

The Chironomidae (Diptera) of the Seychelles

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Tanypus complanatus sp. n., *Pseudosmittia remigula* sp. n. and *Polypedilum (Tripodura) silhoettarium* sp. n. are described as male imagines and *Clunio gerlachi* sp. n. as male and female imago. The male imagines of *Larsia pallidissima* (Kieffer), *Gymnometriocnemus (Gymnometriocnemus) mahensis* (Kieffer), *Pseudosmittia xanthostola* (Kieffer) and *Polypedilum (Polypedilum) glabripenne* (Kieffer) are described for the first time. The male imagines of *Paramerina minima* (Kieffer), *Smittia megalochirus* (Kieffer) n. comb., *Smittia mahensis* (Kieffer) and *Pseudosmittia melanostola* (Kieffer); and the female imago of *Pseudosmittia xanthostola* (Kieffer) are redescribed. A key to the known chironomids of the Seychelles is given. Twenty-eight chironomid species are known from the Seychelles, 23 from the island of Mahé, 12 from Silhouette, 3 from Curieuse, 2 from Anonyme and 1 from each of Fregate, North and the coralline Alphonse. The likely marine intertidal species appears to have their closest relatives in Micronesia and the Pacific, while the freshwater chironomid fauna appear to have more Afrotropical relatives.

Keywords : chironomids, Seychelles, key, new species, redescription.

Introduction

In 1905 the Percy Sladen Trust Expedition visited the islands of the western Indian Ocean, followed by a second expedition in 1908-9 concentrating on the Seychelles islands. These expeditions were organised and led by Prof. John Stanley Gardiner to complete the earlier work of the 'Challenger' expeditions. Gardiner's intentions were to investigate the biological relationships between the islands of the Seychelles, Mascarenes and Chagos groups and attempt to find evidence for former land connections between the islands. The results of the expedition still form the basis of all discussion of the region's biogeography. Gardiner and the entomologist of the expedition, H. Scott, demonstrated that the granitic Seychelles islands formed a distinct faunal unit, with close associations with Madagascar and India 65 million years ago. The coralline Sey-

chelles islands and the Mascarenes also shared links with the granitic Seychelles, probably resulting from dispersal across the sunken banks at times of lower sea levels 15,000 years ago. In contrast the Chagos and Cargados show typically low-diversity mid-oceanic Indo-Pacific assemblages (Gerlach 2003). The Percy Sladen Trust Expedition remains the most extensive study of the Seychelles islands. The chironomid material from the expedition was described by Kieffer (1911b) and was deposited at The Natural Science Museum (British Museum), in London. There have been several expeditions since the Percy Sladen Trust Expedition but except for a few specimens collected by H. Malicky, Lunz am See, Austria, no chironomids have been identified or described. Recently The Indian Ocean Expedition 2000-2005 «Biodiversity assessment celebrating the centenary of the Percy Sladen Trust Expedition to the Indian Ocean» was initiated with Dr. Justin Gerlach of The Nature Protection Trust of Seychelles, Cambridge, as scientific co-ordinator. Dr. Gerlach asked me to identify and describe the material collected.

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Material

All previously known species from the Seychelles were originally described by Kieffer (1911b), redescribed by Freeman (1955 c, 1956, 1957, 1958) and listed or assigned to present genera by Freeman & Cranston (1980). The material described by Kieffer as well as the present material is deficient with most of the specimens lacking antennae and tarsi.

Methods and terminology

The general terminology follows Sæther (1980). All the *Pseudosmittia* Goetghebuer described here have a forked postcubitus. The ratio VR_2 gives the distance from the arculus to the postcubital fork divided by the length of M from the arculus to RM, corresponding to the venarum ratio, VR (or VR_1) which gives the distance to the cubital fork divided by the length of M. All material is on microscope slides prepared in Canada balsam. Measurements are given as ranges followed by a mean when 4 or more measurements are given, followed by the number measured (n) in parenthesis. The holotypes of the new species are deposited at the Museum of Zoology, Department of Zoology, University of Bergen, Norway (ZMBN). Paratypes are in The Natural History Museum, London (BMNH), and at University Museum of Zoology, Cambridge (UMZC).

Key to Chironomidae from the Seychelles

1. Wing with crossvein MCu present.....
.....*Tanypodinae* 2
- Wing lacking crossvein MCu or brachypterous .
.....4
2. Crossvein MCu before FCu, distance between FCu and MCu 1/3 as long as Cu_1 ; (Figs.1-3)
.....*Tanypus complanatus* sp. n. 3
- Crossvein MCu beyond FCu3
3. Scutal tubercle well developed, all tibial spurs lyrate, costal extension twice as long as MCu (Figs.4-6)*Larsia pallidissima* (Kieffer)
- No scutal tubercle, tibial spurs semilyrate, costa not extended; (Figs. 7-8).....*Paramerina minima* (Kieffer)
4. Hind tibial comb consisting of fused spines, gonostylus rigidly fused to gonocoxite, fore tarsomere 1 longer than fore tibia...Chironominae 15
- Hind tibial comb consisting of free spiniform setae, gonostylus movable, fore tarsomere 1 shorter than fore tibia.....Orthocladiinae 5
5. Wing membrane with setae ; (Figs. 9-11)
....*Gymnometriocnemus* (*G.*) *mahensis* (Kieffer)
- Wing membrane bare.....6
6. Eyes hairy, male anal point absent.....7
- Eyes bare, anal point absent or present.....9
7. Wing broad, about half as wide as long, and rounded in male, absent in female ; 9 flagellomeres in male, 4 in female ; palp 2-segmented; (Figs. 19-26).....*Clunio gerlachi* sp. n.
- Wing more narrow, at most 1/3 as wide as long; 13 flagellomeres in male; palp 5-segmented8
8. Dorsocentrals decumbent, squama fringed.....
.....*Cricotopus quadrifasciatus* (Kieffer)
- Dorsocentrals erect, squama bare
.....*Smittia brevicornis* Tokunaga
9. Veins R_1 and R_{4+5} short, tick, fused with costa into clavus, ending before mid-point of wing.....
.....*Corynoneura seychellensis* Kieffer
- Veins R_1 and R_{4+5} narrow, elongate, separated from costa until apex beyond mid-point of wing10
10. About 12-17 weak acrostichals, starting in front ; postcubitus not forked; costal extension more than 110 μ m long; male anal point long, parallel-sided, bare, placed posteriorly on tergite IX.....
.....*Smittia* Holmgren 11
- Two short, but distinct median acrostichals ; postcubitus forked; costal extension absent or less than 110 μ m long; male anal point when present placed anteriorly on tergite IX
.....*Pseudosmittia* Goetghebuer 12
11. Squama with 2 setae ; R with 7-11 setae, R_1 with 4-6, R_{4+5} with 7-10 setae; (Figs. 12-14).....
.....*Smittia megalochirus* (Kieffer)
- Squama bare ; R with 1 seta, other veins bare....
.....*Smittia mahensis* (Kieffer)
12. Anal point triangular.....13
- Anal point absent or long, bare and parallel-sided.....14
13. Inferior volsella posterior on gonocoxite, curved; (Figs. 29, 30).....
.....*Pseudosmittia triangula* Tokunaga
- Inferior volsella anterior on gonocoxite, extremely long, digitiform; (Figs. 28, 32-36)
.....*Pseudosmittia xanthostola* (Kieffer)
14. Anal point absent, gonostylus paddle-oar-shaped ; (Fig. 37).....*Pseudosmittia remigula* sp. n.
- Anal point long and parallel-sided, gonostylus normal ; (Figs. 27, 31)
.....*Pseudosmittia melanostola* (Kieffer)
15. Wing membrane with microtrichiae, squama ba-

- re, RM parallel to R₄₊₅ and continuous with it ; median volsella present.....
.....*Tanytarsus* v. d. Wulp 16
- Wing membrane bare, squama fringed, RM oblique to R₄₊₅ ; median volsella absent20
16. Anal point absent, gonostylus very broad ; (Figs. 38-41)*Tanytarsus esakii* Tokunaga
- Anal point present, gonostylus normal17
17. Digitus not extending beyond inner margin of superior volsella ; (Figs. 44-46)
.....*Tanytarsus pallidulus* Freeman
- Digitus clearly extending beyond inner margin of superior volsella18
18. Superior volsella large with projection on lateral margin, digitus broad-based ; inferior volsella reaching to about 1/2 length of gonostylus.....
.....*Tanytarsus atomarius* Kieffer
- Superior volsella medium sized, digitus with narrow base; inferior volsella reaching to about 1/3 length of gonostylus.....19
19. Digitus narrow, pointed; wing apparently not cuneiform.....*Tanytarsus pallidissimus* Kieffer
- Digitus broad, long, apically rounded; wing cuneiform; (Figs. 42, 43)
.....*Tanytarsus* sp. n. near *pallidissimus*
20. Legs clothed with adpressed scales as well as erect setae, pulvilli absent.....
.....*Lepidopus nigratipes* (Kieffer)
- Legs with setae only, pulvilli present21
21. Male antenna with 13 flagellomeres; fore tibia with projecting inner scale usually with spur, outer scale absent ; no scutal tubercle; apodeme lobe of female without apical microtrichiae
.....*Polypedilum* Kieffer 22
- Male antenna with 11 flagellomeres; fore tibia with inner scale low, rounded, scarcely projecting beyond outer scale ; scutal tubercle present ; apodeme lobe of female with apical microtrichiae25
22. Anal point trifold, superior volsella without apical extension; (Fig. 47)
.....*Polypedilum (Tripodura) silhouettarium* sp. n
- Anal point simple, superior volsella with apical extension23
23. Superior volsella with apical extension longer than base, wing length about 1.6-1.7 mm24
- Superior volsella with apical extension shorter than base or not clearly separable from base, wing length about 0.8 mm ; (Fig. 49)
.....*Polypedilum (Polypedilum) glabripenne* Kieffer
24. Gonostylus narrow, nearly parallel-sided ; AR about 0.5 ; (Fig. 48)
.....*Polypedilum (Polypedilum) melanophilum* Kieffer
- Gonostylus narrow, outer margin curved ; AR about 1.6.
.....*Polypedilum (Polypedilum) brunneicorne* Kieffer
25. Inferior volsella very broad, superior volsella with inner setae basally and along apical projection; (Figs. 56, 59-61, 62, 65)
.....*Kiefferulus chloronotus* (Kieffer)
- Inferior volsella narrow, superior volsella either without setae on apical projection or with apical setae26
26. Superior volsella without distinct setaceous base, swollen at apex, with apical setae ; (Figs. 50-52)*Dicrotendipes binotatus* (Kieffer)
- Superior volsella with distinct setaceous base ; apical projection tapering, bare.....27
27. Superior volsella projection nearly 3 times as long as base, frontal tubercles mostly less than twice as long as wide, wing length more than 2.5 mm ; (Figs. 57, 60, 63, 66)
.....*Chironomus seychelleanus* Kieffer
- Superior volsella projection about 1.5 times as long as base, frontal tubercles more than 3 times as long as wide, wing length about 2 mm; (Figs. 58, 61, 64, 67).....*Chironomus linearis* Kieffer

Subfamily Tanypodinae

Tanypus complanatus sp. n.

Figures 1-3

Type material : Holotype : ♂, SEYCHELLES : Mahé, Marc aux Cochons, 29 viii 2002, J. Gerlach (ZMBN Type No. 402).

Diagnostic characters : The reduced or absent scutal tubercle combined with the presence of dorsal postnotals and the nearly straight gonostylus separate the species from all other described species of *Tanypus* Meigen.

Etymology : From the Latin *complanatus*, flattened, referring to the reduced scutal tubercle.

MALE IMAGO (n=1)

Total length 2.32 mm. Wing length 1.20 mm. Total length/wing length 2.04. Thorax pale with dark vittae, preepisternum and dorsal part of postnotum. Abdomen

apparently with tergites brown medially, tergites VI and VII fully brown, and tergite VIII, IX and hypopygium whitish. At least hind leg with dark brown femur whitish in apical 1/5, and tibia whitish with apical 1/3 brownish.

Head. Antenna lost. Temporal setae 24, consisting of 14 inner verticals, 7 outer verticals, and 3 postorbitals. Clypeus with 10 setae. Tentorium 146 μm long, 30 μm wide. Stipes 75 μm long. Lengths of three first palpomere (in μm): 38, 49, 90. Last palpomere lost.

Thorax (Fig. 2). Antepronotum with 4 lateral setae, apparent dorsolateral tubercle small. Scutal tubercle reduced. Dorsocentrals 42, acrostichals 40, prealars 20, no supraalar seta. Scutellum with 12 uniserial posterior setae, and 24 weaker anterior setae in 2-3 transverse rows. Postnotum with 2 dorsal setae.

Wing (Fig. 1). Apex of wing lost. Membrane brownish, with macrotrichiae on whole wing, with several diffuse spots. R_1 and R_{4+5} close together and it is not possible to see whether R_{2+3} is present and forked or not. VR 1.25. Anal lobe well developed. Distance between MCu and FCu exactly 1/3 length of Cu_1 . R with 44 setae, R_1 with 43, R_{4+5} with more than 36, subcosta with about 20, RM with 3, M with 8, M_{1+2} with 41, M_{3+4} with 10, Cu with 20, Cu_1 with 6, postcubitus with 32, and An with 10 setae. Squama with 12 setae.

Legs. Front and mid legs and hind tarsomeres lost. Spurs of hind tibia 68 μm and 34 μm long. Width at apex of hind tibia 41 μm . Comb reduced to 2 setae, 45 μm long. Hind femur 588 μm long, hind tibia 643 μm long.

