

# Taxonomy of Afrotropical *Securiops*, new genus, and *Cloeodes* Traver (Ephemeroptera: Baetidae)

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Based on the examination of type material, new collections, and associated life-history stages, certain species and generic concepts are revised. We recognize new synonyms for the pantropical genus *Cloeodes* Traver [= *Potamocloeon* Gillies, syn. n.; = *Maliqua* Lugo-Ortiz & McCafferty, syn. n.] and the following new species synonyms and new combination: *C. dentatus* (Kimmins), comb. n. [= *M. plumosa* (Wuillot), syn. n.; = *M. abdallahi* McCafferty, syn. n.]. First descriptions of male alates are provided for *C. portabilis* Lugo-Ortiz & McCafferty and *C. pseudogladius* Gattolliat. A species previously placed in the genus *Afrobaetodes* Demoulin instead belongs to *Cloeodes* [*C. pusillus* (Navás), comb. n.]. *Securiops*, gen. n., is established for the larvae formerly and incorrectly attributed to *Potamocloeon*, and this genus contains four species, including *S. macafertiorum* (Lugo-Ortiz), comb. n., the type species. We name three new species: *S. mandrare*, sp. n., *S. megapalpus*, sp. n., and *S. mutadens*, sp. n.

**Key words:** Ephemeroptera, Baetidae, *Securiops*, new genus, new species, *Cloeodes*, *Maliqua*, *Potamocloeon*, new synonyms, *Afrobaetodes*.

## INTRODUCTION

Despite recent advances, the Afrotropical Ephemeroptera fauna is in need of more detailed faunistic and systematic research (Barber-James 1994; Elouard 2001; McCafferty 2002; Jacob 2003; Barber-James & Lugo-Ortiz 2003). The faunae of northern Africa (Thomas 1998; Beauchard *et al.* 2003), South Africa (McCafferty & de Moor 1995; Barber-James & Lugo-Ortiz 2003), and Madagascar (Sartori *et al.* 2000; Elouard *et al.* 2001; Benstead *et al.* 2003; Elouard *et al.* 2003) are relatively well documented. Eastern and western Africa have been sampled to a lesser extent (Mathooko 1998; Lévêque *et al.* 2003). Nevertheless, the fauna of much of the continent remains unknown (Elouard 2001: fig. 3). The mayfly family Baetidae, in particular, requires more study (Gattolliat & Sartori 2003; Gattolliat & Jacobus 2005). It is among the most challenging groups of Ephemeroptera, and it is one of the most rich in species (Lugo-Ortiz & McCafferty 1999; Brittain & Sartori 2003). In this study, we offer new data and taxonomic revision pertaining to a small portion of the Afrotropical Baetidae.

## BACKGROUND

*Cloeon dentatum* Kimmins was described based on adults that were collected from Uganda

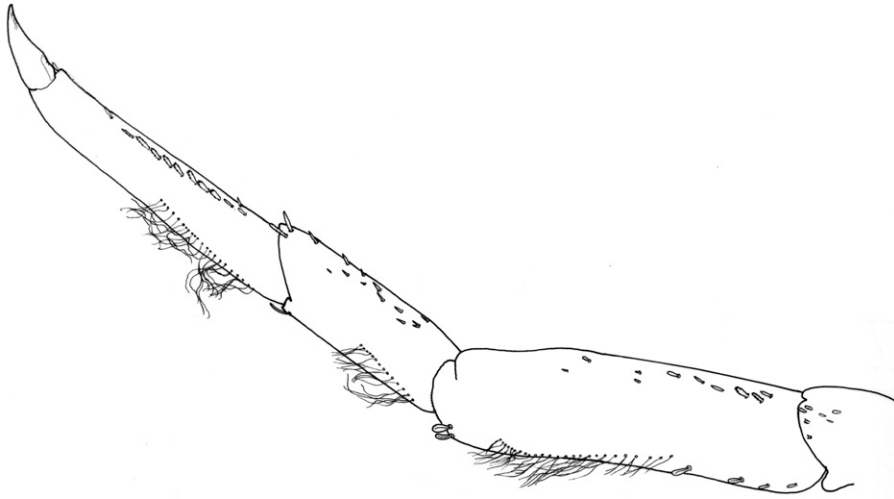
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(Kimmins 1956). Subsequent reports of the species from Uganda were made by Tjønneland (1960) and Gillies (1980). Gillies (1980) also reported this species from the Ivory Coast, but he did not specify the basis of that report. Gillies (1988: figs 14–30) described some distinctive larvae from Guinea as those of *C. dentatum*, noting that the association was not based on rearing, and therefore tentative. *Cloeon dentatum* was the only Afrotropical species of the genus *Cloeon*, *sensu lato*, for which the larva was unknown at the time, and adults similar to *C. dentatum* had been collected from the same location. Based on this concept of the larva, Gillies (1988) also reported the species from Gambia and the Ivory Coast.

The genus *Potamocloeon* Gillies (1990) was established later for *C. dentatum*. A second species, *P. macafertiorum* Lugo-Ortiz subsequently was described based on a larva from South Africa (Lugo-Ortiz & McCafferty 1996). Jacobus & McCafferty (2005) reported additional material of the latter species and discussed its distinctiveness. Gattolliat (2003) described two unnamed *Potamocloeon* species from Madagascar.

