

RESEARCH ON THE MOSQUITO SUBFAMILY TOXORHYNCHITINAE (DIPTERA: CULICIDAE) II—DESCRIPTION OF THE AFROTROPICAL SUBGENUS *AFRORHYNCHUS* SUBGEN. NOV.^{1,2}

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ABSTRACT. The *lutescens* group of Edwards is removed from the subgenus *Toxorhynchites* and given subgeneric rank. Four subgenera are now recognized within the genus *Toxorhynchites*: *Ankylorhynchus* and *Lynchiella*, Neotropical; *Toxorhynchites*, Gondwanian, represented in the Afrotropical Region by the *brevipalpis* group of Edwards; and *Afrorhynchus* subgen. nov., purely Afrotropical. The new taxon, typified by *Toxorhynchites lutescens*, is described and a key to all four subgenera is provided.

INTRODUCTION

The mosquito family Culicidae (Diptera) includes the three subfamilies Anophelinae, Culicinae and Toxorhynchitinae (Edwards 1932). The latter, containing only the genus *Toxorhynchites* Theobald, has predacious larvae which are potential agents of biocontrol of other mosquitoes (Steffan and Evenhuis 1981). Within the genus *Toxorhynchites*, the following three subgenera are currently recognized; *Toxorhynchites*, with about 50 species and subspecies occurring throughout the Oriental, Afrotropical and Australian regions, with some extensions into the Palaearctic; *Lynchiella* Lahille, with 14 species of the Neotropical Region; and *Ankylorhynchus* Lutz, with only four species of the Amazon basin (Brazilian Subregion of the Neotropical) (Knight and Stone 1977, Knight 1978, Ward 1984, Gaffigan and Ward 1985).

The Afrotropical species are currently classified into the *brevipalpis* and *lutescens* groups (Edwards 1941, Service 1990, Ribeiro 1991a). The species of the *brevipalpis* group are very near to those of the Oriental *splendens* group,

and, along with the Oriental *christophi* group, may be considered as one of the three groups of the *splendens* series (Steffan and Evenhuis 1985). The *lutescens* group, on the contrary, exhibits characters that clearly separate it not only from the *brevipalpis* group but also from all the other groups within the subgenus *Toxorhynchites*, as well as from the subgenera *Ankylorhynchus* and *Lynchiella*. Accordingly, the *lutescens* group is removed from the subgenus *Toxorhynchites* and recognized as a new subgenus, endemic to the Afrotropical Region.