Hypopygium (Fig. 3). Tergite IX apparently with only 2 posterior setae. Phallapodeme 79 μm long; sternapodeme triangular, with 15 μm long median projection. Gonocoxite 120 μm long, gonostylus 105 μm long. HR 1.14, HV 2.21.

Remarks

In many details this damaged specimen does not conform to the generic diagnosis of the genus. However, it conforms even less to the alternative placements such as *Djalmabatista* Fittkau and *Procladius* Skuse. Most likely it deserves a separate genus.

Distribution

The marsh at Marc aux Cochons according to Gerlach (2003) is one of the most important habitats on Mahé supporting a wide variety of aquatic invertebrates including the three tanypodine species known from the Seychelles.

Larsia pallidissima (Kieffer)

(Figures 4-6)

Isoplastus pallidissimus Kieffer, 1911b: 364.

Pentaneura (*Pentaneura*) *pallidissima* (Kieffer); Freeman 1955 c: 30.

Larsia pallidissima (Kieffer); Freeman & Cranston 1980: 179.

Material examined: SEYCHELLES: Mahé, Marc aux Cochons, 1 ♂, 29 viii 2002, J. Gerlach (ZMBN).

Diagnostic characters: The extended costa, the small size, and the long phallapodeme distinguish the species from other members of the genus.

MALE IMAGO ($n=1$)

Total length 2.01 mm. Wing length 1.08 mm. Total length/wing length 1.91. Wing length/length of preepisternum and postnotum, with scutellum slightly less dark. Abdomen pale.

Head. Antenna lost. Temporal setae 16, consisting of 4 inner verticals, 5 outer verticals, and 7 postorbitals. Clypeus with 12 setae. Tentorium 143 μm long, 38 μm wide. Lengths (in μm) of three basal palpomeres 30, 38, 79. Other palpomeres lost.

Thorax (Fig. 5). Antepronotum with 5 lateral setae. Row of 5 tubercles present just posterior to antepronotum. Dorsocentrals 34, acrostichals 25, prealars 18, supraalar 1. Scutal tubercle well developed. Scutellum with 10 uniserial posterior setae, and 12 weaker anterior setae in 1-2 transverse rows. Postnotum without setae.

Wing (Fig. 4). VR 0.86. Costal extension 75 μm long, RM 41 μm long, MCu 32 μm long, distance between FCu and MCu 15 μm . R with 20 setae; R_1 with 33; R_{4+5} with 48; subcosta with about 14; RM with 2; M with 14; Cu with 13; M_{1+2} , M_{3+4} , Cu_1 , and postcubitus each with about 40-60 setae; An with about 15 setae. Squama with 13 setae.

Legs. Spur of front tibia 45 μm long, spurs of middle tibia lost, of hind tibia 30 μm and 26 μm long. Width at apex of front and middle tibiae each 34 μm , of hind tibia 41 μm . Lengths (in μm) of femora of front to hind leg: 520, 558, 718; of front to hind tibiae: 614, 539, 581. Tarsomeres lost.

Hypopygium (Fig. 6). Tergite IX with 9 setae in transverse posterior row. Phallapodeme 75 μm long, transverse sternapodeme triangular. Gonocoxite 113 μm long; gonostylus 79 μm long, with 6 μm long megaseta. HR 1.43, HV 2.54.

Remarks

The species does not conform to the generic diagnosis of the genus since the costa is distinctly extended

and the phallapodeme long. However, in other details it fits the generic diagnosis. Although the single specimen examined is damaged it is described here since the species may deserve a separate genus.

Distribution

The species previously was known only from the female holotype from Mahé.

Paramerina minima (Kieffer)

(Figures 7-8)

Isoplastus minimus Kieffer, 1911b: 356.

Pentaneura (*Pentaneura*) *minima* (Kieffer); Freeman 1955 c: 33.

Paramerina minima (Kieffer); Freeman & Cranston 1980 : 179.

Material examined : SEYCHELLES: Mahé, Marc aux Cochons, 1 ♂, 29 viii 2002; Silhouette 4 ♂, 6 i 2002; Curieuse, 3 ♂, 20 iii 2003. All J. Gerlach (ZMBN, UMZC).

Diagnostic characters: The species is distinguished by its small size, low antennal ratio, and by having tergite V and hypopygium pale.

MALE IMAGO

(n= 8 except when otherwise stated)

Total length 2.08-2.42, 2.30 mm. Wing length 1.11-1.25, 1.19 mm. Total length/wing length 1.86-2.05, 1.94. Wing length/length of profemur 2.09-2.27, 2.18. Coloration pale with darker vittae and postnotum, and with lower part of preepisternum and scutellum slightly darkened. Tergites I-IV with brown median band; tergite V pale, but not fully whitish; tergites VI-VIII with broad, brown median band, with tergite VIII nearly fully dark; tergite IX and hypopygium whitish. Legs apparently pale. Wing unmarked.

Head. AR 1.19-1.24 (2). Ultimate antennal segment as in *Paramerina anomala* Beck & Beck (Murray & Fittkau 1989, fig. 5.28A), 23-26 µm (2) long; penultimate flagellomere 141-150 µm (2) long; apical seta 47 µm (2) long Temporal setae 114-17, 15; consisting of 4-6, 5 inner verticals; 4-6, 5 outer verticals; and 4-6, 5 postorbitals. Clypeus with 9-13, 12 setae. Tentorium 125-150, 140 µm long; 30-36, 31 µm wide. Lengths (in µm) of palpomeres 26-38, 32; 41-53, 48; 108-146, 134; 135-163, 150 (5); 169-225 (3).

Thorax (Fig.7). Anteprepronotum with 1-3,2 lateral setae. Row of 4-8, 6 tubercles present just posterior to anteprepronotum. Dorsocentrals 17-28, 24; acrostichals 24-36, 31; prealars 9-11, 10; supraalar 1. Scutellum with 8-10, 10 uniserial posterior setae; and 12-20, 15 weaker anterior setae in 1-2 transverse rows. Postno-

tum without setae.

Wing. Wing venation as in *Paramerina cingulata* (Walker) (Murray & Fittkau, 1989 fig. 5.28B). [*Chironomus cingulatus* Walker, 1856 is a junior primary homonym of *C. cingulatus* Meigen, 1830. However, the two homonyms have not been placed in the same genus by any author after 1899 and no solution to this homonymy was published prior to 2000. Under such circumstances, the fourth edition of the nomenclature Code (ICZN, 1999 : Article 23.9.5) now prohibits replacing the junior homonym without applying for an ICZN decision. Consequently, *P. cingulata* (Walker) remains the valid name, its replacement with the junior synonym *P. pygmaea* (van der Wulp, 1874) by Moller Pillot & Beuk (2002) is invalid. See Spies & Sæther 2004).] VR 0.84-0.86, 0.88. Costal extension 15-38, 26 µm long; RM 23-30, 26 µm long; MCu 26-32, 28 µm long; distance between FCu and MCu 0-11, 5 µm. Brachiolum with 2 setae; R with 27-38, 33; R₁ with 24-48, 35; R₄₊₅ with 34-48, 42; subcosta with 27-44, 33; RM with 0-1, 1; M with 11-21, 15; M₁₊₂ with 78-91, 84; M₃₊₄ with 27-52, 39; Cu with 12-21, 16; Cu₁ with 16-33, 23; postcubitus with 39-58, 48; An with 20-30, 28 setae. Squama with 10-20, 15 setae.

Legs. Spur of front tibia 30-41, 37 µm (7) long; spurs of middle tibia 49-56, 53 µm (7) and 19-26, 24 µm (7) long; of hind tibia 53-64, 57 µm and 23-30, 25 µm long. Width at apex of front tibia 24-36, 30 µm; of middle tibia 32-38, 34 µm; of hind tibia 34-39, 37 µm. Lengths (in µm) of femora of front to hind leg : 520-588, 552; 614-677, 643; 520-568, 543; of front to hind tibiae : 572-666, 609; 491-568, 525; 609-680, 652. Tarsomeres lost.

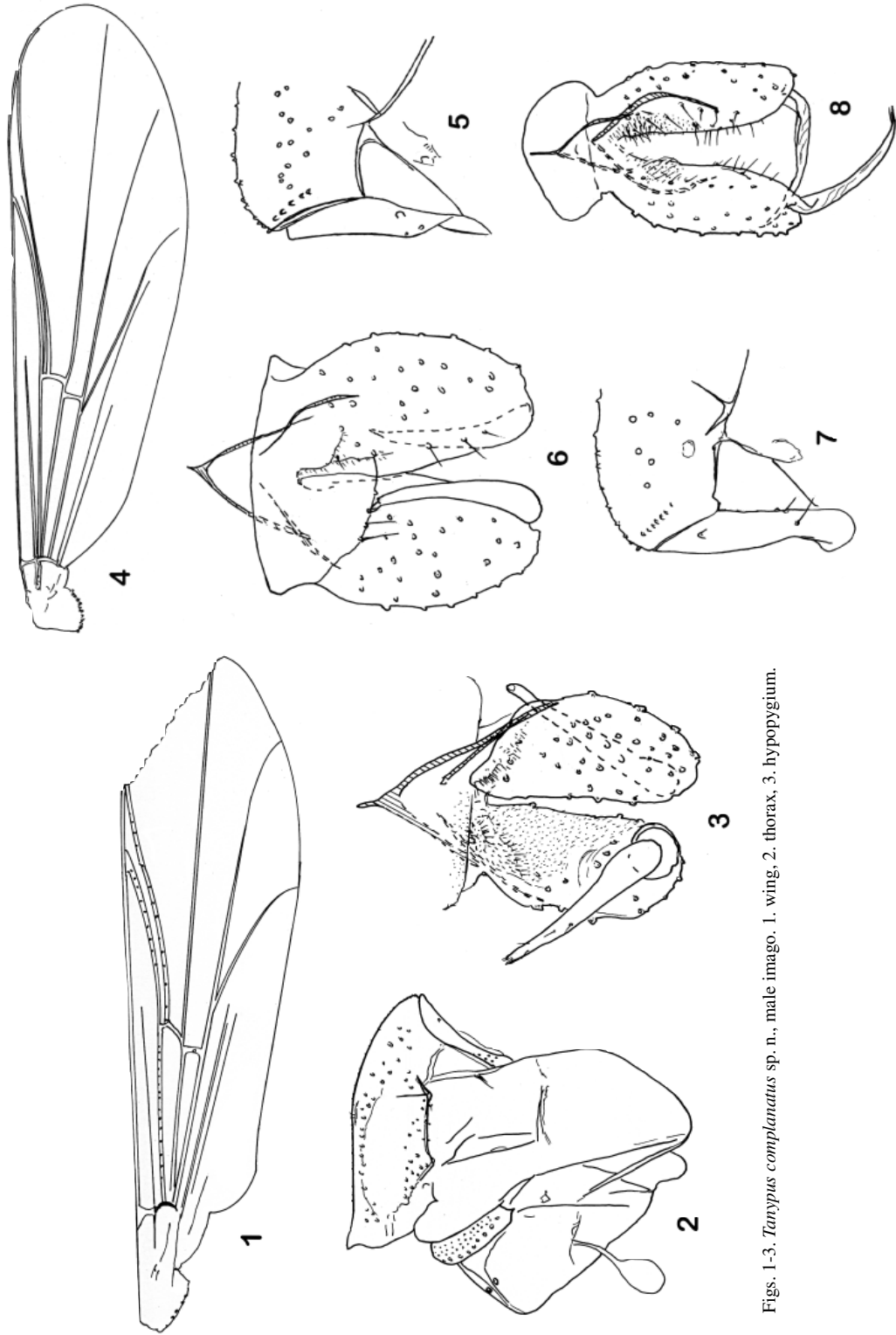
Hypopygium (Fig. 8). Tergite IX without posterior setae. Phallapodeme 83-120, 105 µm long; transverse sternapodeme triangular with 19-23, 20 µm long anterior projection. Gonocoxite 154-184, 168 µm long; gonostylus 116-131, 123 µm long, with 11-15, 12 µm long megaseta. HR 1.31-1.44, 1.36; HV 1.77-1.95, 1.88.

Remarks

The species is very similar to other species of the genus. *Paramerina vaillanti* Fittkau (Fittkau 1962: 335) known from Algeria, the Canary Islands, Jordan, Saudi Arabia, Zimbabwe and South Africa (Cranston & Judd 1989, Armitage et al. 1995) could conceivably be a junior synonym. However, that species appear to have a much shorter phallapodeme (Fittkau 1962 fig. 269) and a higher antennal ratio.

Distribution

The species previously was known only from the male holotype from Mahé.



Figs. 1-3. *Tanypus complanatus* sp. n., male imago. 1. wing, 2. thorax, 3. hypopygium.

Figs. 4-8. Tanypodinae imagines, 4-6. *Larsia pallidissima* (Kieffer), 4. wing, 5. thorax, 6. hypopygium. 7-8. *Paramerina minima* (Kieffer), 7. thorax, 8. hypopygium.

Subfamily Orthocladiinae

Cricotopus quadrifasciatus (Kieffer)

Trichocladus quadrifasciatus Kieffer, 1911b: 360.

Cricotopus quadrifasciatus (Kieffer); Freeman 1956 : 310, Freeman & Cranston 1980 : 183.

This species was one of only six previously recorded species not found by The Indian Ocean Expedition. Freeman (1956 : 310) redescribed it from the island of Mahé. The species is also known from Mali, Niger and Nigeria.

Gymnometriocnemus (Gymnometriocnemus) mahensis (Kieffer)

(Figures 9-11)

Metriocnemus mahensis Kieffer, 1911b : 360.

Metriocnemus mahensis Kieffer ; Freeman 1956 : 303.