## OBSERVATIONS

We examined the *P. dentatum* holotype and additional material from the type locale. These



**Fig. 1.** *Cloeodes dentatus*. Foreleg.

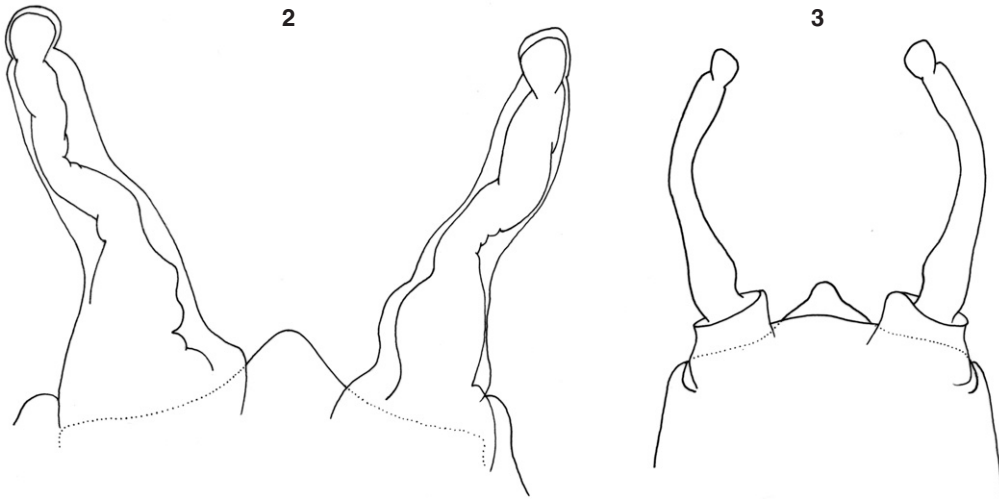
male adults are characterized by the absence of hindwings and by having distinctive genital forceps (Demoulin 1970). However, the forceps do not resemble the figure provided by Kimmins (1956: fig. 9) or the reillustration provided by Lugo-Ortiz & McCafferty (1996: fig. 19). The second segment of the forceps is expanded proximally, and the third segment is bowed, distally truncate, and about twice as long as wide.

We examined specimens that Gillies (1988) used to make his explicitly tentative association of larva and adult. The only adults that we located are damaged females that lack distinctive colouration, and the generic identity of these specimens cannot be determined. Therefore, we conclude that there was no basis for associating a larva with *P. dentatum*, as Gillies (1988) had done.

The adults Gillies (1988) had identified as *P. dentatum* were collected from the same location as type material of the species *Maliqia plumosa* (Wuillot) (in Wuillot & Gillies 1993), which was designated as the type species of the genus *Maliqia* Lugo-Ortiz & McCafferty (1997). The male adult and larva of this latter species have been associated positively by rearing (Wuillot & Gillies 1993). The holotype of *M. plumosa* is identical to the *P. dentatum* holotype and to additional male adults that we examined.

Examination of larval exuviae from the type material of *M. plumosa* indicates that certain characters associated with the species have been overlooked or misinterpreted in previous studies. In contrast to previous descriptions (Wuillot &

Gillies 1993; Lugo-Ortiz & McCafferty 1997), the claws have no denticles; sterna 2–6 have symmetrical rows of setae and/or setal pits; and the femora, tibiae, and tarsi have arching rows of long, thin setae (Fig. 1). These characters are the same as those described for the species *M. abdallahi* McCafferty (2000), and they are typical of the pantropical genus *Cloeodes* Traver (Waltz & McCafferty 1987). Lugo-Ortiz & McCafferty (1997) had distinguished *Maliqia* from *Cloeodes* by the larvae having tufts of setae between the prosthecae and molae of both mandibles, the prostheca of the left mandible with three blunt denticles and a comblike process, and minute denticles on the claws. *Maliqia* alates were distinguished from those of *Cloeodes* by having forewings with single marginal intercalary veins. Examination of *Cloeodes maculipes* Traver material from Puerto Rico [the type species of the genus (Traver 1938)] and material of each of the other five Afrotropical species (Waltz & McCafferty 1994; de Moor & McCafferty 1996; Gattolliat 2001) revealed that each of these species also has a distinctively shaped prostheca on the left mandible (similar to *Maliqia*), setae between the mola and prostheca of both mandibles, and at least some single marginal intercalaries in the forewing (see, e.g., Waltz & McCafferty 1987: figs 3, 4, 18, 19). The newly associated male alates of *C. pseudogladius* Gattolliat and *C. portabilis* Lugo-Ortiz & McCafferty, described below, also have single marginal intercalaries in the forewing. For reviews of recent literature pertaining to *Cloeodes*, see Gattolliat



**Figs 2–3.** *Cloeodes portabilis*. **2**, Male subimago genitalia (reared); **3**, male adult genitalia (associated with subimago).

(2001) and Tong *et al.* (2003). Monaghan *et al.* (2005) recently used molecular techniques to explore the biogeography of some Malagasy small minnow mayflies, including *Cloeodes*.

#### NEW DESCRIPTIONS OF LIFE-HISTORY STAGES

***Cloeodes portabilis*** Lugo-Ortiz & McCafferty, 1999 (Lugo-Ortiz *et al.* 1999: 208)

##### *Description*

*Male subimago.* Length: body 5.2 mm. Forewing 5.2 mm. Body colour: light brown. *Head:* turbinate eyes purple. Antenna pale proximally, brown distally. *Thorax:* forewing hyaline, with marginal intercalary veins occurring singly between longitudinal veins; pterostigma with four crossveins, only proximal crossveins reaching subcosta. Hindwing absent. Legs pale; femur with broad dark brown patch medially. *Abdomen:* terga pale, sometimes with faint transverse brown stripe anteriorly; sterna pale, unmarked. Genitalia (Fig. 2) with forceps three-segmented; annulation between segments 1 and 2 faint. Forceps base without apophysis; segment 1 stout, inner margin with rounded apophysis; segment 2 with subparallel margins; segment 3 truncate. Caudal filaments broken and missing.

