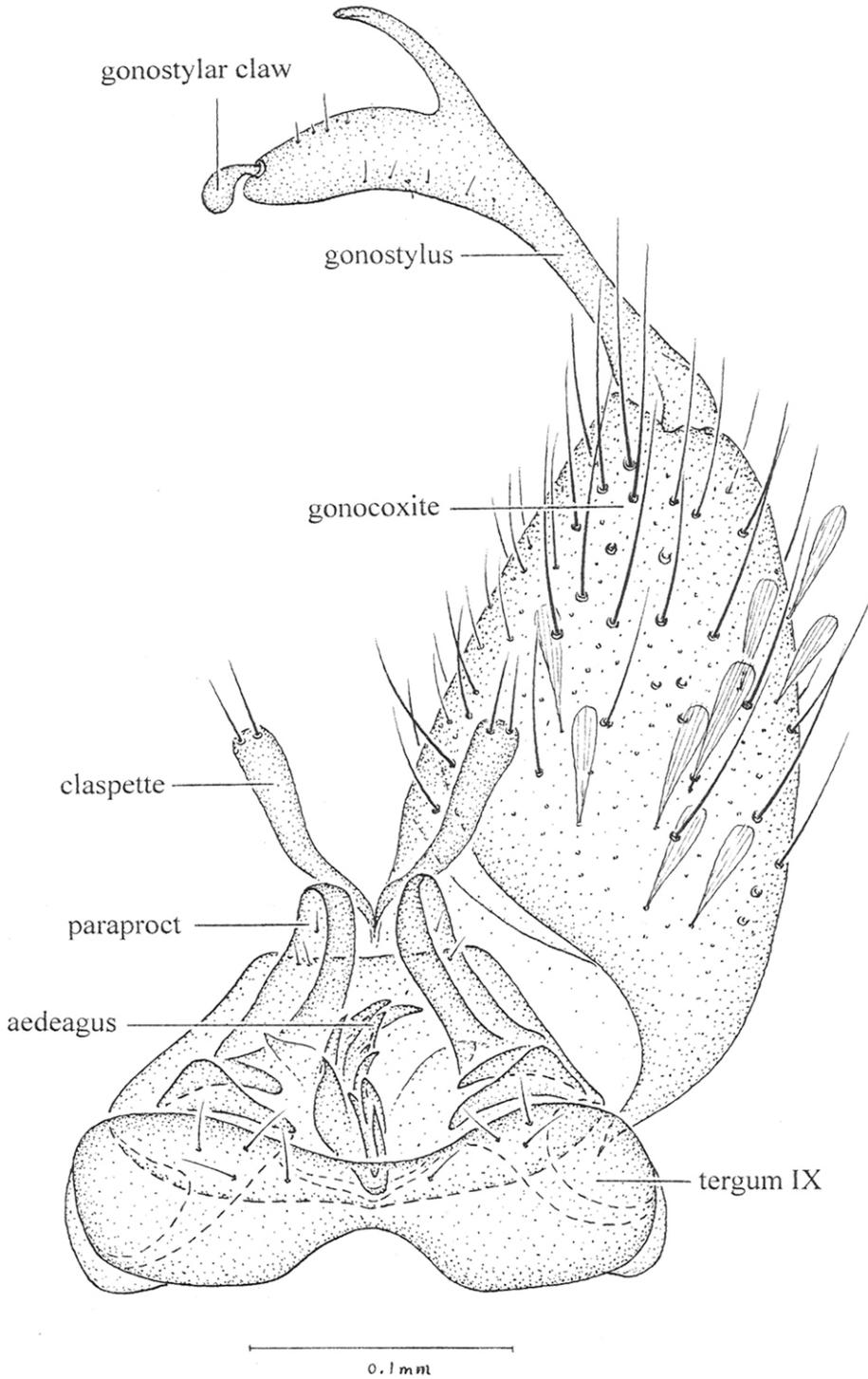


Fig. 2. *Aedes (Pseudalbuginosus) grjebinei* Hamon, Taufflieb, and Maillot, male genitalia, tergal aspect.

Unfortunately, there is no other classification that can be used for studying *Aedes* mosquitoes of the Afrotropical Region. Although Reinert *et al.* (2004, 2006, 2008, 2009) substantially revised the classification of the tribe Aedini, we do not accept herein their classification because their results were based on partial treatments of several groups, and the selection of exemplars in some cases did not represent the known complexity and diversity within a group. This paper does not intend to address or answer every question about their classification, and for details, please see specific remarks of Huang (2005: 527, 528), Huang *et al.* (2012: 202, 203) and Huang and Rueda (2014: 594). Furthermore, for reference purposes, the current “Systematic Catalog of Culicidae” in the Walter Reed Biosystematics Unit website (WRBU 2015) includes the classification of family Culicidae, having tribe Aedini, with separate lists of taxa based on old and new arrangements.

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