Gymnometriocnemus mahensis (Kieffer) ; Freeman & Cranston 1980 : 183.

Material examined : SEYCHELLES : Silhouette ; Mon Plaisir, 1 ♂, 2 ♀, 6 viii 2000, J. Gerlach (ZMBN).

Diagnostic characters : The imagines are characterised by having no eye elongation. The male differs from other members of the genus by having a true anal point and appears to be lacking a virga.

MALE IMAGO ($n=1$)

Total length 1.90 mm. Wing length 1.00 mm. Total length/wing length 1.90. Wing length/length of profemur 2.12. Coloration brown.

Head. Antenna lost. Eye without dorsomedian elongation. Temporal setae not measurable. Clypeus with 12 setae. Tentorium 120 μm long, 23 μm wide. Stipes 101 μm long. Palpomeres not measurable.

Thorax. Scutellum with 4 setae. Other details not measurable.

Wing. VR 1.31. Anal lobe reduced, but wing not cuneiform. Costa 150 μm long. Brachiolum with 1 seta ; subcosta ; RM and M bare ; costal extension with 14 non-marginal setae, R with 20 setae, R_1 with 12, R_{4+5} with 23, M_{1+2} with 33, M_{3+4} with 16, Cu with 13, Cu_1 with 10, postcubitus with 15, and An with 9 setae. Squama bare. Cell m basal of RM with 9 setae, r_{4+5} with about 55, m_{1+2} with about 110, m_{3+4} with 26, and cells cu and an combined with about 60 setae.

Legs. Spur of front tibia 38 μm long, spurs of middle tibia 23 μm and 15 μm long, of hind tibia 38 μm and 17 μm long. Width at apex of front tibia 38 μm , of middle tibia 30 μm , of hind tibia 36 μm . Comb of 10

setae, 23-34 μm long. Lengths (in μm) of front to hind femur as : 473, 473, 510 ; of front to hind tibia ; 501, 468, 548.

Hypopygium (Fig. 9). Anal point 12 μm long. Tergite IX apparently with about 22 setae including about 8 on anal point; laterosternite IX apparently with 5 setae. Phallapodeme 79 μm long; transverse sternapodeme 49 μm long, oral projections well developed. Virga not observed and perhaps absent. Gonocoxite 143 μm long. Gonostylus 62 μm long, semicircular, with 7 μm long megaseta. HR 2.30, HV3.06.

FEMALE IMAGO ($n=1-2$)

Total length 1.32 mm. Wing length 0.94-1.01 mm. Total length/wing length 1.41. Wing length/length of profemur 2.17-2.25.

Head. Antenna lost. Temporal setae 12-14, consisting of 4-5 inner verticals 2-4 outer verticals, and 2-5 postorbitals. Clypeus with 12-14 setae. Tentorium 114-129 μm long, 9-11 μm wide. Stipes 98-109 μm long. Palpomere lengths (in μm): 23, 30, 45-49, 49-51, and lost.

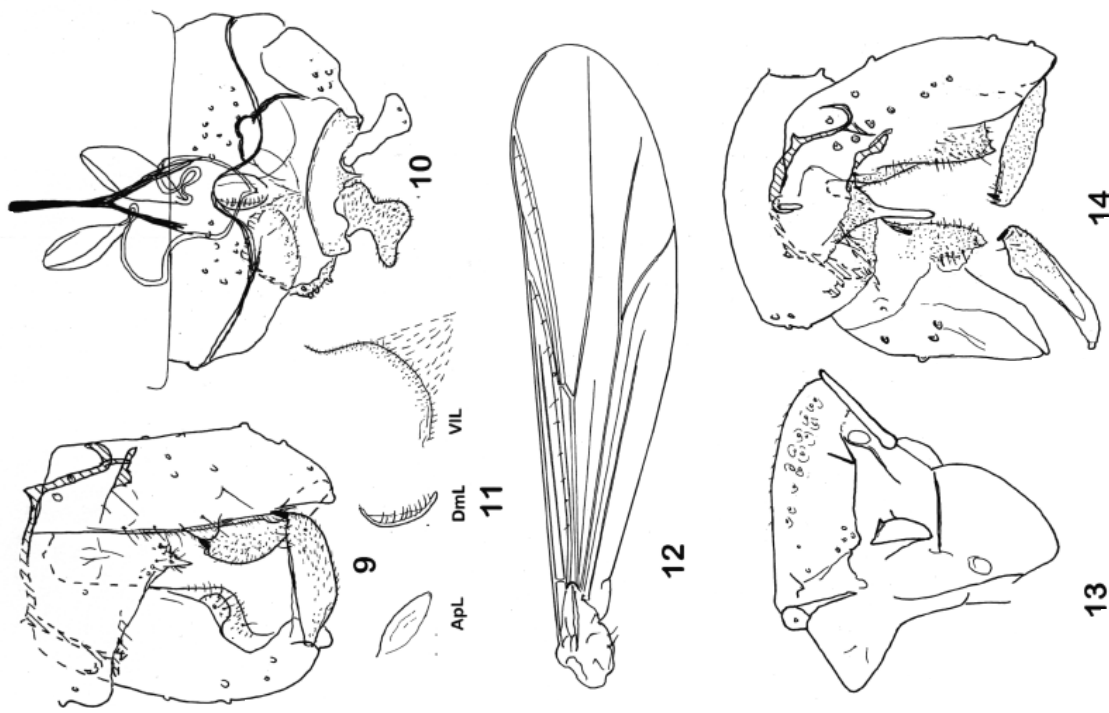
Thorax. Antepronotum apparently with lateral setae. Dorsocentrals 15, acrostichals 12, prealars 3. Scutellum with 6 setae.

Wing. VR 1.28. Costal extension 143-158 μm long. Brachiolum with 1 seta; subcosta, RM and M bare; costal extension with 15-23 non-marginal setae, R with 11-16 setae, R_1 with 10-13, R_{4+5} with 19-20 setae, M_{1+2} with 30, M_{3+4} with 19, Cu with 10-11, Cu_1 with 11, postcubitus with 16 setae. Squama bare. Cell m basal of RM with 10 setae, r_{4+5} with 62, m_{1+2} with about 120, m_{3+4} with about 40, and cells cu and an combined with about 90 setae.

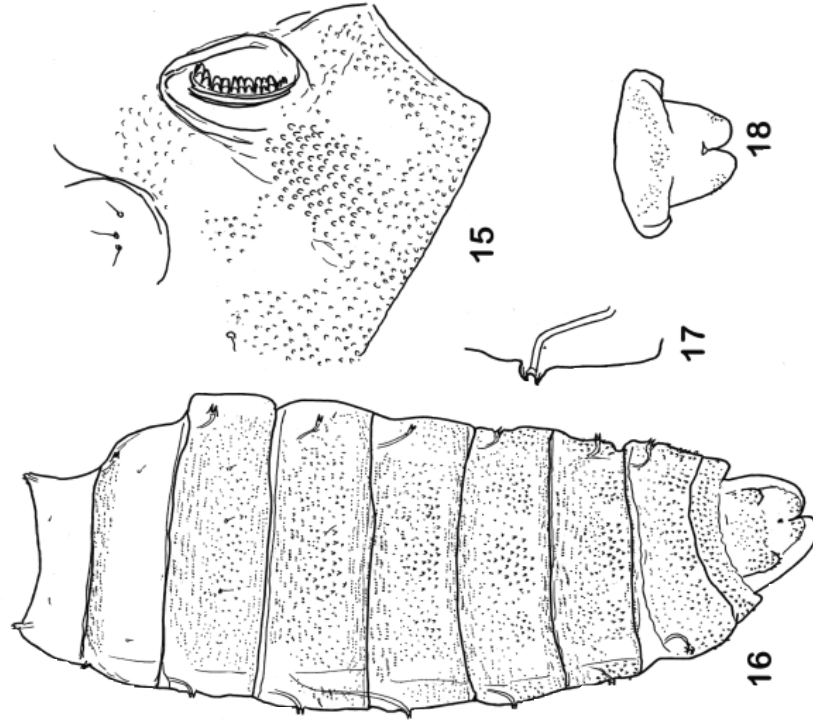
Legs. Spur of front tibia 32 μm long, spur of middle tibia 23 μm and 15 μm long, of hind tibia 38 μm and 15-17 μm long. Width at apex of front and middle tibiae each 30-32 μm , of hind tibia 34-38 μm . Comb of 8-10 setae, 19-23 to 34 μm long. Tarsi lost on all front and middle legs. Lengths (in μm) of front to hind femora: 416-463, 406-454, 435-501; of front to hind tibiae: 435-515, 406-473, 482-558; of hind ta_1 - ta_5 : 302, 132, 99, 47, 38. LR₃ 0.63, BV₃ 3.85, SV₃ 3.03.

Abdomen. T VIII with about 20 setae. Sternite VIII with 22 setae.

Genitalia (Figs 10-11). Gonocoxite apparently 8 setae. Tergite IX divided, apparently with altogether 20 setae. Cercus 64-75 μm long. Seminal capsule 68-71 μm long including 15-17 μm long neck, 49 μm wide. Notum 58-60 μm long.



Figs. 9-14. Orthocladinae imagines. 9-11. *Gymnometriocnemus* (*Gymnometriocnemus*) *malensis* (Kieffer), 9. male hypopygium, 10. female genitalia, 11. apodeme lobe (ApL), dorsomesal lobe (DmL) and ventrolateral lobe (VIL) of female, 12-14. *Smittia megalochirus* (Kieffer) n. comb., male, 12. wing, 13. thorax, 14. hypopygium.



Figs. 15-18. Pupa of ? *Smittia* sp. 15. thorax, 16. tergites, 17. opening of spiracle of segment V, 18. anal lobe.

Remarks

The specimens are in a bad shape and some details such as the apparent presence of a true anal point may be misinterpreted. A virga was not observed, but the male specimen is much cleared and there may be a small virga. However, the species obviously cannot belong to the subgenus *Rhaphidocladus* Sæther.

Distribution

The species previously was known only from the female holotype from Mahé, Cascade Estate, 240-460 m a.s.l. Mon Plaisir on Silhouette is a high altitude forest with a highly diverse fauna and flora (Gerlach 2003).

Corynoneura seychellensis Kieffer, *nomen dubium*

Corynoneura seychellensis Kieffer, 1911b : 363.

Corynoneura seychellensis Kieffer ; Freeman 1956 : 364).

Corynoneura seychellensis Kieffer ; Freeman & Cranston 1980 : 182.

According to Freeman (1956) the single male present of the type series is lacking the abdomen and thus must be regarded as a *nomen dubium*. No specimens of *Corynoneura* were present in the recent collections. The type locality of the species is Mahé, Cascade Estate, 800-1, 500 feet.

Smittia megalochirus (Kieffer) comb. n.

(Figures 12-14)

Dactylocladius megalochirus Kieffer, 1911b : 363.

Orthocladus megalochirus (Kieffer) ; Freeman 1956 : 336, Freeman & Cranston 1980 : 184.

Material examined : SEYCHELLES: Silhouette, Mon Plaisir, 6 ♂, 8 vii- 6 viii 2000, J. Gerlach (ZMBN); Mahé, Marc aux Cochons, 1 ♂, 29 viii 2002, J. Gerlach (ZMBN).

Diagnostic characters: The imago is distinguished by having completely bare eyes, weak acrostichals starting in front near antepnotum, two setae on squama and setae on R₁ and R₄₊₅.

MALE IMAGO (n=6-7 except when otherwise stated)

Total length 1.80-2.02, 1.92 mm. Wing length 1.01-1.13, 1.04 mm. Total length/wing length 1.73-1.92, 1.82. Wing length/length of profemur 2.00-2.24 (3). Coloration blackish brown

Head. Antenna lost. (AR 0.6 according to Freeman, 1956). Temporal setae 9-11 (3) ; consisting of 3-6, 5 (4) inner verticals ; 2-3 (3) outer verticals ; and 2-4, 3

(4) postorbitals. Clypeus with 8-13 (3) setae. Tentorium 98-113 µm (3) long, 21-23 µm (3) wide. Palpomere lengths (in µm) : 23-26, 25 (4) ; 34-41, 38 (4) ; 71-90, 80 (4); 90-101 (2); and lost. Third palpomere with 2 (2) rather broad lanceolate sensilla clavata.

Thorax (Fig. 13). Antepnotum with 1-2 (3) setae. Dorsocentrals 14-16, 15; acrostichals 12-17, 15 ; prealars 4-5, 4 (4), supraalar 1 (3). Scutellum with 6-8, 7 setae.

Wing (Fig. 12). VR 1.36-1.54, 1.48. Costal extension 120-135, 128 µm long. Brachiolum with 1 seta; costal extension with 2-4, 3 non-marginal setae ; R with 7-11, 8 setae; R₁ with 4-6, 5 ; R₄₊₅ with 7-10, 8 setae; other veins bare. Squama with 2 setae.

Legs. Spur of front tibia 56 µm (1) long ; spurs of middle tibia 30 µm (1) and 19 µm (1) long ; of hind tibia 45-60, 54 µm (4) and 19 µm (1) long. Width at apex of front and middle tibiae each 26-30, 29 µm (4); of hind tibia 30-38, 33 µm. Comb of 9 (5) setae ; longest setae 38-41, 39 µm (5) long ; shortest setae 23-26, 24 µm (4) long. Tarsi lost on all legs. Lengths (in µm) of front to hind femora : 482-567, 515 (4) ; 449-539, 485 ; 463-539, 492 ; of front to hind tibiae : 473-558, 511 (4) ; 397-539, 469 (5) ; 473-610, 537.

