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Chironomidae from Ethiopia, Part 3. Chironomini, with description of a new species

(Insecta, Diptera)

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Males, females, pupae and larvae of Chironomini found in the Ethiopian Highlands and Rift Valley are described. Not all stages were available for all species. One new species is described: *Polypedilum (Polypedilum) tesfayi*, spec. nov.

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Introduction

This paper is the third in the series on Chironomidae collected in Ethiopia; the two previous papers were on the Tanypodinae (Harrison 1991), and the Orthocladiinae (Harrison 1992). Freeman & Cranston (1980) list Chironomini of Sub-Saharan Africa; most of the males of these are illustrated by Freeman (1957, 1958) and by Lehmann (1979, 1981), who also describes some females, larvae and pupae.

In this paper detailed descriptions are given of males of known species, and also of females, pupae and larvae when available. One new species is described. *Dicrotendipes septemmaculatus* and *D. pilosimanus* were also collected but are not dealt with here; they are given special treatment in Harrison (1993).

Specimens were collected by the author and colleagues from the Biology Department, Addis Abba University. The ecological background is given in Harrison & Hynes (1988), Tudorancea & Harrison (1988), Tilahun Kibret & Harrison (1989), Tudorancea, Baxter & Fernando (1989) and Tesfaye Berhe, Harrison & Hynes (1989).

Methods

Adults were collected by sweeping with a net in marginal vegetation along river banks and lakeshores; many were caught at lights. Running water species were bred out in an aquarium in the laboratory at Addis Ababa. Larvae and pupae were collected during lake and river survey programmes.

Specimens were mounted in Canada balsam dissolved in cellosolve; measurements were made with an eyepiece micrometer, and all drawings with a drawing tube on the microscope.

Generic definitions of males follow the model of Cranston, Dillon, Pinder & Reiss (1989), of females the model of Saether (1977), of pupae the model of Pinder & Reiss (1986) and of larvae the model of Pinder & Reiss (1983). Langton (1984) was also used for the pupal studies. Morphological terminolgy is from Saether (1980).

Station numbers (ET) given for river sites in the text are those of Harrison & Hynes (1989) who give descriptions and map references.

The type and paratype of the new species are deposited in the Zoologische Staatssammlung, Munich, Germany. Most of the other specimens have been deposited in the same museum.

Chironomus alluaudi, Freeman 1957

All three stages of the Ethiopian material were associated by breeding out material in Addis Ababa. Freeman separated *alluaudi* from other similar species by means of the large dark spots on abdominal segments 1-5 and the anal point that appears almost straight in side view.

Adult male (N = 2 mounted and many unmounted). Freeman's description is augmented as follows:

Wing length 4.0-6.0 mm.

Head. AR 3.0-3.1. Frontal tubercles about as long as wide. Palp segments: 130, 130, 221, 260, 364 µm, 4 subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 4, dorsocentrals about 20 biserial, posterior prealars 9 uniserial, scutellars 6 per side.

Wing. Setation: R 20, R_1 14, R_{4+5} nil.

Leg. LR fore 1.95, mid 1.8, hind 1.4-1.5. Sensilla chaetica on tarsomere 1: midleg 10, hindleg 11. Tarsomeres 2 & 3 of foreleg with beard.

Abdomen. Large brown spots on tergites 1-5.

Hypopygium. As described by Freeman, and with strong tergite bands, not meeting anterior to the 10 median tergite setae. About 18 anal tergite setae per side. Dorsal edge of anal point almost straight in lateral view. Base of superior volsella small with setae and sparse small microtrichia (Fig. 1); digitiform apex broadest in middle. Inferior volsella with about 36 strong, curved setae.

Adult female (N = 2 mounted). Wing length 5.6 mm.

Head. AR 0.4. Apical flagellomere 0.9× length of 3 and 4 together. Frontal tubercles twice as long as wide.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 4, dorsocentrals about 20 biserial, posterior prealars 6 uniserial, scutellars 7 per side.