*Remarks.* We tentatively associate a male adult (genitalia in Fig. 3) with the reared subimago described above.

***Cloeodes pseudogladus*** Gattolliat, 2001: 395  
= *Cloeodes pseudoglodius* Gattolliat, 2001: 387,  
incorrect spelling.

##### *Description*

*Male adult.* Length: body 5.1 mm. Forewing 4.8 mm. Body colour: brown. *Head:* turbinate eyes purple. Antenna light brown. *Thorax:* colour coppery brown. Forewing hyaline (Fig. 4), with marginal intercalary veins occurring singly between longitudinal veins; pterostigma with four to five crossveins generally reaching subcosta. Hindwing absent. Legs pale, with dark brown longitudinal line on coxa, trochanter, and proximal half of femur. *Abdomen:* terga pale with dark brown pattern (similar to larva; Gattolliat 2001: fig. 28), pronounced on tergum 5, faint on tergum 4; sterna with anterior dark brown transverse stripes. Genitalia (Fig. 5) with forceps three-segmented; annulation between segments 1 and 2 faint. Forceps base without apophysis; segment 1 stout, inner margin with rounded apophysis, oriented slightly dorsally; segment 2 with subparallel margins; segment 3 truncate, width subequal to length. Caudal filaments broken and missing.

#### REVISIONS

Based on the observations detailed above, we conclude that the genera *Potamocloeon* and *Maliqia* are equivalent to *Cloeodes* [*Cloeodes* = *Potamocloeon*, *syn. n.*; = *Maliqia*, *syn. n.*], and we recognize the

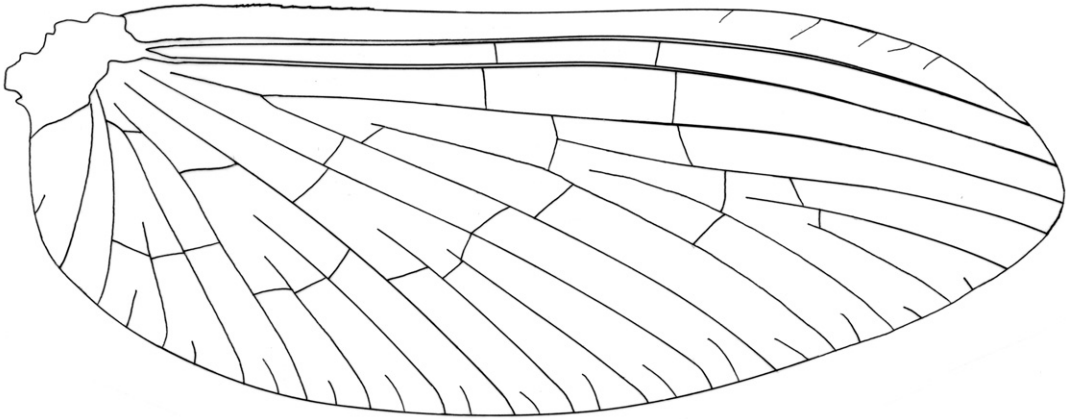


Fig. 4. *Cloeodes pseudogladius*. Adult male, forewing.

following new combination and new species synonyms: *Cloeodes dentatus*, **comb. n.** [= *M. plumosa*, **syn. n.**; = *M. abdallahi*, **syn. n.**].

Gattolliat (2003: figs 24–26) described a single male adult from Madagascar as '*Potamocloeon* spB.' This male adult has long, slender, daggerlike (Gillies 1991) hindwings, each with two longitudinal veins and a prominent costal process, and the specimen has genital forceps segment 2 with a proximal expansion covered with setae. The adults of Afrotropical *Cloeodes* (= *Potamocloeon*), however, do not have hindwings, and the genital forceps have a relatively stronger proximal expansion on segment 2. Based on these characters, '*Potamocloeon*

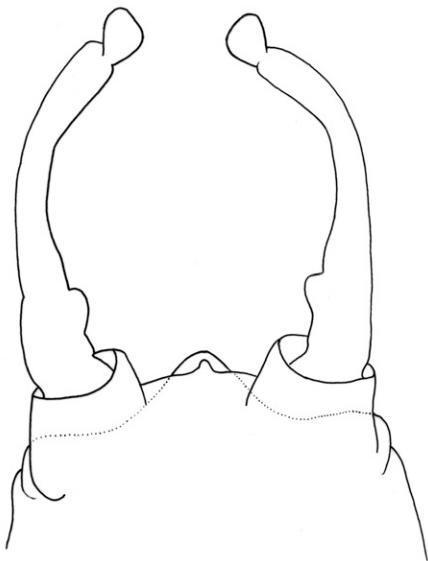


Fig. 5. *Cloeodes pseudogladius*. Adult male, genitalia.

spB' might belong instead to the genus *Afrobaetodes* Demoulin. *Afrobaetodes* larvae have been reported from Madagascar by Gattolliat & Sartori (1999, 2003). However, we note that genital forceps segment 3 of *Potamocloeon* spB is relatively short and truncate, similar to *Cloeodes*, and not long and elliptical, like that of other *Afrobaetodes* species. Therefore, our inclusion of this unnamed adult with *Afrobaetodes* is tentative.