Hypopygium (Fig. 14). Anal point 45-56, 50 µm (5) long. Tergite IX with 4-7, 6 setae; laterosternite IX with 5 setae. Phallapodeme 56-64, 58 µm long; transverse sternapodeme 54-60, 56 µm long, oral projections normally developed. Virga 11 µm (2) long. (It is not clear whether there are one broad single spine or a few separate spines.) Gonocoxite 143-154, 149 µm long. Gonostylus 77-86, 81 µm long; with 8-11, 9 µm (5) long megaseta. HR 1.78-1.95, 1.84; HV 2.25-2.44, 2.36.

Remarks

Based on the presence of setae on the squama Freeman (1956) placed the species in *Orthocladus* v. d. Wulp. The wing venation shown in Freeman (1956, fig. 9 d) is typical of *Smittia* Holmgren and cannot belong to an *Orthocladus*. However, there are several details that do not fit the generic diagnosis given in Cranston et al. (1989). Presence of minute acrostichals and completely bare eyes are not unique within *Smittia* Holmgren. The presence of setae on the squama and of setae on R₁ and R₄₊₅, however, appear to be unique and the species could well deserve a separate genus. The wing venation as well as the hypopygium, however, is typical for species belonging to *Smittia*. The vertical position of the anal point indicated by Freeman (1956 fig. 9 k) appears to be an artefact.

Distribution

The species previously was known only from the male holotype from Mahé at the top of Mt. Sebert, 550 m.

? *Smittia mahensis* (Kieffer)

Dactylocladius mahensis Kieffer : 1911b : 361

Smittia mahensis (Kieffer) ; Freeman 1956 : 353.

Pseudosmittia mahensis (Kieffer) ; Freeman & Cranston 1980 : 186.

Material examined : SEYCHELLES : Silhouette, Mon Plaisir, 1 damaged ♂, 8 vii- 6 viii 2000, J. Gerlach (ZMBN).

Diagnostic characters : The male imago is distinguished by having completely bare eyes, weak acrostichals starting in front near antepnotum and 1 seta on vein R with other veins bare.

MALE IMAGO (n=1)

Total length 1.80 mm. Wing length 1.04 mm. Total length/wing length 1.74. Wing length/length of profeur 2.24.

Head. Antenna lost. (AR 0.9 in type according to Freeman.). Eyes completely bare. Temporal setae 9, consisting of 4 inner verticals, 2 outer verticals, and 3 postorbitals. Clypeus with 13 setae. Tentorium, stipes and palp not measurable.

Thorax. Antepnotum apparently with 2 setae. Dorsocentrals 6, acrostichals about 12, prealars 3, supraalar 1. Scutellum with 6 setae.

Wing. Wing venation as in *Smittia megalochirus*. VR 1.46. Costal extension 135 µm long. Brachiolum with 1 seta, R with 1 setae, other veins bare. Squama bare.

Legs. Spur of front tibia 41 µm long, spurs of middle tibia 23 µm and 19 µm long, of hind tibia 41 µm and 15 µm long. Width at apex of front tibia 24 µm, of middle tibia 28 µm, of hind tibia 34 µm. Comb of 10 setae, 19-34 µm long. Lengths (in µm) of front to hind femora : 463, 463, 510 ; of front to hind tibiae : 520, 439, 553. All tarsi lost.

Hypopygium. Laterosternite IX with 6 setae. Transverse sternapodeme 49 µm long. Gonocoxite 114 µm long. Gonostylus 53 µm long, evenly wide. HR 2.14, HV 3.41. Other details not measurable.

Remarks

The type of *Smittia mahensis* from Mahé is damaged and lacks the hypopygium, but there are short acrostichals starting in front of the scutum. Although both

specimens described here and the holotype are damaged it should be possible to recognise the species based on the completely bare eyes, the presence of several acrostichals and the single seta on vein R.

Distribution

The species is known only from Mahé and Silhouette.

? *Smittia Holmgren*

(Figures 15-18)

Material examined : SEYCHELLES : Silhouette, Corgat-Cocos Marrons Ridge, litter, pupal exuviae, 18 viii 2000, J. Gerlach (ZMBN).

A very interesting pupa with well developed thoracic and abdominal spiracles is illustrated in figures 15-18. No hemipneustic chironomid pupa is previously known, all either are propneustic or apneustic. The pupa conceivably could belong to a different family such as the Ceratopogonidae, but keys to *Smittia* both in Coffman et al. (1986) and Sæther et al. (2000)

The pupa is 2.16 mm long. All thoracic setae are 15 µm long or shorter. The anterior spiracle opening (Fig. 15) consists of an oval area 71 µm long and 38 µm wide, with about 10 tubercles along one side. The distance from the anterior dorsocentral (Dc₁) to the second is 79 µm, from Dc₂ to Dc₃ 4 mm, from Dc₃ to Dc₄ 11 mm.

***Clunio gerlachi* sp. n.**

(Figures 19-26)

Material examined : Holotype : ♂, SEYCHELLES: Silhouette, La Passe (above Dauban mausoleum), Malaise, 1-4 vii 2000, J. Gerlach (ZMBN Type No.403). Paratypes, as holotype, 23 ♂, 1 ♀ in copula with holotype, 1-4 vii 2000, J. Gerlach (ZMBN, UMZC, BMNH); Silhouette, La Passe, Heath trap, 18 ♂, 12 viii 2000, J. Gerlach (ZMBN, UMZC, BMNH).

Etymology: Named after the collector of the material from the Seychelles and the initiator of the expedition.

Diagnostic characters: The male imago is distinguished by an antenna with 9 flagellomeres with ultimate flagellomere as long as the 6-7 preceding, scutellum with about 12-14 setae in double row, tibial spurs strongly curved, third tarsomere of hind leg deeply incised and tergite IX with 1-6 setae. The female has only about 8 ommatidia and 4 flagellomeres.

MALE IMAGO (n= 10 except when otherwise stated)

Total length 2.49-2.72, 2.62 mm (4). Wing length 1.20-1.46, 1.30 mm. Total length/wing length 1.90-2.20, 2.65 (4). Wing length/length of profemur 3.23-3.49, 3.33. Coloration pale brown with hypopygium darker.

Head. Eyes hairy. Antenna (Fig. 20) with 9 flagellomeres, ultimate flagellomere as long as 6-7 preceding flagellomeres, basal flagellomere 0.63-0.90, 0.78 times as long as ultimate. AR 0.46-0.67, 0.54. Lengths (in μm) of flagellomeres : 120-150, 136; 30-38, 34 ; 28-38, 31 ; 19-30, 28 ; 19-30, 27 ; 17-28, 26 ; 17-30, 25 ; 23-26, 24 ; 154-233, 178. No temporal setae. Clypeus with 0-1, 0 setae. Tentorium 45-64, 53 μm long ; 9-11, 10 μm wide. Basal palpomere 11-26, 16 μm long ; second palpomere 45-60, 53 μm long.

Thorax. Dorsocentrals 3-8, 5 ; acrostichals very weak, about 3-6, 5 ; prealars 2-5, 3. Scutellum with 12-14, 13 setae in two irregular transverse rows.

Wing (Fig. 19). VR 1.29-1.40, 1.35. R with 1-3, 2 setae ; R_1 with 1-2, 2 ; R_{4+5} with 1-5, 3 setae ; other veins bare.

Legs. Spur of front tibia 19-30, 27 μm long ; spurs of middle tibia 28-41, 36 μm and 11-19, 15 μm (7) long, second spur perhaps sometimes absent ; of hind tibia 41-56, 47 μm and 15-26, 18 μm long ; all longer spurs strongly curved at apex. Width at apex of front tibia 38-49, 44 μm ; of middle tibia 45-56, 51 μm ; of hind tibia 49-60, 56 μm . Lengths and proportions of legs as in Table 1.

Hypopygium (Fig. 21). Tergite IX with 1-6, 3 setae ; laterosternite bare. Gonocoxite 476-563, 515 μm long ; with about 6-10 setae on inner apical margin. Gonostylus 229-270, 252 μm long ; with 5-10, 7 apical spines ; 4-11, 6 to 15-26, 20 μm long ; inner fold also with 2-4 weak spines at anterior apex. HR 1.97-2.14, 12.05 ; HV1.01-1.08, 1.05 (4), 2.36.

FEMALE IMAGO ($n=1-2$)

Total length about 1.7 mm.

Head. Antenna (Fig. 23) with 4 flagellomeres, AR 0.71. Lengths (in μm) of flagellomeres: 19, 19, 15, 38.

Eye (Fig. 24) with about 8 ommatids. Other details not clear.

Legs. All leg segments apparently of similar lengths. Lengths (in μm) femur to ta_5 of each leg: 150, 114-116. 30-34, 19-23, 19, 19, 26-30. LR₃ 0.24-0.29.

Genitalia (Figs 25-26). Gonocoxite apparently a few short setae. Seminal capsule 75 μm long. Notum 90 μm long. Other details not measurable.

Remarks

The genus *Clunio* Haliday is in need of revision. However, *C. gerlachi* differs from *C. pacificus* Edwards by having hairy eyes and strongly curved tibial spur ; from *C. tuthilli* Tokunaga (Tokunaga 1964 : 537) by having ultimate flagellomere as long as the 6-7 preceding segments and an apparent different aedeagus ; from *C. marinus* Haliday by the strongly incised third tarsomere on the hind leg, the strongly curved tibial spurs, more numerous setae on the scutellum and by having ultimate flagellomere as long as the 6-7 preceding segments. However, according to Edwards (1926 fig. 2a) there are 9 flagellomeres in *C. marinus* while Tokunaga (1964 : 537) mentions 10 flagellomeres indicating that they have different species. Some specimens from Gough Island in the Atlantic apparently belonging to *C. africanus* Hesse have been compared with *C. gerlachi*. They resemble *C. gerlachi* in the tibial spur, the third tarsomere of the hind leg as well as the shape of the aedeagus. However, the ultimate flagellomere is only as long as the 4-5 preceding flagellomeres, scutellum has 16-22 multiseriate setae, tergite IX carries 2-17 setae and the gonostylus is more similar to that of *C. marinus* as for instance illustrated by Strenzke (1960 fig.11). The female of *C. gerlachi* differs from that of *C. marinus* by having only about 8 ommatidia in the eye and 4 flagellomeres as in *C. pacificus* (Tokunaga 1935), while *C. marinus* has 21-31 ommatidia and 5 flagellomeres and *C. tsushimensis* Tokunaga has about 14 ommatidia and 4 flagellomeres (Tokunaga 1935). *C. pacificus* may be the closest related species of *C. gerlachi*.

Table 1. *Clunio gerlachi* sp. n. Length (in μm) and proportions of legs of males.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄
p ₁	369-425, 394	572-680, 622	95-123, 111	28-47, 41	28-38, 32	24-28, 26
p ₂	482-572, 532	425-539, 483	76-85, 83	28-43, 37	28-38, 33	24-28, 26
p ₃	510-614, 554	491-572, 518	85-99, 93	28-38, 37	57-76, 64	24-28, 28
	ta ₅	LR	BV	SV	BR	
p ₁	33-47, 41	0.16-0.20, 0.18	7.45-9.48, 8.11	8.25-10.98, 9.26	0.8-1.0, 1.0	
p ₂	38-47, 42	0.16-0.19, 0.17	7.36-8.64, 7.95	9.22-12.82, 11.85	1.0-1.6, 1.2	
p ₃	38-52, 43	0.16-0.20, 0.18	6.29-7.74, 6.81	10.19-12.78, 11.58	1.6-2.7, 2.1	

Distribution

The species is known only from La Passe, Silhouette, the main settlement area of the island (Gerlach 2003).

Semiocladus brevicornis (Tokunaga)

Smittia brevicornis Tokunaga, 1964 : 518.

Semiocladus brevicornis (Tokunaga) ; Cranston & Martin 1989 : 263.

Semiocladus brevicornis (Tokunaga) ; Sæther & Ferrington 1997 : 229.

Material examined : SEYCHELLES : Silhouette, La Passe, Heath trap, 9 ♂, 12 viii 2000, J. Gerlach (ZMBN, UMZC, BMNH).

The species previously was known only from Micronesia (Caroline Is.) (Tokunaga 1964 as *Smittia*). Sæther & Ferrington (1997) redescribed the species.

Pseudosmittia triangula (Tokunaga)

(Figures 29-30)

Smittia triangula Tokunaga, 1964: 524.

Pseudosmittia triangula (Tokunaga) ; Cranston & Martin 1989 : 262.

Material examined : SEYCHELLES : SEYCHELLES : Silhouette, Grand Barbe, 4 ♂, 6 i 2002, J. Gerlach; Silhouette, La Passe (above Dauban mausoleum), Malaise, 1 ♂, 1-4 vii 2000, J. Gerlach (ZMBN).

The species previously was known from Caroline and Marshall Islands (Tokunaga 1964 as *Smittia*). The type has been examined in connection with an ongoing revision of the genus *Pseudosmittia*. The coastal woodland and marsh at Grande Barbe is an extremely rich environment and one of the most important marsh habitats in the Seychelles (Gerlach 2003).

Pseudosmittia melanostola (Kieffer)

(Figures 27, 31)

Dactylocladius melanostolus Kieffer, 1911b : 362.

Smittia melanostola (Kieffer) ; Freeman 1956 : 357, pro parte.

Pseudosmittia melanostola (Kieffer) ; Freeman & Cranston 1980 : 186 pro parte.

Material examined : SEYCHELLES : Mahé, Cascade Estate, lectotype ♂, here designated, iii 1909, J. S. Gardineau (BMNH); Mahé, Marc aux Cochons, 1 ♂, 29 viii 2002, J. Gerlach (ZMBN),

Diagnostic characters : The long, bare, parallel-sided anal point combined with the forked postcubitus and R_{4+5} ending above apex of M_{3+4} separate this species from other members of the genus.