TAXONOMIC TREATMENT

Genus *Toxorhynchites* Theobald

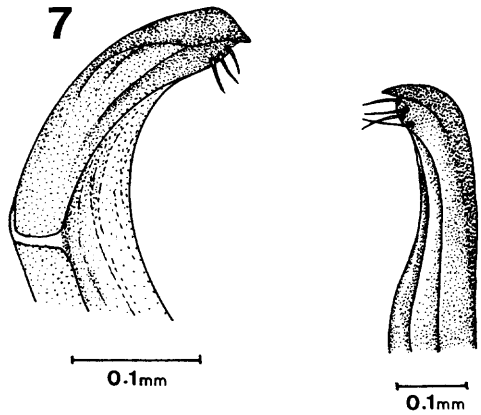
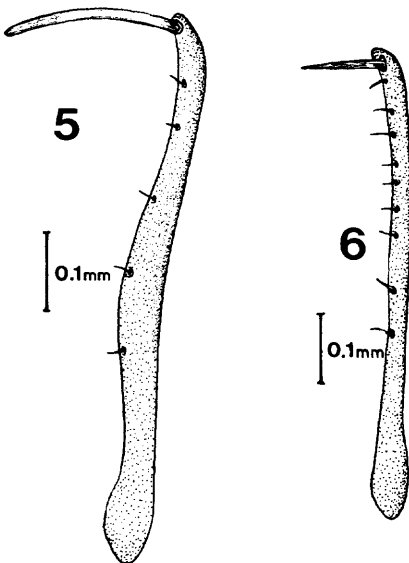
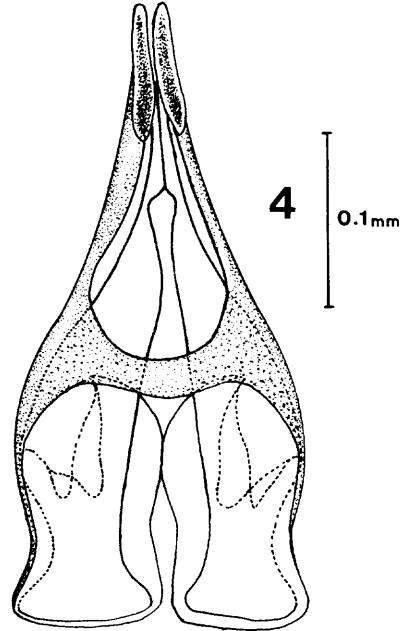
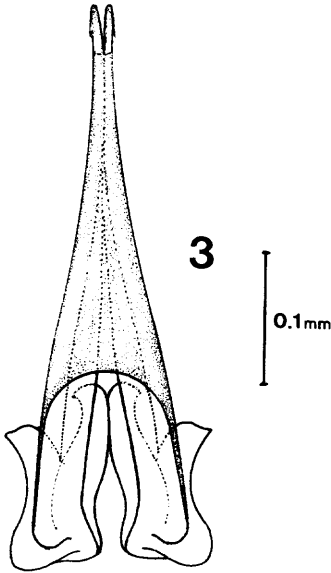
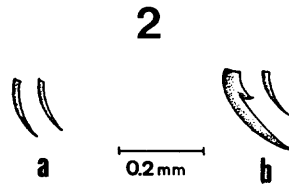
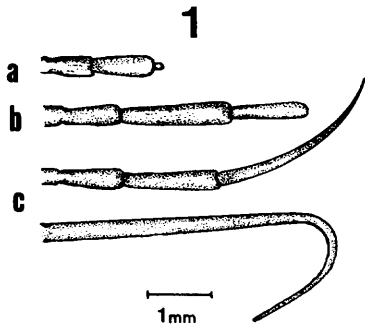
Subgenus *Afrorhynchus* subgen. nov. (Figs. 1a,2a,3,5,7)

Type species. *Toxorhynchites lutescens* Theobald, 1901

Diagnosis. ♀♂: Mesokatepisternum with, at least, a small patch of golden scales below, usually also above; scales on forecoxa all or almost all golden; hindfemur golden-scaled beneath; laterotergite with few or no scales; lateral aspects of abdominal terga golden scaled; caudolateral tufts of abdominal terga either golden, orange or red, never white,

¹ The first article of this series is published elsewhere. See Ribeiro 1991a.

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brown or black; pale scales on abdominal sterna golden, never white. ♀: maxillary palpus short, only about 0.25 length of proboscis, with rounded apex, and apparently made up of only 2 palpomeres owing to extreme reduction of palpomere 3; antenna normal, not subplumose. ♂: tarsal claws of midleg small, equal and simple; gonostylus widened at middle; gonostylar claw set at a right angle, blunt tipped and long, from about 0.25 to almost 0.33 of gonostylus; dorsal bridge of aedeagus wide or very wide; paraproct appearing divided by a transverse unsclerotized band.

Etymology. The name of the new subgenus refers to its geographical distribution and to the peculiar shape of the proboscis throughout the genus. The three-letter abbreviation *Afr.* is recommended for this subgenus.

Remarks. The taxonomy of the Toxorhynchitinae at the genus-group level has been mainly based on the structure of the female maxillary palpi and antennae, which seem to show the most primitive (plesiomorphic) conditions in the Amazonian subgenus *Ankylorhynchus*. On the contrary, these organs exhibit an apparently derived (apomorphic) structure in the subgenus *Toxorhynchites* and in the new Afrotropical subgenus *Afrorhynchus*, while the widespread Neotropical *Lynchiella* has similar antennae and maxillary palpi of an intermediate type. The distinction between the new subgenus and the other three subgenera is quite clear.