Gillies (1979: figs 1, 2) described the male adult of *Afrobaetodes pusillus* (Navás), which previously had been known only as a female adult (Navás 1930; Demoulin 1957). The larva of this species is not known, but the venation of the forewings, the absence of hindwings, and the structure of the male genitalia each match our concept of *Cloeodes*, rather than *Afrobaetodes*, and we recognize the following new combination: *C. pusillus*, **comb. n.** With this new combination, all remaining *Afrobaetodes* species are known to have hindwings. Therefore, diagnoses and descriptions of *Afrobaetodes* (e.g. Lugo-Ortiz & McCafferty 1996: 179; Jacobus & McCafferty 2001: 100) should be emended as such. An additional emendation should be made to the diagnosis provided by Jacobus & McCafferty (2001: 97): *Afrobaetodes* larvae have a papilla on the first segment of the *maxillary* palp and no such papilla on the labium.

*Cloeodes* larvae previously included in *Maliqia* (Wuillot & Gillies 1993: figs 42–51; Lugo-Ortiz & McCafferty 1997: figs 1–9; McCafferty 2000: figs 9–16) are very different from the larvae that erroneously had been attributed to the genus *Potamocloeon* (Gillies 1988: figs 14–30; Gillies & Thorpe 1996; Lugo-Ortiz & McCafferty 1996:

figs 2–9; Gattolliat 2003: figs 13–23). The larvae incorrectly attributed to *Potamocloeon* therefore represent a new genus that is distinguished easily from all other Baetidae genera by the characters given below.

### Genus *Securiops* gen. n.

Type species: *Potamocloeon macafertiorum* Lugo-Ortiz, 1996 (Lugo-Ortiz & McCafferty 1996: 178).

#### *Diagnosis*

*Larvae* can be distinguished from all other Baetidae genera by having the following combination of characters: a labium with greatly reduced glossae, enlarged paraglossae, and truncate, very broad hatchetlike palps; gills 1–4 with bilobulate lamellae; legs elongate with only a few minute setae on the dorsal and ventral margins; very elongate claws that are edentate; and the lateral margins of posterior abdominal segments with sharp spines.

#### *Description*

*Male adult.* Unknown.

*Mature larva. Head:* antenna approximately one-third body length. Labrum with broad median notch. Maxilla with elongate two-segmented palp. Angulate mandible with cleft incisors and deeply separated right incisors, prosthema reduced but apically denticulate; planate mandible with deeply separated incisors, prosthema reduced to robust filament with minute apical denticles, tuft of setae more or less developed between prosthema and molae of both mandibles. Labium with greatly enlarged paraglossae and enlarged hatchet shaped palps, with palp segments 2 and 3 apparently fused. *Thorax:* hindwingpad present or absent; if present, prominent or minute. Legs slender, with tibia shorter than tarsus; tibio-tarsal joint apparently fused; claw elongate and edentate. *Abdomen:* terga 1–7 with subtriangular, lamellate gills; gills 1–4 with dorsal lobe; gills 5–7 without lobe, gill 7 larger than others. Lateral margins of posterior segments with long, thin spines. Median filament subequal in length to cerci.

*Etymology.* *Securiops* is an arbitrary combination of letters with allusion to the Latin *securis* and Greek *iops*. Together, they mean ‘small hatchet fish’ (a minnowlike mayfly with hatchetlike labial palps).

***Securiops macafertiorum*** (Lugo-Ortiz, 1996, in Lugo-Ortiz & McCafferty 1996: 178) **comb. n.**

#### *Diagnosis*

*Larvae* of *S. macafertiorum* are distinguishable from the larvae of other *Securiops* species by having conspicuous hindwingpads, segment 2 of maxillary palp 0.85 times length of segment 1, some median and submedian speckling on terga, and lateral longitudinal dashes on sterna (Jacobus & McCafferty 2005). Width of segment 1 of maxillary palp is not greatly enlarged. Abdominal segments 5–9 or 6–9 have spines on lateral margins.

*Distribution.* *Securiops macafertiorum* is known only from South Africa (Lugo-Ortiz & McCafferty 1996; Jacobus & McCafferty 2005).

### ***Securiops mandrare* sp. n.**

= *Potamocloeon* spA Gattolliat 2003: 7.

#### *Diagnosis*

*Larvae* have no hindwingpads. Segment 2 of maxillary palp is nearly 0.85 times length of segment 1, and width of segment 1 is not enlarged. Dorsal margins of femora have no setae, in contrast to femora of the African species. Abdominal segments 4–9 have spines on lateral margins.

*Type material.* See Materials section, below.

*Etymology.* The specific epithet is a noun in apposition that refers to the Mandrare River, the type locale of the species.

*Distribution.* *Securiops mandrare* is known only from Madagascar (Gattolliat 2003).

### ***Securiops megapalpus* sp. n., Figs 6–19**

#### *Diagnosis*

*Larvae* have no hindwingpads, and segment 2 of maxillary palp is nearly 0.55 times length of segment 1, with segment 1 relatively broad. Distal setal row of galea comprised of only six setae, fewer than found in other species. Abdominal segments 7–9 have spines on lateral margins.