Wing. Setation: R 22, R_1 35, R_{4+5} 36.

Leg. LR fore 0.8, mid 0.5, hind 0.65. Sensilla chaetica on tarsomere 1: mid about 125, hind about 115.

Abdomen. Large brown spots on tergites 1-5.

Genitalia (Figs 2-4). Chitinized setigerous ventral ridge on tergite VIII anterior to dorsomesal lobe of gonocoxite VIII. Gonocoxapodeme VIII rounded caudally and not joined mesally. Gonopophysis VIII divided into a large, tongue-shaped dorsomesal lobe and brushlike ventrolateral lobe; apodeme lobe small with microtrichia. Coxosternapodeme large, dark and curved anteriorly (Fig. 3, left). Gonocoxite IX with about 15 setae. X with about 12 setae per side. Postgenital plate (not in figure) well-developed and rounded at apex. Labia without microtrichia. Seminal capsules oval, 143 µm long, spermathecal ducts with common opening.

Pupa (N = 2 mounted). Cephalothorax. Granulose with small scutal tubercles, 2 very small precorneals, 2 very small antepronotals, 4 inconspicuous dorsocentrals in pairs close together.

Abdomen. Tergite I without shagreen, II-VI largely covered with shagreen of fairly uniform appearance, anterior points about 6 µm, central points 15-19 µm and posterior points 24-31 µm; VII with 2 anterior patches of small points; VIII with 2 posterior patches of small points; conjunctives IV/V, V/VI and VI/VII with very fine shagreen. Hook row on II 0.73-0.85 width of tergite. Pedes spuri B on segment II and small pedes spurii A on IV. Posterolateral spur of VIII broad and somewhat curved (Fig. 5). Segment I without L setae, II-IV each with 3, V-VII with 4 lamelliform L setae. VIII with 5 lamelliform L setae. Anal lobe with fringe of about 105 setae.

Larva (N = 7 mounted). Head capsule length about 845 µm.

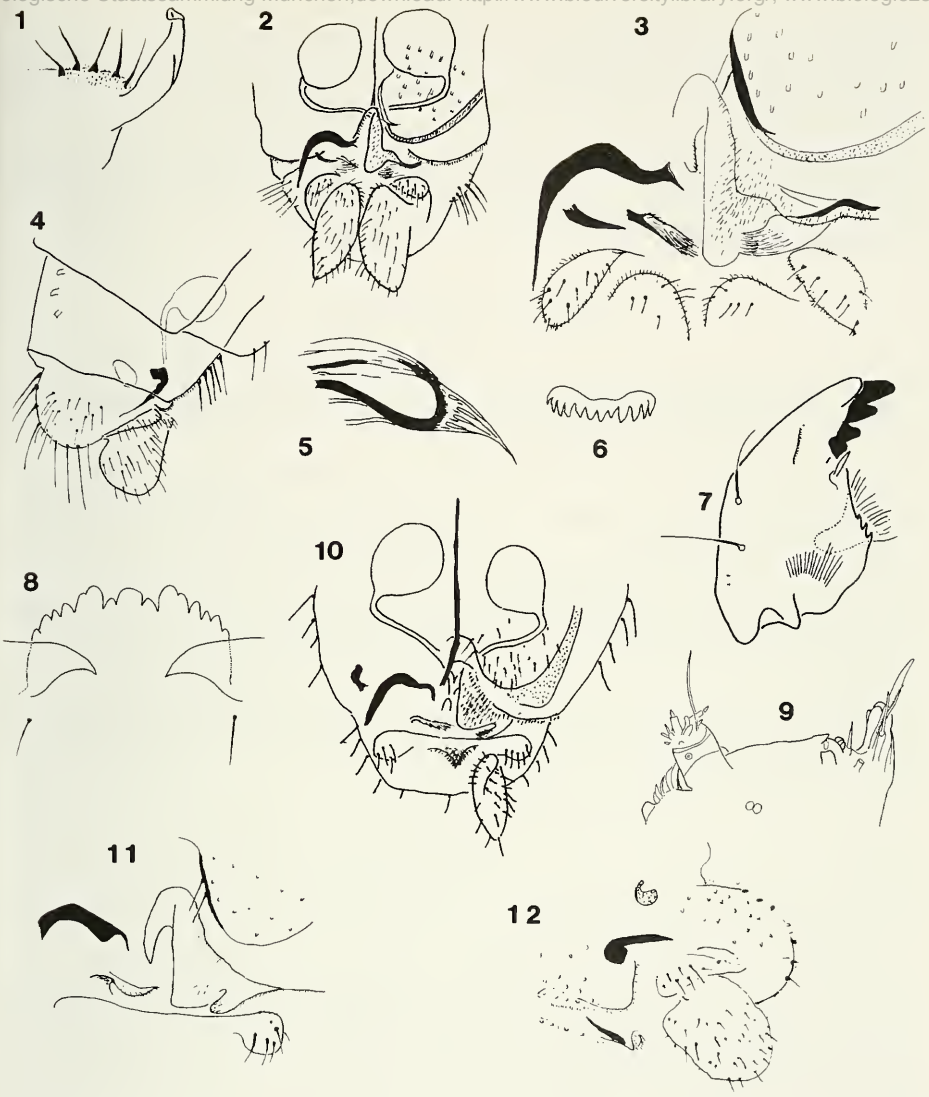
Antenna. Similar to generic definition.