MALE IMAGO ($n=1-2$)

Total length 2.22-2.40 mm. Wing length 1.30-1.31 mm. Total length/wing length 1.70-1.84. Wing length/length of profemur 2.42. Coloration black, according to Freeman (1956) with brilliant silvery pruinose shoulders.

Head. AR 1.39. Ultimate flagellomere 414 μ m long. Temporal setae 10-11, consisting of 5-6 inner verticals, 5 outer verticals, no postorbitals. Clypeus with 9-11 setae. Tentorium 113-130 μ m long, 23-25 μ m wide. Stipes 105-118 μ m long, 46 μ m wide. Palpomere lengths (in μ m) : 27-24, 34-41, 85, 89, 129. Third palpomere with 15 scalpellate sensilla clavata.

Thorax. Median anteprenotal lobes slightly reduced, anteprenotum with 4-8 lateral setae. Dorsocentrals 24, acrostichals 2, prealars 6-9, no supraalar seta. Scutellum with 12-14 setae.

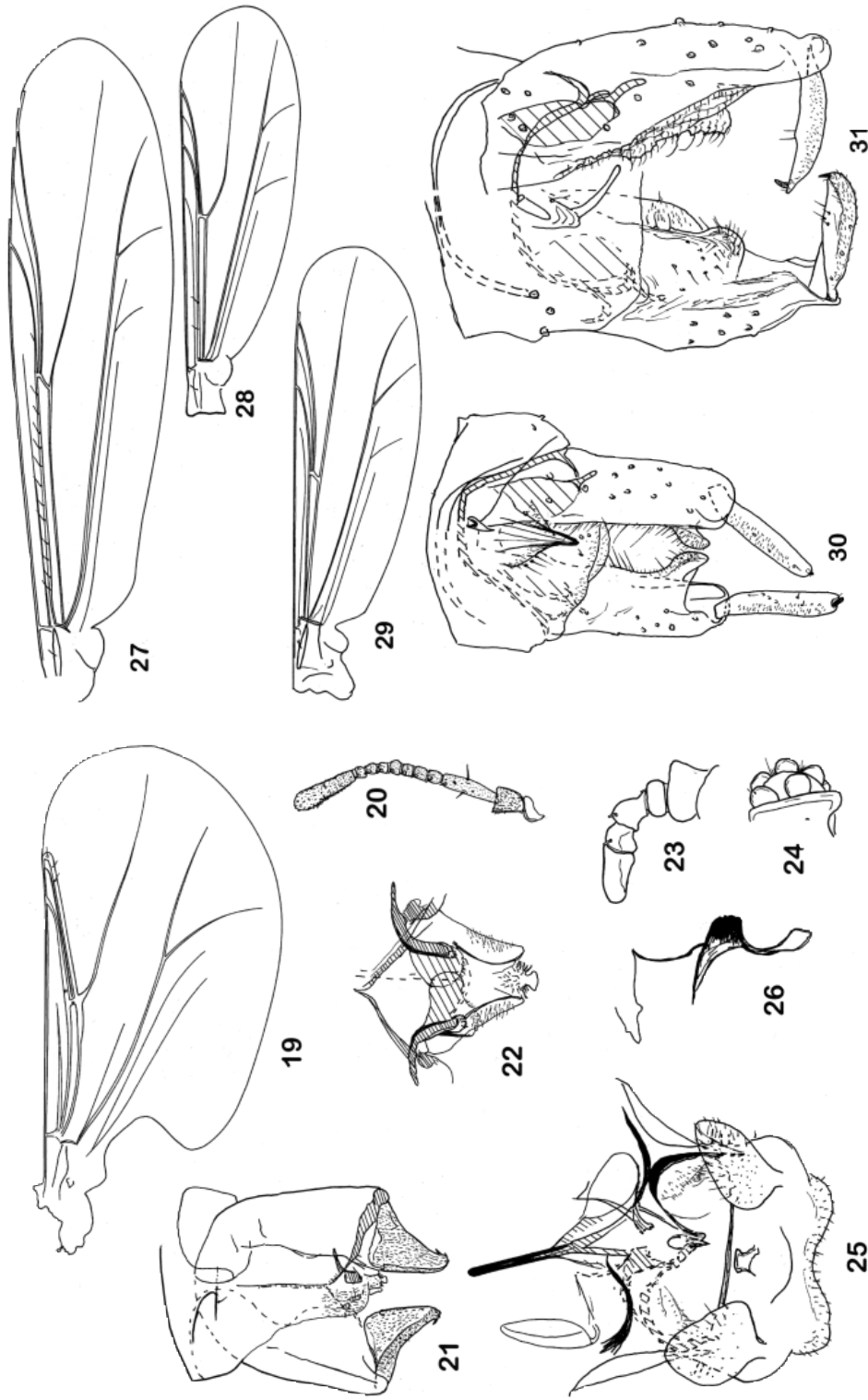
Wing (Fig. 27). VR 1.54-1.56. VR_2 1.25-1.26. Anal lobe present. Costal extension 62-79 μ m long. R_{4+5} ending above apex of M_{3+4} ; Cu_1 curved. Brachiolum with 1 seta, R with 11-12 setae, R_1 with 1-3 setae, other veins bare.

Legs. Spur of front tibia 53 μ m long, spurs of middle tibia 41 μ m and 27 μ m long, of hind tibia 62 μ m and 32 μ m long. Width at apex of front and middle tibiae each 29-30 μ m, of hind tibia 37-39 μ m. Comb of 10-11 setae, 20-46 μ m long. Lengths and proportions of legs as in Table 2.

Hypopygium (Fig. 31, Freeman 1956 fig. 14k). Anal point 57 μ m long, parallel-sided and bare ; tergite IX with 9-10 weak setae ; laterosternite IX with 4-5 setae. Phallapodeme 75 μ m long ; transverse sternapodeme about 56-59 μ m long, no oral projections. Virga 23-26 μ m long. Gonocoxite 188-190 μ m long; no superior

Table 2. *Pseudosmittia melanostola* (Kieffer). Length (in μ m) and proportions of legs of males.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV
p ₁	540	540	347	203	171	104	63	0.64	2.64	3.12
p ₂	585-614	576-610	324	162	126	77	54	0.56	3.55	3.58
p ₃	585-605	594-652	387	216	180	90	54	0.66	2.90	3.05



Figs. 19-26. *Clunio gertlachi* sp. n. 19. male wing, 20. male antenna, 21. male hypopygium, 22. male aedeagus, 23. female antenna, 24. female eye, 25. female genitalia, 26. apparent apodeme lobe of female genitalia.

Figs. 27-31. *Pseudosmittia* spp., male imagines. 27. wing of *P. melanostola* (Kieffer), 28. wing of *P. xanthostola* (Kieffer), 29. wing of *P. triangula* Tokunaga, 30. hypopygium of *P. melanostola*, 31. hypopygium of *P. triangula*.

volsella; inferior volsella reaching to 0.68-0.70 gonocoxite length, no accessory lobe. Gonostylus 73 μm long, megaseta 7 μm long; HR 2.59-2.73, HV 2.96-3.05.

Remarks

Freeman synonymized *Dactylocladius melanostolus* with *Dactylocladius xanthostolus* and *D. heterostolus*. The types of *P. xanthostolus* have been examined. The wing venation is quite different and the size considerably smaller. *P. melanostola* appear related to *P. macrobrachia* (Edwards) from Samoa (Edwards 1928: 62).

Distribution

This species is known only from the Seychelles.

Pseudosmittia xanthostola (Kieffer)

(Figures 28, 32-36)

Dactylocladius xanthostolus Kieffer, 1911b : 362.

Dactylocladius heterostolus Kieffer, 1911b : 363.

Smittia melanostola (Kieffer) ; Freeman 1956 : 357, pro parte.

Pseudosmittia melanostola (Kieffer) ; Freeman & Cranston 1980 : 186, pro parte.

Material examined : SEYCHELLES : Mahé, Cascade Estate, lectotype ♀, here designated, iii 1909, J. S. Gardiner (BMNH); 2 ♀ paralectotypes, same data as lectotype; Mahé, Anse aux Pins, mangrove, 1 ♂, 19 xii 1992, H. Malicky (ZSM); Anonyme Island, lectotype of *heterostolus* ♀, here designated, I 1909, J. S. Gardiner (BMNH).

Diagnostic characters : The imagines are characterized by having a strong apical antennal seta in both sexes, 12-14 scalpellate sensilla clavata located subapically on the third palpomere, postcubitus forked in both sexes, 16-20 dorsocentrals and 9-15 setae on the clypeus. The male imago is easily recognised by the sharply triangular large and dark anal point and the extremely long digitiform inferior volsella. The female can be separated from the very similar females of *Pseudosmittia brevifurcata* by having a distinct postcubital fork and only a posterior group of 5-6 prealar

setae in addition to being smaller in size.

MALE IMAGO ($n=1$)

Total length 1.64 mm. Wing length 0.82 mm. Total length/wing length 1.99. Wing length/length of profemur 2.61. Coloration blackish brown.

Head. AR 0.45. Ultimate flagellomere 155 μm long, with 39 μm long strong apical seta. Temporal setae 5, consisting of 2 inner verticals and 3 outer verticals, no postorbitals. Clypeus with 9 setae. Tentorium 107 μm long, 16 μm wide. Palpomere lengths (in μm) : 22, 27, 50, 57, 97. Third palpomere with about 12 strongly scalpellate sensilla clavata.

Thorax. Anteprenotal lobes not observable. Dorsocentrals 17, acrostichals 2, apparently 6 prealars, no supraalar seta. Scutellum with 6 setae.

Wing (Fig. 28). VR 1.63, VR₂ 1.26. Anal lobe reduced, but wing not cuneiform. Costa not extended. R₄₊₅ ending well proximal to apex of M₃₊₄ ; Cu₁ slightly curved. Brachiolium with 1 seta, R with 2 setae, other veins bare.

Legs. Spur of front tibia 37 μm long, single spur of middle tibia 21 μm long, of hind tibia 37 μm and 18 μm long. Width at apex of front and middle tibiae each 21-22 μm , of hind tibia 34 μm . Comb of 16 setae, 25-32 μm long. Lengths and proportions of legs as in Table 3.

Hypopygium (Fig. 32). Anal point 54 μm long, 46 μm wide at base, sharply triangular and with 10 lateral setae; laterosternite ix with 4 setae. Phallapodeme 50 μm long ; transverse sternapodeme 37 μm long, no oral projections. Virga 14 μm long. Gonocoxite 112 μm long, with 56 μm long digitiform inferior volsella placed proximally on gonostylus but reaching to 0.82 gonocoxite length. Gonostylus 75 μm long ; attenuate, with 8 μm long megaseta pointing in longitudinal direction. HR 1.48, HV 2.19.

FEMALE IMAGO ($n=3-4$, except when otherwise stated)

Total length 1.59-1.77. Wing length 0.76-0.83. Total length/wing length 1.96-2.11 (2). Wing length/length of profemur 2.33-2.45 (2). Coloration blackish brown.

Table 3. *Pseudosmittia xanthostola* (Kieffer). Length (in μm) and proportions of legs of males.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
p ₁	315	356	180	81	63	41	41	0.51	3.78	3.73	2.4
p ₂	351	360	185	90	68	41	36	0.53	3.85	3.76	3.2
p ₃	351	360	230	117	108	50	41	0.64	3.03	3.10	3.8

Head. AR 0.54-0.55 (2). Lengths of flagellomeres (in μm) 53-59, 37-43, 41-46, 41-46, 91-96 (2). Ultimate flagellomere with lost strong apical seta. Temporal setae 5-10, 8, consisting of 3-5, 4 inner verticals and 2-6, 4 outer verticals, no postorbitals. Clypeus with 11-15, 13 setae. Tentorium 101-105, 104 μm long, 7-11, 9 μm wide. Stipes 87-91, 90 μm long, 23-30, 26 μm wide. Palpomere lengths (in μm): 21-30, 24; 27-30, 29; 57-69; 69-72 (2); 105-112 (2). Third palpomere with 13-14 (2) scalpellate sensilla clavata. Coronal suture complete in 3 specimens, 34 μm long in fourth specimen.

Thorax. Median anteprenotal lobes reduced, anteprenotum with 2-3, 3 lateral setae. Dorsocentrals 16-20, 17; acrostichals 2; prealars 5-6, 5; no supraalar seta. Scutellum with 6-8, 8 setae.

Wing. VR 1.62-1.76, VR₂ 1.37-1.48. Costal extension 87-105 μm long. R₄₊₅ ending well proximal to apex of M₃₊₄; Cu₁ straight. Brachiolium with 1 seta, costal extension with 7-13 non-marginal setae, R with 6-9 setae, R₁ with 2, R₄₊₅ with 9-11 setae, other veins bare.

Legs. Spur of front tibia 32 μm long, spur of middle lost, of hind tibia 46-48 μm (2) and 22 μm (1) long. Width at apex of front and middle tibiae each 23-25 μm , of hind tibia 34-48 μm . Comb of 14-15 setae, 26-43 μm long. Tarsi lost on all front and middle legs. Lengths (in μm) of front to hind femora: 324-332; 351-414 (2); 342-414; of front to hind tibiae: 351-365 (2); 396 (1); 374-432; of hind ta₁-ta₅ 243; 108; 113; 45; 36. LR₃ 0.57 (1), BV₃ 3.58 (1), SV₃ 3.44 (1), BR₃ 2.7 (1).