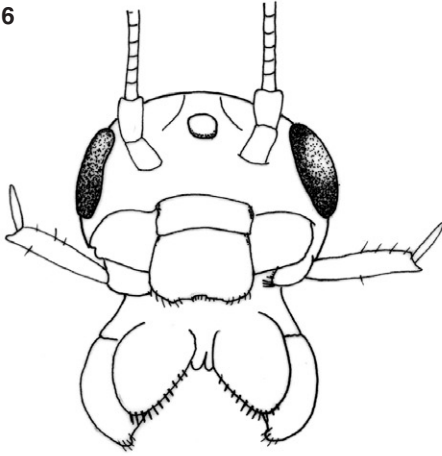
#### *Description*

*Larva.* Length: body 3.8 mm. Caudal filaments 1.8 mm. Body colour: light yellow.

*Head* (Fig. 6): dorsal surface of labrum (Fig. 7) with scattered, long fine setae; anterior margin with two kinds of setae: apicolaterally long, pointed, stout setae and apicomediaally eight stout shorter setae; ventral surface with apicolateral



6



7



8



10



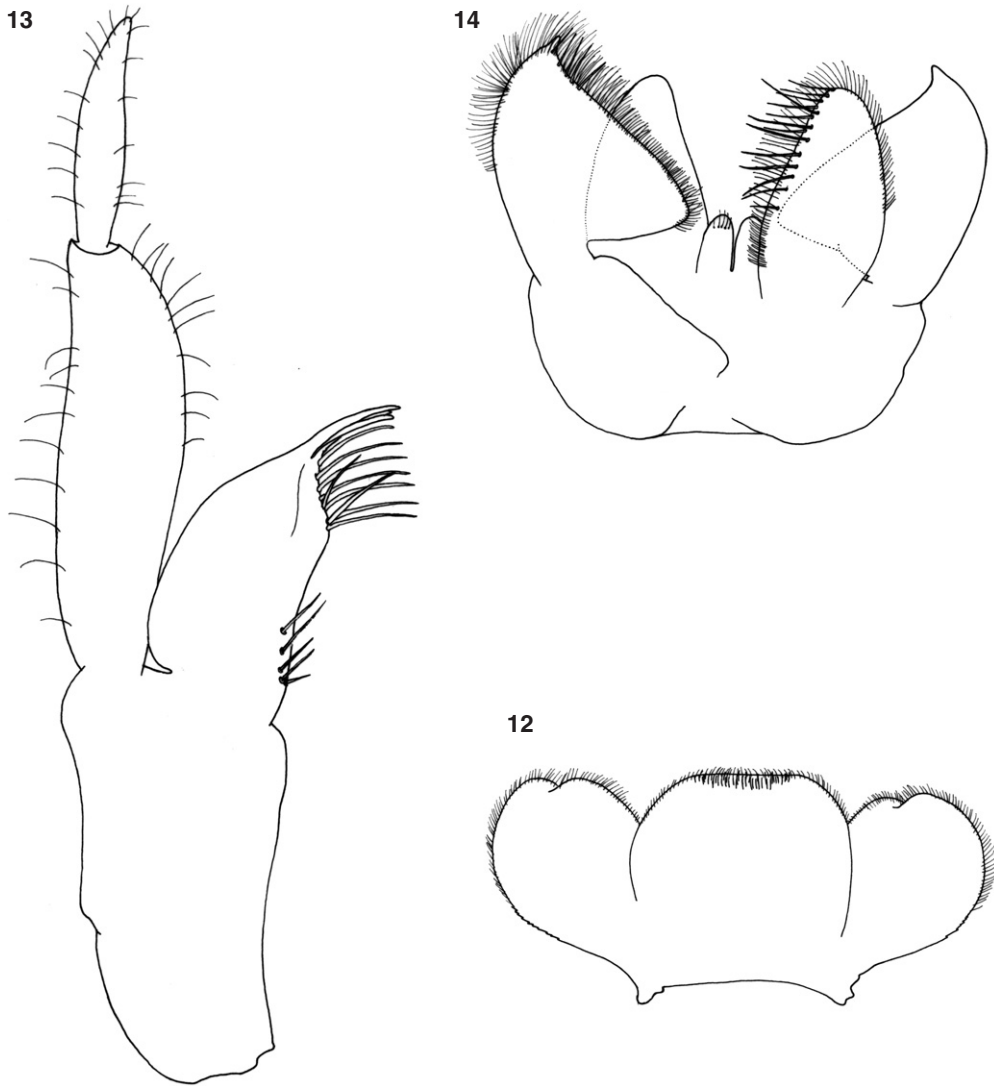
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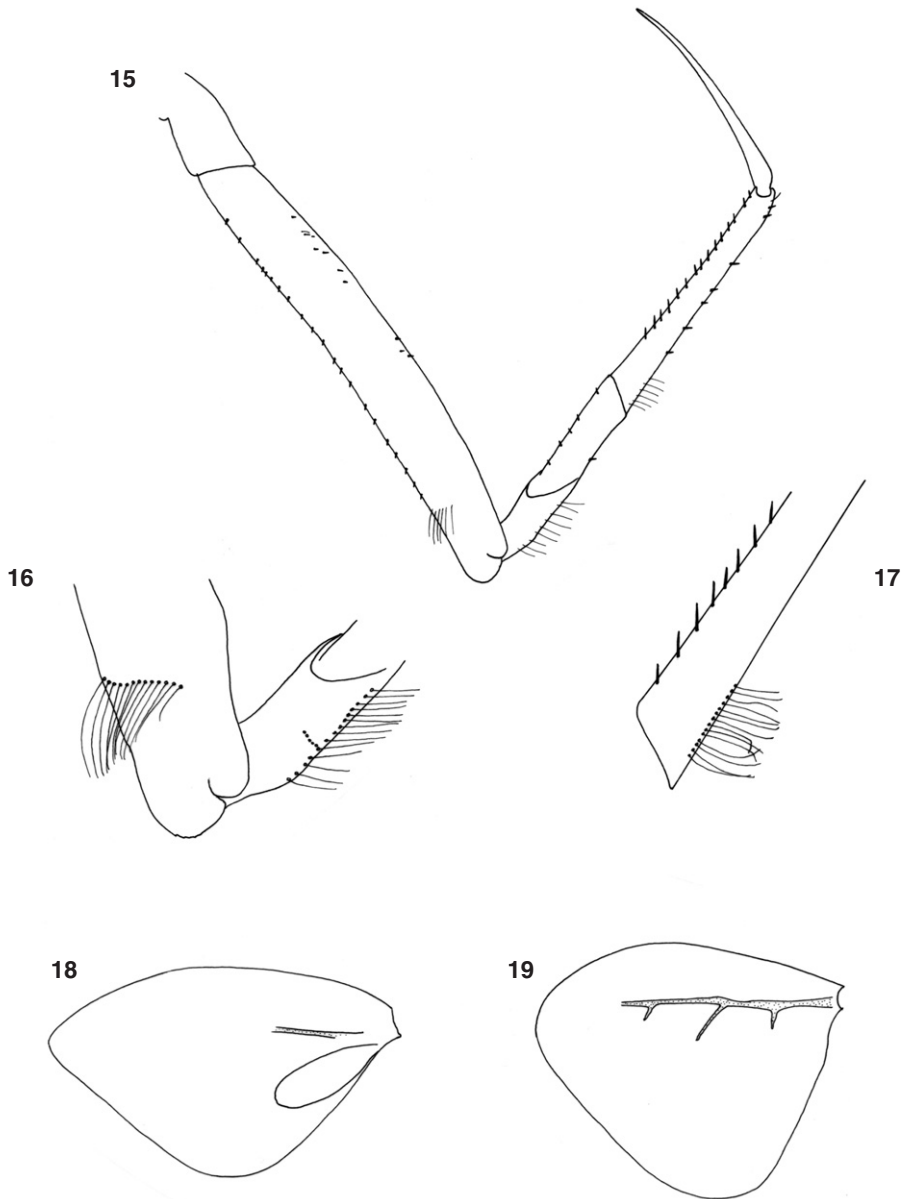
**Figs 6–11.** *Securiops megapalpus*. **6**, Head, anterior view; **7**, labrum; **8**, apex of planate mandible; **9**, planate mandible; **10**, apex of angulate mandible; **11**, angulate mandible.