In *Afrorhynchus*, both sexes have extensive body areas clothed with golden scales, the caudolateral tufts are always golden, orange or red in color, never white, black or brown, and the laterotergite has few or no scales. In males, the midungues are small, equal and simple, the gonostylus is noticeably widened at middle, the gonostylar claw is long, there

is a wide dorsal aedeagal bridge, and a transverse unsclerotized band is present on the paraproct.

As defined, *Afrorhynchus* is endemic to the Afrotropical Region and includes the following species: *Toxorhynchites lutescens* Theobald, 1901, *Tx. aeneus* (Evans 1926), *Tx. erythrurus* (Edwards 1941), *Tx. kaimosi* (Van Someren 1946), *Tx. nairobiensis* (Van Someren 1946), *Tx. pauliani* (Doucet 1951), *Tx. ruwenzori* (Van Someren 1948), *Tx. viridibasis* (Edwards 1935), and a new, yet unpublished species from the island of Sao Tome (Ribeiro 1991b).

The following provisional key will separate the four subgenera of the genus *Toxorhynchites*, at least in the female.

Key to the subgenera of *Toxorhynchites*

Adults

1. ♀♂: Mesokatepisternum with at least a small patch of golden scales below, usually also above; scales on forecoxa all or almost all golden; laterotergite with few or no scales. ♂: Midungues small, equal and simple; gonostylus noticeably widened at middle; gonostylar claw long, from about 0.25 to almost 0.33 of gonostylus; dorsal bridge of aedeagus wide; paraproct appearing divided into a proximal and a distal portion by a narrow unsclerotized transverse band. Afrotropical Region *Afrorhynchus*
- ♀♂: Mesokatepisternum without golden scales; scales on forecoxa all white; laterotergite densely clothed with scales. ♂: Midungues unequal, one of them toothed and stronger; gonostylar claw small, 0.13 to about 0.20 of gonostylus;

Figs. 1-8. Some subgeneric characters of the genus *Toxorhynchites*. 1, Structure of female maxillary palpi in *Toxorhynchites* and *Afrorhynchus* (a), *Lynchiella* (b) and *Ankylorhynchus* (c), with proboscis for comparison. 2, Midtarsal claws of males in *Afrorhynchus* (a) and in the other subgenera (b). 3, Structure of aedeagus in *Afrorhynchus* showing very large dorsal aedeagal bridge. 4, Aedeagus of *Tx. (Tox.) brevipalpis brevipalpis* Theobald (Maputo, Mozambique) showing narrow dorsal aedeagal bridge. 5, Gonostylus and gonostylar claw of *Tx. (Afr.) lutescens* (holotype) showing widened gonostylus and long gonostylar claw characteristic of *Afrorhynchus*. 6, Gonostylus and gonostylar claw of *Tx. (Tox.) phytophygus* Theobald (Mbandaka, Zaire). 7, Paraproct of *Tx. (Afr.) lutescens* (holotype) showing unsclerotized transverse band characteristic of the new subgenus. 8, Paraproct of *Tx. (Tox.) phytophygus* (Mbandaka, Zaire).

- dorsal aedeagal bridge narrow; para-proct without unsclerotized transverse band 2
2. ♀: Antenna subplumose, with long verticillate hairs; maxillary palpus about as long as proboscis, with 3 distinct palpomeres, of which the apical one is the longest, pointed and directed upward. Amazon basin (Brazilian Subregion of the Neotropical) *Ankylorhynchus*
- ♀: Antenna normal, not subplumose; maxillary palpus obviously shorter than proboscis 3
3. ♀: Maxillary palpus about 0.67–0.75 length of proboscis, blunt tipped, and with 3 distinct palpomeres, of which the second is the longest. Neotropical Region, with extensions into the Nearctic *Lynchiella*
- ♀: Maxillary palpus with only 2 distinct palpomeres and shorter, about 0.25 of proboscis. Oriental, Afrotropical and Australian regions, with extensions into the Palaearctic *Toxorhynchites*

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