Abdomen. Tergite I bare; T II-V each with 18-25, 21 setae; T VI with 14-21, 16; T VII with 11-17, 15; T VIII with 12-16, 14 setae. Sternites I and II bare; S III with 4-6 setae; S IV-VI each with 6-11, 8; S VII with 8-17, 12; S VIII with 29-34, 32 setae.

Genitalia (Figs 32-36). Gonocoxite with 1-2, 2 strong and 2-3, 2 weak setae. Tergite IX divided; with altogether 9-11, 11 setae; apodeme against gonocoxite 75-85, 81 μm long. Cercus 59-69, 65 μm long. Seminal capsule relatively pale, 69-71, 70 μm long; 46-59 μm wide; apparently no microtrichiae. Notum 80-89, 83 μm long.

Remarks

Freeman (1956: 357) synonymized *Pseudosmittia xanthostola* and *P. heterostola* with *P. melanostola*. However, as shown above, *P. melanostola* cannot constitute the male of *P. xanthostola*. The present male, however, collected 83 years later, but on the same

island, almost certainly is the male of *P. xanthostola* as deduced by sensilla clavata, numerous dorsocentrals, setae of the clypeus, and wing venation. *P. xanthostola* may be the sister species of the very similar *P. bifurcata* (Tokunaga) (Tokunaga, 1936 fig.1) known from Kiribati and Japan.

Ecology and distribution

The species has been collected from seaweed and in a mangrove area, and larvae are likely to live in the intertidal zone. According to Gerlach (2003) Anonyme Island has a small fresh-water fauna present in temporary pools of rain-water which could be an additional locality. The species is known only from the Seychelles.

Pseudosmittia remigula sp. n.

(Figure 37)

Type material: Holotype: ♂, SEYCHELLES: Mahé, Marc aux Cochons, 29 viii 2002, J. Gerlach (ZMBN Type No.404). Paratype: 1 ♂, SEYCHELLES: no other data (BMNH).

Diagnostic characters: The absence of an anal point, the long adpressed inferior volsella with a covered accessory lobe, and particularly the paddle-ear-shaped gonostylus readily separate the male imago from other species of the genus.

Etymology: From the Latin remigulus, a rower, referring to the oar-shaped gonostyli.

MALE IMAGO ($n=1-2$)

Total length 1.92-2.12 mm. Wing length 1.05-1.15 mm. Total length/wing length 1.83-1.84. Wing length/length of profemur 2.42-2.58. Coloration black.

Head. AR 1.15-1.33. Ultimate flagellomere 323-347 μm long. Temporal setae 5, consisting of 2 inner verticals and 3 outer verticals, no postorbitals. Clypeus with 8-9 setae. Tentorium 113-119 μm long, 21-23 μm wide. Stipes 101-114 μm long, 23 μm wide. Palpomere lengths (in μm): 26-30, 34-37, 71-78, 99-103, 124-144. Third palpomere with 26-27 μm long spine at apex, no sensilla clavata.

Thorax. Median anteprenotal lobes reduced, anteprenotum with 6-7 lateral setae. Dorsocentrals 12-16, acrostichals 2, prealars 3-5, and no supraalar seta. Scutellum with 9 setae.

Wing. VR 1.56-1.59, VR₂ 1.25. Anal lobe relatively well developed. Costal extension 38 μm long. R₄₊₅ ending above apex of M₃₊₄; Cu₁ nearly straight. Brachiolium with 1 seta, other veins bare.

Legs. Spur of front tibia 40-41 μm long, of middle ti-

Table 4. *Pseudosmittia remigula* sp. n. Length (in μm) and proportions of legs of males.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR	BV	SV	BR
p ₁	406-468	449-513	252	144	108	72	54	0.49	3.29	3.93	2.6
p ₂	473-540	454-531	279	149	113	81	50	0.53	3.45	3.84	2.6
p ₃	477-522	482-549	324	176	167	86	54	0.59	2.90	3.31	4.0

bia 28-31 μm long (only one spur), of hind tibia 50-56 μm and 30 μm long. Width at apex of front tibia 26-30 μm , of middle tibia 28-31 μm , of hind tibia 38-43 μm . Comb of 11 setae, 23-39 μm long. Lengths (in μm) and proportions of legs as in Table 4.

Hypopygium (Fig. 37). Anal point absent; tergite IX with 11-16 weak setae; laterosternite IX with 7 setae. Phallapodeme 90-105 μm long; transverse sternapodeme 49-55 μm long, no oral projections. Virga 16-23 μm long. Gonocoxite 154-162 μm long; inferior volsella long, reaching to 0.79-0.88 gonocoxite length. Gonostylus 124-135 μm long. HR 1.22-1.24, HV 1.55-1.59.

Remarks

This highly peculiar species nonetheless has several synapomorphies in common with some species such as *Pseudosmittia yapensis* (Tokunaga) described by Tokunaga (1964) from Micronesia and *P. brachydicrana* (Edwards) (syn. *P. micronesiana* (Tokunaga)) known from Micronesia, Marshall Islands, Diego Garcia, Hawaii and Jamaica. The more important synapomorphies are shape of the inferior lobe and the absence of an anal point.

Distribution

The species is known only from the Seychelles.

Subfamily Chironominae

Tanytarsus esakii Tokunaga

(Figures 38-41)

Tanytarsus esakii Tokunaga, 1940 : 224.

Tanytarsus (Tanytarsus) esakii Tokunaga ; Tokunaga 1964 : 622.

Tanytarsus esakii Tokunaga ; Cranston & Martin 1989 : 266.

Material examined : SEYCHELLES : Silhouette, La Passe, heath trap, 12 ♂, 4 ♀, 12 viii 2000, J. Gerlach (ZMBN, UMZC, BMNH); Silhouette, Corgat-Cocos Marrons Ridge, litter, 5 ♀, 18 viii 2000, J. Gerlach

(ZMBN); Alphonse Island, Malaise and light, 15 ♂, 7 iv 2001, J. Gerlach (ZMBN); North Island, *Calophyllum* woodland, Malaise, 2 ♂, 30 vii- 1 viii 2002, J. Gerlach (ZMBN).

This very characteristic species was previously known from the Caroline and Marshall Islands. The species belongs to the *T. « maritimus »* group, which morphologically differ considerably from other members of the genus.

While all the other islands with records of chironomids are of granitic origin, Alphonse Island is coralline.

Tanytarsus pallidissimus Kieffer

Tanytarsus pallidissimus Kieffer, 1911b : 358.

Tanytarsus (Tanytarsus) pallidissimus Kieffer ; Freeman 1958 : 338.

Tanytarsus pallidissimus Kieffer ; Freeman & Cranston 1980 : 201, Ekrem 2001 : 27.

The species is known only from Mahé in the Seychelles.

Tanytarsus sp. n. near *pallidissimus* Kieffer

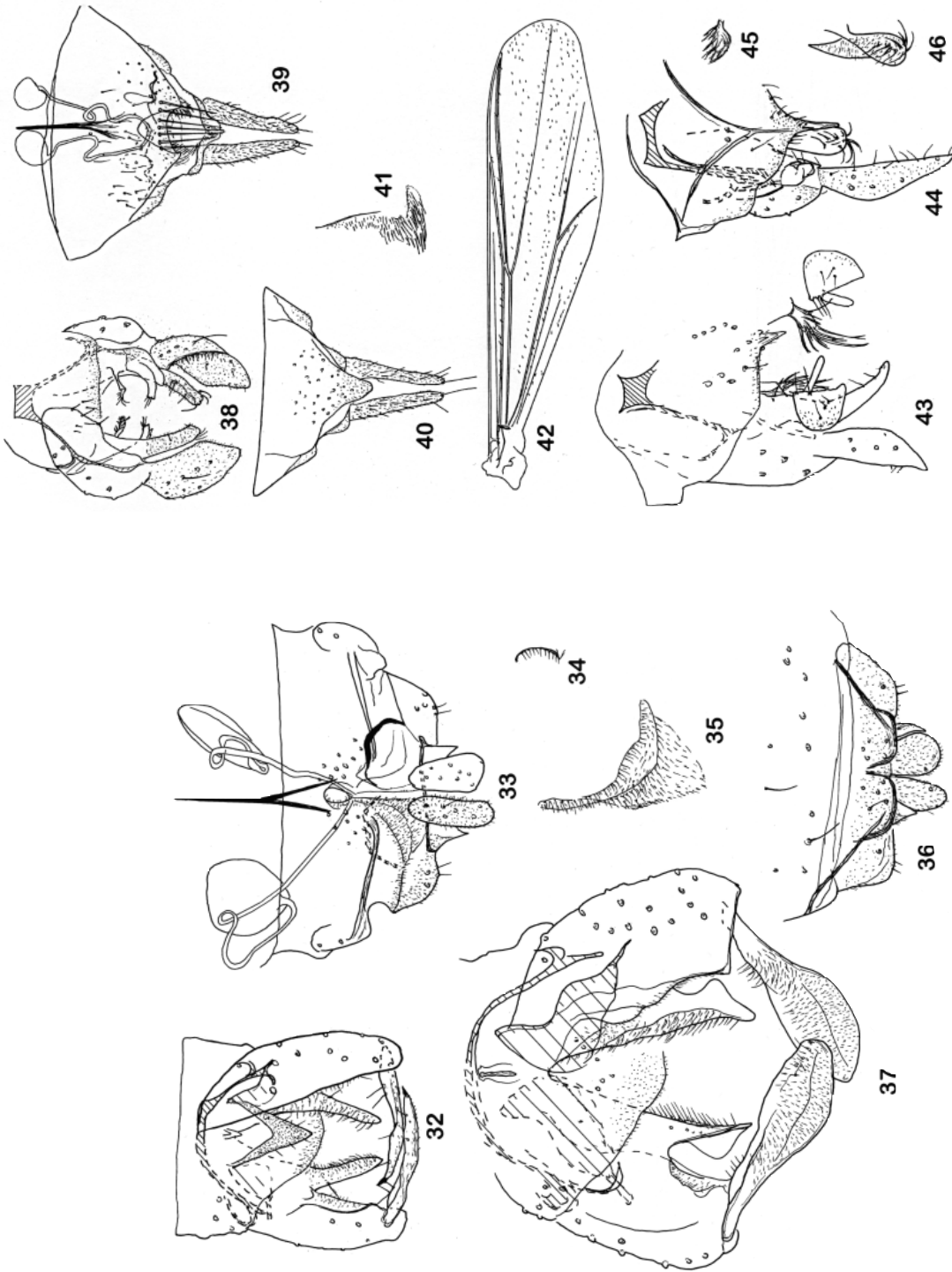
(Figures 42-43)

Material examined : SEYCHELLES : Mahé, Marc aux Cochons, 1 ♂, 29 viii 2002, J. Gerlach (ZMBN).

This damaged specimen illustrated in Figures 42-43 keys to *T. pallidissimus* in Ekrem (2001), but differ in several details. The clypeus has 9 setae and there are 8 inner verticals, 2 outer verticals and 1 postorbital. The thorax has 7 dorsocentrals and 9 acrostichals. The cuneiform wing (Fig. 42) is 0.95 mm long with a VR of 1.08. The anal point (Fig. 43) appears to be simple with 10 setae medially on tergite IX. The gonocoxite is 98 μm long, the superior volsella 39 μm long with a 24 μm long digitus, the inferior volsella 68 μm ; the median volsella has some apically split setae; and the inferior volsella is 68 μm long. Antenna and legs are lost and the hypopygium is crushed.

Tanytarsus atomarius Kieffer

Tanytarsus atomarius Kieffer, 1918, : 72.



Figs. 32-37. *Pseudosmittia* spp., imagines. 32-36. *P. xanthostola* (Kieffer), 32, male hypopygium, 33, female genitalia, ventral view, 34, dorsomesal lobe, 35, ventrolateral lobe, 36, female genitalia, dorsal view. 37. Hypopygium of *P. remigata* sp. n.

Figs. 38-46. *Tanytarsus* spp., male imagines. 38-41. *Tanytarsus esakii* Tokunaga, 38, male hypopygium, 39, female genitalia, ventral view, 40, female genitalia, dorsal view, 41, gonapophysis VIII; 42. Wing of *Tanytarsus* sp. n. near *pallidissimus* Kieffer, 43, hypopygium of *Tanytarsus* sp. n. near *pallidissimus*, 44, Hypopygium of *Tanytarsus pallidulus* Freeman, 45, median volsella of *T. pallidulus*, 46, inferior volsella of *T. pallidulus*.

Tanytarsus (Tanytarsus) atomarius Kieffer ; Freeman 1958 : 337.

Tanytarsus atomarius Kieffer ; Freeman & Cranston 1980 : 201, Ekrem 2001 : 27.

Tanytarsus pallidissimus Kieffer, 1911b, pro parte.

According to Freeman (1958: 338) the type series of *T. pallidissimus* from Mahé included three males and three females probably belonging to *T. atomarius*. The species otherwise is known from South Africa.

***Tanytarsus (Tanytarsus) pallidulus* Freeman**

(Figures 44-46)

Tanytarsus (Tanytarsus) pallidulus Freeman, 1954 : 24.

Tanytarsus (Tanytarsus) pallidulus Freeman ; Freeman 1955a : 35, 1955b : 380, 1958 : 333.

Tanytarsus pallidulus Freeman ; Freeman & Cranston 1980 : 201, Cranston & Judd 1989 : 270, Ekrem 2001 : 27.

Material examined : SEYCHELLES: Mahé, Marc aux Cochons, 6 ♂, 29 viii 2002, J. Gerlach (ZMBN).

The species is previously known from South Africa, Mozambique, Nigeria, Zimbabwe, Democratic Republic of Congo, and Saudi Arabia (Cranston & Judd 1989). New to the Seychelles.