**Figs 12–14.** *Securiops megapalpus*. 12, Hypopharynx; 13, maxilla; 14, labium.

patch of stout relatively long setae. Planate mandible (Figs 8, 9) with two deeply separated sets of incisors, each set with three denticles; prostheca slender with two relatively large denticles and several minute denticles; restricted tuft of abundant setae between prostheca and mola; small tuft of setae at apex of mola; basal half without setae. Angulate mandible (Figs 10, 11) with two sets of incisors, outer set with three denticles, inner set with four denticles; prostheca elongate with three denticles; large tuft of setae between prostheca and mola; small tuft of setae at apex of mola; basal half without setae. Hypopharynx (Fig. 12) with

broad apically straight lingua, covered with minute setae, middle seta thickest; superlingua broadly rounded with short setae apically. Maxilla (Fig. 13) with four long teeth, none opposed to others; one row of seven stout setae as long as teeth, and two spinelike setae; base of crown without setae; base of galea with row of four long stout setae; one stout seta perpendicular to margin of galea; palp two-segmented, segment 1 broad, 1.8 times length segment 2. Labium with (Fig. 14) glossae with distal arc of five thin setae; paraglossae with medial submarginal row of long stout setae. Labial palp two-segmented; segment 1 almost bare;



**Figs 15–19.** *Securiops megapalpus*. **15**, Foreleg; **16**, foreleg, femur and tibia; **17**, foreleg, tarsus; **18**, Anterior gill; **19**, posterior gill.

segment 2 with well-developed medial triangular projection, apex with outwardly recurved point; inner and distal margins with numerous fine setae. *Thorax*: hindwingpad not visible. Legs slender with dorsal and ventral margins subparallel (Fig. 15). Dorsal margin of femur with minute stout setae and arc of very long thin setae; ventral margin of femur with short pointed setae, lateral margins

bare. Tibia (Fig. 16) with arc of very long and thin setae. Tarsus (Fig. 17) with blunt setae on ventral margin, dorsal margin with subproximal arc of very long thin setae; claw slender elongate, about 0.9 times length of respective tarsus, edentate, with no subapical setae. *Abdomen*: terga pale with two small symmetrical brown spots, except tergum 2 yellow with central brown broad T-shaped



pattern, and tergum 6 with central brown pattern. Sterna unmarked. Lateral margins of segments 7–9 with five, four and two spines, respectively (spine at posterolateral angle excluded from count). Gills 1–4 bilobulate with small dorsal lobe (as in Fig. 18), gills 5–7 simple (as in Fig. 19), broad, strongly asymmetrical; all gills without serrations or marginal setae.

*Types.* See Materials section, below.

*Etymology.* The specific epithet is a reference to the large size of maxillary palp segment 1.

*Distribution.* *Securiops megapalpus* is known from a single locality in the Ivory Coast.