Labrum. Similar to definition; S I plumose on both sides with lateral feathering extending about the distal one third. Pecten epipharynx (Fig. 6) with 12 teeth of irregular length. Premandible with 2 teeth.

Mandible (Fig. 7). Dorsal tooth pale, the rest dark, seta subdentalis simple and pointed, radially arranged grooves on outer surface.

Mentum (Fig. 8). In all specimens teeth were worn and rounded but arrangement is typical for genus. Ventrolateral plates are 0.95× width of mentum and separated by about one third width of mentum.

Maxilla (Fig. 9). Similar in general appearance to that illustrated by Cranston & Rice (1983) for the



Figs 1-9. *Chironomus alluaudi*. Adult: 1. Superior volsella. 2. ♀ genitalia, ventral. 3. ♀ genitalia, ventral. 4. ♀ genitalia, lateral. Pupa: 5. Abdomen, posterolateral spur. Larva: 6. Labrum, pecten epipharynx. 7. Mandible. 8. Mentum. 9. Maxilla.
Figs 10-12. *Chironomus caliptertus*. Adult: 10 ♀ genitalia, ventral. 11. ♀ Dorsomesal and apodeme lobes. 12. ♀ genitalia, lateral.

Orthocladiinae. Chaetulae of palpiger about one third the length of palp, a-seta of palp long and thin, b-seta and bisensillum absent, seta maxillaris 1+2, no pecten galearis, sensilla basiconicum thin and pointed, multilabate sensillum with broad lobes, lacinal chaetae near tip broadly rounded, one at least 2× length of others, one narrow and finely pectinate. Paraxial seta small, antaxial seta with base more than one third length of seta, ring organ on raised base, appendix seta simple.

Body. Similar to definition, lateral tubules and 2 pairs of ventral tubules, anal tubules short and rounded.

Specimens examined. Adults: Numerous ♂♂ and ♀♀, at lights, Addis Ababa, October & November 1982; numerous ♂♂ and ♀♀ bred from larvae collected in polluted Kebena River below ET.2C, Addis Ababa, March & April 1985; 1♂, Kosso River, ET.17, 84/1/12; 1♂, pond near Dinsho, Bale Mountains, 84/10/20. Pupae: Two, Kebena River below ET2C, Addis Ababa 1985. Larvae: Numerous, polluted Kebena River, below ET.2C, Addis Ababa 1985.