***Tanytarsus* sp.**

Material examined : SEYCHELLES : Silhouette, La Passe Reservoir, 4 ♀, 7-14 vii 2001, J. Gerlach (ZMBN)

These four females could belong to one of the above species.

***Polypedilum (Tripodura) silhouettarium* sp. n**

(Figure 47).

Material examined: Holotype: ♂, SEYCHELLES: Silhouette, Gratte Fesse, powdery rotten wood,

13 vii 2000, J. Gerlach (ZMBN Type No.405). Paratypes : SEYCHELLES: As holotype, 4 ♂ (ZMBN, UMZC, BMNH) ; Silhouette, La Passe (above Dauban mausoleum), Malaise, 2 ♂, 1-4 vii 2000, J. Gerlach (ZMBN).

Diagnostic characters : The species differ from other Afrotropical members of the subgenus except *P. aegyptium* Kieffer (Vårdal et al. 2002 : 388) by having lateral projections on each side of the anal point, and subtriangular superior volsella. It differs from *P. aegyptium* by having a more sharply pointed superior volsella with two inner subapical spine-like setae, several inner subapical weak setae or strong microtri-

chiaie, two outer subapical setae and one inner median seta.

MALE IMAGO ($n=6-7$ except when otherwise stated)

Total length 12.40-2.79, 2.59 mm. Wing length 1.26-1.41, 1.31 mm. Total length/wing length 1.91-2.14, 1.98. Wing length/length of profemur 1.84-2.00, 1.93. Coloration light brown with darker thoracic markings.

Head. AR 1.15-1.35, 1.26. Ultimate flagellomere 444-510, 461 μm long. Temporal setae 10-13, 11 ; consisting of 5-7, 6 outer verticals and 4-6, 5 postorbitals. Clypeus with 16-23, 19 setae. Tentorium 108-128, 118 μm long; 26-30, 27 μm wide. Stipes 116-131, 122 μm long. Palpomere lengths (in μm) : 34-45, 38; 38-56, 45 ; 90-109, 97 (5) ; 98-126, 114 (5) ; 173-214 (2). Third palpomere with 2 lanceolate sensilla clavata, 19-23 μm long.

Thorax. Anteprenotum with 0-1, 0 lateral setae. Dorsocentrals 11-14, 12 ; acrostichals 12-22, 16 ; prealars 4-5, 4 ; no supraalar seta. Scutellum with 10-12, 11 stronger posterior setae and 4-6, 5 weaker anterior row of setae.

Wing. VR 1.30-1.38, 1.34. Brachiolum with 1 seta ; R with 15-17, 16 setae ; R1 with 12-13, 13; R₄₊₅ with 21-28, 25; M or RM with 1-3, 1 seta; other veins bare. Squama with 4-9, 6 setae.

Legs. Spur of front tibia 38-45, 43 μm long including 11-15, 12 μm long apical spine; spur of middle tibia 45-51, 46 μm long including comb; of hind tibia 53-68, 58 μm long. Width at apex of front tibia 41-45, 43 μm; of middle tibia 45-51, 46 μm ; of hind tibia 49-53, 50 μm. Lengths (in μm) of front to hind femora : 633-747, 678 ; 680-775, 726 ; 690-803, 736 ; of front to hind tibiae : 369-416, 388 ; 586-652, 612 ; 624-737, 668 ; of ta₁-ta₅ of mid leg ($n=1$) : 340, 187, 123, 76, 38. Ratios of mid leg ($n=1$) : LR 0.58, BV 3.84, SV 3.81, BR 4.2.

Hypopygium (Fig. 47). Anal point 71-128, 89 μm long ; 26-30, 29 μm wide at apex ; 41 -53, 46 μm wide at lateral projections. Tergite IX with 4-10, 6 median setae basal of anal point and 11-18, 16 setae underneath and lateral of point. Laterosternite IX with 2-3, 3 setae. Phallapodeme 86-113, 95 μm long ; transverse sternapodeme 30-45, 37 μm long. Gonocoxite 136-143, 137 μm long ; inferior volsella long 105-124, 114 μm long, with 8-10, 9 apical setae ; superior volsella 49-60, 54 μm long ; with 2 strong spine-like inner apical setae, several weak setae or strong microtrichia, 1 median inner seta, and 2 outer apicolateral setae. Gonostylus 146-154, 151 μm long. HR 10.88-0.92, 0.91 ; HV 1.61-1.81, 1.72.

Distribution

The species is known only from two localities on Silhouette, the main settlement area at La Passe and the high altitude forest at Gratte Fesse.

Polypedilum (Polypedilum) brunneicorne (Kieffer)

Chironomus brunneicornis Kieffer, 1911b : 352.

Chironomus pandani Kieffer, 1911b : 356.

Polypedilum (Polypedilum) brunneicorne (Kieffer) ; Freeman 1958 : 295, Freeman & Cranston 1980 : 196.

Material examined : SEYCHELLES : Mahé, Marc aux Cochons, 1 ♂, 29 vii 2002, J. Gerlach (ZMBN); Silhouette, Grande Barbe, riverside, grass under Tabebuia/ Terminalia, Malaise, 1 ♂, 22-23 vii 2000, J. Gerlach (ZMBN)

The species also is known from West Africa. The more widespread *P. dewulfi* Goetghebuer may be a synonym. Both the locality on Mahé and on Silhouette are marshlands.

Polypedilum (Polypedilum) glabripenne (Kieffer)

(Figure 49)

Tanytarsus glabripennis Kieffer, 1911b : 359.

Polypedilum (Polypedilum) glabripennis (Kieffer); Freeman 1958: 296.

Polypedilum glabripenne (Kieffer) ; Freeman & Cranston 1980 : 197.

Material examined : SEYCHELLES : Mahé, Marc aux Cochons, 4 ♂ 29 viii 2002, J. Gerlach (ZMBN).

Diagnostic characters : The absence of wing markings and spots on thorax, the small size (wing length 0.8 mm), the cuneiform wing with 2 setae on squama, and the hypopygium with superior volsella broad-based and curved and with 2 inner basal setae and 2 outer lateral setae readily separate the male imago from other species of the genus.

MALE IMAGO (n=2-4)

Total length 1.29-1.35, 1.34 mm. Wing length 0.82-0.84, 0.83 mm. Total length/wing length 1.57-1.63, 1.61. Wing length/length of profemur 2.02-2.22, 2.09. Coloration yellowish with reddish thoracic markings.

Head. Antenna lost. Temporal setae 6-8, 7 ; consisting of 4-6, 5 outer verticals ; and 2 postorbitals. Clypeus with 4-10 setae. Tentorium 86-94 µm long, 11µm wide. Stipes 68-83 µm long. Basal palpomere 15-19, 18 µm long ; second palpomere 26-29, 27 µm long ; other palpomeres lost.

Thorax. Median anteprenotal lobes reduced, anteprenotum with 1 lateral seta. Dorsocentrals 7-8, 7;

acrostichals 8-10, 10; prealars 3; no supraalar seta. Scutellum with 4 setae.

Wing. Wing cuneiform. VR 1.31-1.36, 1.33. Brachiolum with 1 seta, R with 11 setae ; R₁ with 5 ; R₄₊₅ with 15-18, 16 setae : other veins bare. Squama with 2-3, 2 setae.

Legs. Spur of front tibia pointed, 19 µm long ; of middle tibia 30-36 µm long ; of hind tibia 30-34 µm long. Width at apex of front tibia 23-26 µm ; of middle tibia 24-26 µm ; of hind tibia 26-30, 27 µm. Lengths (in µm) of front to hind femora : 369-416, 398 ; 378-406 ; 369-435, 415 ; of front to hind tibiae : 184-198, 190 ; 265-293 ; 331-369, 353.

Hypopygium (Fig. 49). Anal point slender, 23-30µm long. Tergite IX with V-shaped tergal band, with 2-5, 4 setae between bands and 6-8, 7 posterior setae. Laterosternite IX with 1-2 setae. Phallapodeme 45-51, 48 µm long ; transverse sternapodeme 19 µm long. Gonocoxite 71-83 µm long; inferior volsella long 53-60, 56 µm long, with 6 apical setae ; superior volsella 34-38, 36 µm long, with 2 inner basal setae and 2 outer lateral setae. Gonostylus 64-75 µm long. HR 1.10-1.20, HV 1.83-2.03.

Remarks

These specimens keys to *P. glabripenne* in Freeman (1956) and the association appear reasonable certain.

Distribution

The species previously was known only from the female holotype from Mahé. The male described by Kieffer (1911b) is lost.

Polypedilum (Polypedilum) melanophilum (Kieffer)

(Figure 48)

Chironomus melanophilus Kieffer, 1911b : 355.

Chironomus limnocharis Kieffer, 1911b : 357.

Chironomus nocticolor Kieffer, 1911b : 357.

Polypedilum brunneum Freeman, 1954 : 178.

Polypedilum (Polypedilum) melanophilum (Kieffer); Freeman 1958: 296.

Polypedilum (Polypedilum) melanophilum (Kieffer) ; Freeman & Cranston 1980 : 197.

Material examined : SEYCHELLES : Mahé, Marc aux Cochons, 29 viii 2002, J. Gerlach (ZMBN).

The hypopygium is shown in Fig. 48. The species is known from the Seychelles, Chad, Ivory Coast, Nigeria and South Africa.

Lepidopodus nigratipes (Kieffer)

Chironomus nigratipes Kieffer, 1911b : 358.

Lepidopodus nigratipes (Kieffer) ; Freeman 1958 : 326, Freeman & Cranston 1980 : 192.

The species and genus is known only from a single female from Mahé. The combination of scales on the legs, lack of pulvilli and an antepnotum reduced centrally but produced laterally as short tubercles make the genus unique.

***Dicotendipes binotatus* (Kieffer)**

(Figures 50-55)

Chironomus binotatus Kieffer, 1911b : 354.

Chironomus seychellensis Kieffer, 1911b : 356 (in part).

Chironomus (Dicotendipes) binotatus (Kieffer) ; Freeman 1957: 367.

Dicotendipes binotatus (Kieffer) ; Freeman & Cranston 1980 : 190.

Material examined : SEYCHELLES : Silhouette, Grande Barbe, 20 ♂, 6 i 2002, J. Gerlach (ZMBN, UMZC, BMNH); Curieuse, 6 ♂, 20 iii 2003, J. Gerlach (ZMBN).

There is some slight difference between the specimens from Silhouette (Figs 50-52) and those from Curieuse (Figs 53-55). While most specimens from of those from Silhouette appear closer to *D. chambiensis* Goetghebuer, those from Curieuse clearly belong to *D. binotatus*. However, there are intermediate specimens. *D. chambiensis* most likely is a junior synonym.

D. binotatus previously was recorded from Mahé and also is known from Mozambique and Réunion.

***Kiefferulus chloronotus* (Kieffer)**

(Figures 56, 59, 62, 65)

Chironomus chloronotus Kieffer, 1911b : 355.

Chironomus niloticus Kieffer, 1923 a : 150.

Chironomus latilobus Kieffer, 1923 b : 384 ; Freeman 1955 b : 371.

Chironomus henrardi Goetghebuer, 1936 : 475.

Chironomus (Dicotendipes) chloronotus (Kieffer) ; Freeman 1957 : 371.

Kiefferulus chloronotus (Kieffer) ; Freeman & Cranston 1980 : 191.

Material examined : SEYCHELLES: Silhouette, Grande Barbe, Scaevola beach crest, Malaise, 2 ♂, 22-23 vii 2000, J. Gerlach (ZMBN) ; Silhouette, Grande Barbe, 8 ♂, 6 i 2002, J. Gerlach (ZMBN) ; Fregate, 3 ♂, 1 x 2002, J. Gerlach (ZMBN) ; Curieuse, 15 ♂, 18

♀, 20 iii 2003, J. Gerlach (ZMBN, UMZC, BMNH).

The type locality is on Mahé. The species is widespread Afrotropical. The specimens from the Seychelles, however, are smaller and with thinner, more parallel-sided apical portion of the gonostylus and the continental species should perhaps be named *K. niloticus*. The variation, however, also within continental Africa is large. The minute frontal tubercles (Fig. 56) are common to all members of the genus *Kiefferulus* Goetghebuer.

***Chironomus seychelleanus* Kieffer**

(Figures 57, 60, 63, 66)

Chironomus seychelleanus Kieffer, 1911b : 356.

Chironomus apicalis Kieffer, 1908 : 162.

Chironomus callichirus Kieffer, 1911b : 352 (preoccupied by *Chironomus callichirus* Kieffer, 1911a : 160).

Chironomus mahensis Kieffer, 1912 : 175 (replacement name for *Chironomus callichirus* Kieffer, 1911b, preoccupied by *Chironomus callichirus* Kieffer, 1911a : 160).

Chironomus albomarginatus Kieffer, 1924 : 260 ; Freeman 1955 b : 370.

Chironomus nivalis Freeman, 1954 a : 17 ; Freeman 1955 a : 13.

Chironomus (Chironomus) callichirus Kieffer ; Freeman 1957 : 341.

Chironomus callichirus Kieffer ; Freeman & Cranston 1980 : 187.

Chironomus seychelleanus Kieffer ; Cranston & Judd 1989 : 251.

Material examined : SEYCHELLES : Mahé, Fisherman's Cove, marsh, 4 ♂, 1 ♀, 29 viii 2002, J. Gerlach (ZMBN, UMZC).

Widespread Afrotropical including Madagascar and Réunion, Saudi Arabia and Oman (Cranston & Judd 1989).

***Chironomus linearis* Kieffer**

(Figures 58, 61, 63, 67)

Chironomus linearis Kieffer, 1911 b : 353.