### *Securiops mutadens* sp. n.

= larva (nec adult) misidentified and described as *Potamocloeon dentatum* by Gillies (1988: 53)

### *Diagnosis*

*Larvae* have no hindwingpads, segment 2 of maxillary palp 0.55 times length of segment 1, and little to no speckling or coloration on terga or sterna (Jacobus & McCafferty 2005). Width of segment 1 of maxillary palp is not greatly enlarged. Abdominal segments 4–9 have spines on lateral margins.

*Type material.* See Materials section, below.

*Etymology.* The specific epithet is an approximate anagram of *dentatum* that borrows from the Latin *mutabilis* (change) and *dens* (tooth). It is used as a noun in apposition.

*Distribution.* *Securiops mutadens* has been reported from Gambia, Guinea, and the Ivory Coast by Gillies (1988) as *P. dentatum* (larvae nec adults).

### Key to larvae of the genus *Securiops*

1. Hindwingpads present . . . . . *S. macafertiorum*  
— Hindwingpads absent . . . . . 2
2. Maxillary palp segment 2 length 0.85 times length of segment 1 (distribution of species restricted to Madagascar) . . . . . *S. mandrare* sp. n.  
— Maxillary palp segment 2 length at most 0.55 times length of segment 1 (Fig. 13) (distribution of species restricted to African continent) . . . . . 3
3. Maxillary palp segment 1 very broad, about three times wider than segment 2 (Fig. 13) . . . . . *S. megapalpus* sp. n.  
— Maxillary palp segment 1 not as broad, about two times wider than segment 2 . . . . . *S. mutadens* sp. n.

### MATERIAL

Specimens examined as part of this study are deposited in the Albany Museum, Grahamstown, South Africa [AMGS]; The Natural History Museum, London, England [BMNH]; the Museum National d'Histoire Naturelle, Paris, France [MNHN]; the Musée de zoologie, Lausanne, Switzerland [MZL]; and the Purdue University Entomological Research Collection, West Lafayette, Indiana, USA [PERC].

### *Material examined*

*Cloeodes bicoloratus*: HOLOTYPE, Madagascar, larva, Bas. Antongombato, Riv. Makis, Loc. Camp base WWF, 12°31'38"S, 49°10'21"E, 1075 m elev., 2.iv.1994, J.-M. Elouard, M. Sartori, P0199 [MZL]; PARATYPES, 56 larvae (specimens 199a, 199b, 199c, 199d mounted on slides), same data as holotype [MZL].

*Cloeodes dentatus*: Guinea, 1 ♂ adult, Little Scarcies (Kaba) R., Kaba, 23.i.1987 [MZL]; Guinea, 1 ♂ adult, Loulou R. (trib. Niandan R.), Kissidougou, 21.i.1987 [MZL]; Guinea, 18 larvae (1 larva on slide), Niandan R., Sassambaya, Bas. Niger, 19.iv.1986 [MZL]; Guinea, 1 ♂ adult, same locality, 26.xi.1986 [MZL]; 1 ♂ adult, same locality, 6.iii.1988 [MZL]; 1 ♂ adult, same locality, 19.iii.1988 [MZL]; HOLOTYPE (*Maliqua abdallahi*), Malawi, ♂ larva, Lake Malawi, Thumbi West Island, exposed northern shore, 18.x.1998, A.M. Abdallah [PERC]; PARATYPE (*Maliqua abdallahi*), Malawi, ♂ larva, Lake Malawi, Mumbo Island, sheltered southwestern shore, 28.xi.1998, A.M. Abdallah [PERC]; 4 larvae, same locale as *Maliqua abdallahi* holotype, 20.x.1998/23.i.1999, A.M. Abdallah [PERC]; 9 larvae (parts on slide), same locale as *Maliqua abdallahi* paratype, 28.x.1998/29.xi.1998, A.M. Abdallah [PERC]; HOLOTYPE (*Afroptilum plumosum*), Mali, ♂ adult with corresponding larval exuviae (on slides), Bakoye R., Kokofata, Bas. Sénégal, i.1992, 2201 [MNHN]; 1 ♂ adult, same data [MNHN]; Mali, 1 larva (on slide), Baoule R., Missira, Bas. Sénégal, 8.xi.1984, 2301 [MZL]; Mali, 1 larva (on slide), Niger R., Tienfala (=Tyenfala), Bas. Niger, 20.iii.1985, 1001 [MZL]; 3 larvae, same locality, 21.iii.1985 [MZL]; Sierra Leone, 2 ♂ adults, Mongo R., Musaia, 13.ii.1989 [MZL]; South Africa, 1 larva, Luvuvhu R., Kruger NP near Pafuri gate, 22°26'56"S, 31°04'49"E, 230 m elev., Bas. Limpopo, 23.v.2003, MZL mision, S2122 [MZL]; HOLOTYPE (*Cloeon dentatum*), Uganda, 1 ♂ adult (mounted in Euparal on slide), Jinja, at light, ix.x.1954, P.S. Corbet, '1954-770,' [BMNH]; Uganda, ♂ adults,

Jinja, at light, iii.1956, P.S. Corbet [BMNH]; Uganda, ♂ adults, Jinja, at light, 1956, P.S. Corbet [BMNH].

*Cloeodes freitagae*: HOLOTYPE, Madagascar, ♀ subimago with corresponding larval exuviae (specimen 194b on slide), Makis R., Camp base WWF, station Roussette, Bas. Antongombato, 12°31'40"S, 49°10'09"E, 1075 m elev., 29.iii.1994, J-M. Elouard, M. Sartori [MZL]; PARATYPES, 7 larvae (specimen 810b on slide), Makis R., Camp base WWF, Antongombato Bas., 12°31'27"S, 49°10'21"E, 21.iii.1999, J-L. Gattolliat, Z. Rabeantoandro [MZL].

*Cloeodes inzingae*: PARALECTOTYPE, South Africa, Natal, ♂ adult, Furth Str., xii.1944 [PERC]; South Africa, Transvaal, 1 larva, Buffelspruit at Shalam (Aalwan), 4 km W Badsplaat, 1167 m elev., 17.x.1990, P. & N. McCafferty, F. de Moor, 28A [PERC]; South Africa, Western Cape Prov., 3 larvae, St. Borg R., Driefontein Bridge, 33.55°S, 19.03°E, 21.ix.1950, GBG 91C [PERC].

*Cloeodes maculipes*: Puerto Rico, 5 ♂ adults, 3 ♀ adults, El Verde Sta., Q. Prieta, Emerg. Trap, 370 m elev., 11.iv.1990, E. Masteller, K. Buzby [PERC].

*Cloeodes portabilis*: PARATYPE, Madagascar, Antsiranana, 1 larva (parts on slide Mad:013), Djabala R., 11 km NW Hellville, Nosy-Be, 25.x.1971, G.F. & C.H. Edmunds, F. Emmanuel [PERC]; HOLOTYPE, Madagascar, Tamatave (=Toamasina) Prov., larva, stream at Gri-Gri, RN 2, 17.x.1971, G.F. & C.H. Edmunds, F. Emmanuel [PERC]; Madagascar, 6 ♂ adults, Andronohela R., Camp II Andohahela, Bas. Manampanihy, 24°35'47"S, 46°44'25"E, 26.xi.1995, J-M. Elouard, T. Pilaka, P0543 [MZL]; Madagascar, 1 ♂ subimago and associated larval exuviae, Makis R., Camp WWF, station Roussette, Bas. Antongombato, 12°31'40"S, 49°10'09"E, 2.iv.1994, M. Sartori, J-M. Elouard, P0200 [MZL]; Madagascar, larvae, Manampanihy R., Enosiary, Bas. Manampanihy, 24°40'3"S, 46°49'19"E, 22.xi.1995, T. Pilaka, P0528 [MZL].

*Cloeodes pseudogladus*: Madagascar, 1 ♂ subimago, trib. Manambondro R., bridge near Ariambola, Bas. Matitanana, 22°11'04"S, 47°28'46"E, 22.vi.1995, M.R. Andriamihaja, P0460 [MZL]; Madagascar, 1 ♂ subimago, Namorona R., Bas. Namorona, 21°16'40"S, 47°31'46"E, 13.xi.1996, J-L. Gattolliat, D. Randriamasimanana, P0653 [MZL]; Madagascar, 1 ♂ adults, 1 ♀ adult, Namorona R., Ranomafana, Bas. Namorona, 21°15'37"S, 47°27'18"E, 13.xi.1993, Laboratoire de Recherche sur les Systèmes Aquatiques et leur Environnement

(LRSAE) Antananarivo, P0157 [MZL].

'*Potamocloeon* spB': Madagascar, 1 ♂ adult, Antorendrika R., Belavenoka, Costal bas. between F-Dauphin/Manampanihy, 24°50'18"S, 47°05'02"E, 20 m elev., 23.iv.1995, J-M. Elouard, T. Pilaka, P0405 [MZL]; Madagascar, 1 ♂ adult, Manampanihy R., Enosiary, Manampanihy bas., 24°40'37"S, 46°49'19"E, 100 m elev., 22.xi.1995, T. Pilaka, P0528 [MZL].

*Securiops macafertiorum*: HOLOTYPE, South Africa, Mpumalanga Prov., larva (mouthparts, right foreleg, paraprot on slide SA37), Kruger NP, Sabie R., NE Corner of Old Rhino Camp, 24.x.1990, W.P. & N. McCafferty [PERC]; South Africa, 7 larvae, Mooi R., above Rosetta, 29°18'10"S, 29°57' 50"E, stones out of current, iii.1995, C. Dickens, MOI27AE [AMGS]; South Africa, 9 larvae, Mooi R., Hornet Corner, 28°56'45"S, 30°22'33"E, stones in current, iii.1995, C. Dickens, MOI22AP, MOI23AD [AMGS].

*Securiops mandrare* sp. n.: HOLOTYPE, Madagascar, larva, Mandrare R., Ifotaka, Bas. Mandrare, 60 m elev., 31.viii.2001, R. Gerecke and T. Goldschmidt [MZL].

*Securiops megalpalpus* sp. n.: HOLOTYPE, Ivory Coast, larva (parts on slide), Maraoué R., Danangoro, Bas. Maraoué, 17.xii.1979, leg. J-M. Elouard [MZL]; PARATYPES, 7 larvae (1 on slide) same data as holotype [MZL, PERC].

*Securiops mutadens* sp. n.: HOLOTYPE, larva, Guinea, Kouloutoun R., near Koundara, 28.i.1989, J-M. Elouard [MZL]; PARATYPES, larva, same data as holotype [MZL]; Ivory Coast, 3 larvae, Bouaflé R., Maraoué, vi.1976, J-M. Elouard, W625-6 [BMNH]; Gambia, 5 larvae, Gambia R., Fatoto, 17.ii.1989 [BMNH]; Gambia, 1 larva, Gambia R., Fatoko, 19.ii.1993, Y127-8 [BMNH]; Guinea, 1 larva, Niandam R., Sassambaya, on sand, 13.ii.1986, X265 [BMNH].

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