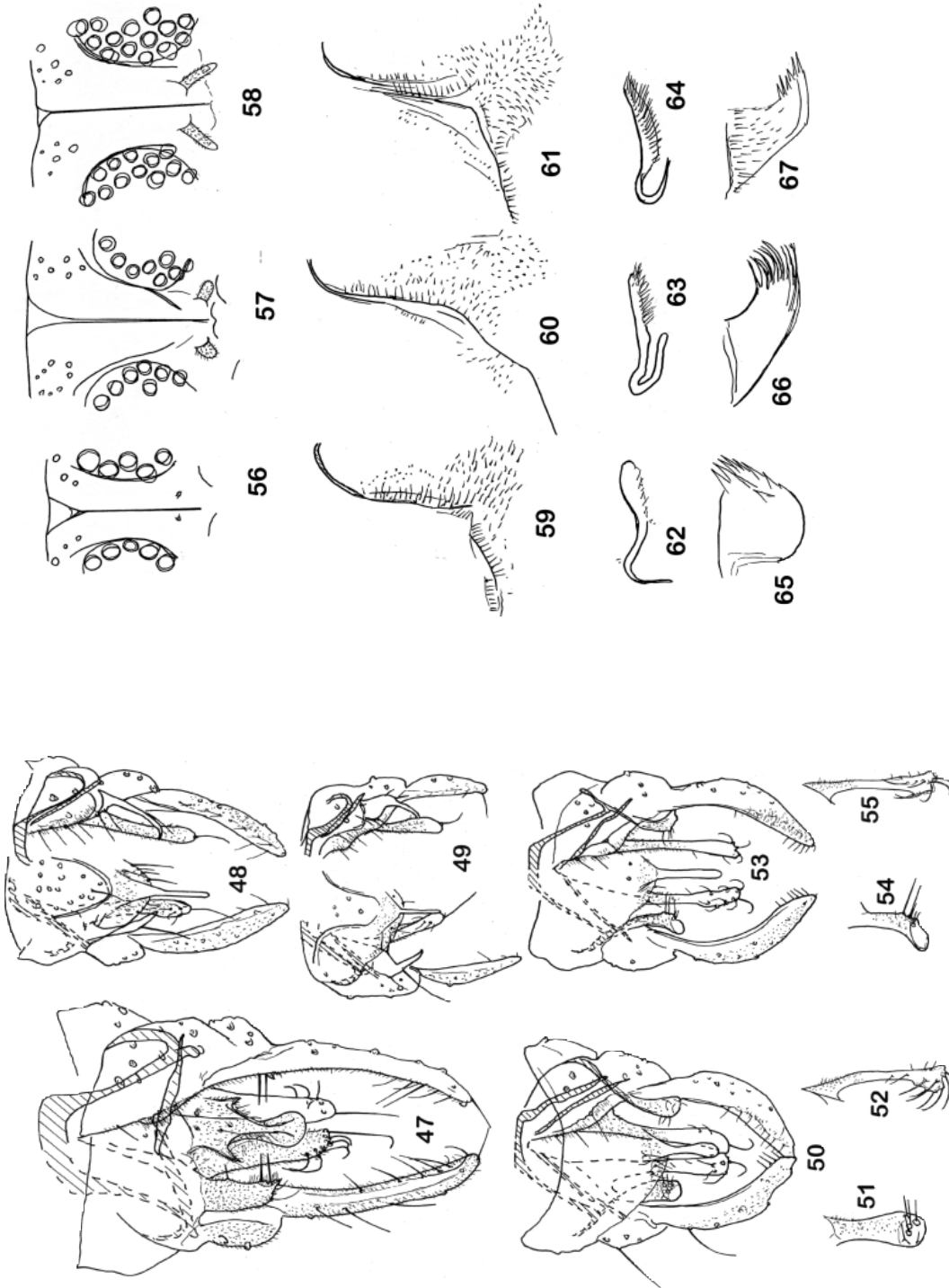
Chironomus leptogastrus Kieffer, 1911 b : 354.

Chironomus (Calochironomus) rostratiforceps Kieffer, 1923 : 383.

Chironomus (Chironomus) linearis Kieffer ; Freeman 1957 : 343.

Chironomus linearis Kieffer ; Freeman & Cranston 1980 : 188.

Material examined : SEYCHELLES : Silhouette, Grande Barbe, Scaevola beach crest, Malaise, 6 ♀, 22-23 vii 2000, J. Gerlach (ZMBN) ; Silhouette, Grande



Figs. 47-55. Hypopygia of *Polypedium* and *Dicrotendipes*. 47. *Polypedium* (*Tripodura*) *silhouetterium* sp. n., 48. *Polypedium* (*Polypedium*) *melanophilum* (Kieffer), 49. *Polypedium* (*Polypedium*) *glabripenne* (Kieffer), 50-55. *Dicrotendipes binotatus* (Kieffer), 50-52. hypopygium (50), superior (51), and inferior volsella (52) of specimen from Silhouette, 53-55. hypopygium (53), superior (54), and inferior volsella (55) of specimen from Curteuse.

Figs. 56-67. *Kiefferulus* and *Chironomus*, female imagines. 56-58. Frons with frontal tubercles of (56) *Kiefferulus chloronotus* (Kieffer), (57) *Chironomus seychelleanus* Kieffer, and (58) *Chironomus linearis* Kieffer. 59-61. Dorsomesal lobe of (59) *K. chloronotus*, (60) *C. seychelleanus* Kieffer, and (61) *C. linearis*. 62-64. Apodeme lobe of (62) *K. chloronotus*, (63) *C. seychelleanus* Kieffer, and (64) *C. linearis*. 65-67. Ventrolateral lobe of (65) *K. chloronotus*, (66) *C. seychelleanus* Kieffer, and (67) *C. linearis*.

Barbe, 4 ♂, 6 i 2002, J. Gerlach (ZMBN, UMZC); Anonyme Island, 1 ♀, 13 xii 2001, J. Gerlach (ZMBN); Curieuse, 2 ♂, 20 iii 2003, J. Gerlach (ZMBN).

The type locality is on Mahé. Also known from Madagascar, Zimbabwe and South Africa.

Notes on biogeography

Twenty-eight species of chironomids are known from the Seychelles (Table 5, Fig.68.) There is a clear relationship between size of the islands and number of species recorded. However, some large islands such as Praslin (2,756 ha) and La Digue (1,010 ha) have no re-

Table 5. Island names, positions, areas and number of chironomid species known from each island.

Island	Position	Area in ha	No. of chironomid species
Mahé	4-5° S 55-56°E	15,252	23
Silhouette	4.29°S 55.12°E	1,995	12
Curieuse	4.15°S 55.440°E	286	3
Fregate	4.35°S 55.60°E	219	1
North	4.240°S 55.150°E	210	1
Alphonse	7.05°S 52.50°E	174	1
Anonyme	4.50°S 5.52°E	9.5	2

cords of chironomids indicating that more sampling are needed at closer intervals to get a more exact picture of the distribution. The fauna of the Praslin National Park is generally scarce due to the dry nature of the woodland, which means that there may be few suitable habitats for chironomids (Gerlach 2003). All the islands with records of chironomids are of granitic origin except for the coralline Alphonse Island in the Amirante Isles. The single species recorded from North and Alphonse is the marine intertidal *Tanytarsus esakii*, while the only species recorded from Fregate Island is the freshwater species *Kiefferulus chloronotus*.

Most of the species are known only from the Seychelles. However, some species among the probably marine intertidal species are also known from Micronesia or have close relatives in the Oceanic or Oriental or Eastern Palaearctic regions, while other species are widespread Afrotropical. A few species do not occur to have close relatives anywhere and may be true relicts.

In the first group are *Semiocladus brevicornis*, known from the Caroline Islands, and *Pseudosmittia triangula* and *Tanytarsus esakii* both known from Caroline and Marshall Islands. *Pseudosmittia melanostola* appear to be related to *P. macrobrachia* (Edwards) from Samoa, *Pseudosmittia xanthostola* may be the sister species of *P. bifurcata* from Kiribati and Japan, *Pseudosmittia remigula* appears related to *P. brachydicrana* (Edwards) known from Micronesia,

Marshall Islands, Diego Garcia, Hawaii and Jamaica. *Clunio gerlachi* may be close to *C. pacificus* from Western Samoa, American Samoa, Australia, Belau, Northern Marianas, Vanuatu, Ryukyus and Japan (Cranston & Martin 1989), and *C. tuthilli* from Marshall Islands. Rather than the northern Gondwanan Afrotropical-South Asia track (Track 3 in Sæther 2000) the similarities with the Australasian and Oceanic regions may be a result of direct dispersal with flotsam (Sæther & Ekrem 2003).

Species occurring in continental Africa includes : *Tanytarsus atomarius*, *Tanytarsus pallidulus*, *Polypedilum (Polypedilum) brunneicorne*, *Polypedilum (Polypedilum) melanophilum*, *Dicrotendipes binotatus*, *Kiefferulus chloronotus*, *Chironomus seychelleanus* and *Chironomus linearis*. *Paramerina minima* obviously is close to *Paramerina vaillantii* Fittkau known from Algeria, the Canary Islands, Jordan, Saudi Arabia, Zimbabwe and South Africa; and *Polypedilum (Tripodura) silhouettarium* is close to the widespread *P. aegyptium* known from the Afrotropical, Palaearctic and Oriental regions.

Tanytus complanatus, *Larsia pallidissima*, *Gymnometriocnemus (G.) mahensis*, *Smittia megalochirus* and *Lepidopus nigratipes* all have some characters which makes them unique within their genus, or in the case of *Lepidopus* which is known only from the female, within the subfamily. This could indicate an early divergence from other Afrotropical species and perhaps true Gondwanan relicts.

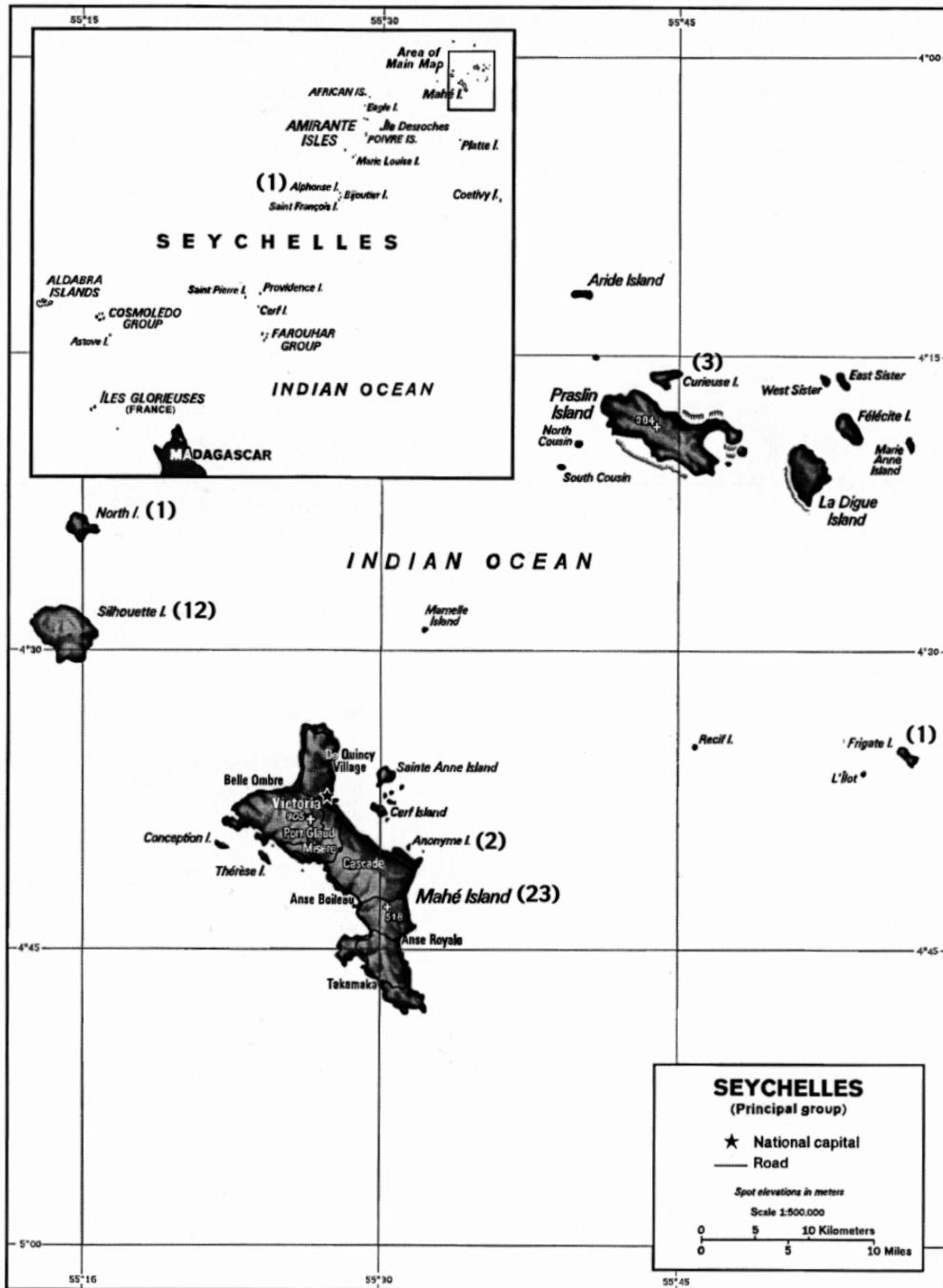


Fig. 68. Map of the Seychelles. Number of species recorded from different islands in parentheses.

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