Ecology. Common to abundant in the polluted Kebena River flowing through Addis Ababa (Tesfaye Berhe et al. 1989), not found in unpolluted rivers or lakes in Ethiopian Highlands. Normal habitat appears to be ponds or small standing water.

Distribution. Kenya (Freeman 1957) and Ethiopian Highlands.

Chironomus calipterus Kieffer

Chironomus calipterus, Freeman 1957; Dejoux 1970b; Cranston & Judd 1989.

Dejoux associated all three stages and described the pupa and larva in detail. Freeman, and Cranston & Judd illustrate the male wing and the hypopygium.

Adult male (N = 2 mounted). Previous descriptions are augmented as follows:

Wing length 3 mm.

Head. AR 2.8. Frontal tubercles about 3× as long as broad. Palp segments: 37, 37, 155, 155, 233 µm. 3 subapical sensilla on segment 3.

Thorax. Small scutal tubercle present. Setation: Lateral antepronotals 5, dorsocentrals 17 partly biserial, posterior prealars 4, scutellars 7 per side.

Wing. With clouds as illustrated by Freeman, spots over cross vein and in cells (Cranston & Judd), visible in mounts, result from refraction by microtrichia. Setation: R 38, R_1 25, R_{4+5} 32, squama 21.

Leg. LR fore 1.7, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: midleg 7, hindleg 8. No beard on foreleg.

Hypopygium. As described by Freeman, Dejoux, and Cranston & Judd. Base of superior volsella small, with setae and long microtrichia up to base of curved digitiform appendix. Inferior volsella with about 15 strong curved setae.

Adult female (N = 4 mounted). Wing length 3 mm.

Head. AR 0.3-0.4. Frontal tubercles about 3× as long as broad. Palp segments: 47, 43, 146, 167, 267 µm.

Thorax. Small scutal tubercle. Setation: Lateral antepronotals 4, dorsocentrals 30 partly biserial, posterior prealars 4, scutellars 6 per side.

Wing. Similar to male. Setation: R 42, R_1 34, R_{4+5} 53, squama 9. Leg. LR fore 1.7-1.8, mid 0.5, hind 0.7. Sensilla chaetica on tarsomere 1: mid 46, hind 56.

Genitalia (Figs 10-12). Chitinized ventral ridge of VIII weak, well anterior to dorsomesal lobe of gonopophysis. Dorsomesal lobe large, microtrichia not extending to edge (Fig. 11, right). Ventrolateral lobe (Fig. 11, right) with short microtrichia. Apodeme lobe (Fig. 11, left) with weakly chitinized base and with microtrichia. Gonocoxapodemes broad and do not join. Coxosternapodeme dark, curved. Gonocoxite IX reduced to small, chitinized ridge with no setae (Fig. 12). Segment X with 8 setae per side. Post genital plate (Fig. 10) pointed. Labia without microtrichia. Seminal capsules almost oval, 109 µm long, ducts with common opening.

Pupa. None found. Dejoux's illustrations show a pupa rather typical for the genus with dorsocentrals easily visible. There are no posterolateral patches of spines on any of the tergites and the posterolateral spur of VIII is fairly broad, dark and bent with about 4 points.

Larva. None found. Dejoux's illustrations show a larva fairly typical for the genus. Premandible has 2 teeth and brush. Pecten epipharynx has 22 irregular teeth. Mentum has typical trifid central tooth. Anal tubercles short.

Specimens examined. Numerous ♂♂ and ♀♀ at lights, Lake Awasa, 81/4/15.

Comments. This species superficially resembles *C. formosipennis* because of the marked wings, but does not share its peculiarities, such as the shape of the male superior volsella, sensilla chaetica on female tarsomeres 2 and 3, and the simple central tooth of the larval mentum. In these and other respects it is more typical of the genus.

Ecology. Though adults were found on one occasion at lights at Lake Awasa no larvae or pupae were found during the extensive sampling of the lake (Tilahun Kibret & Harrison 1989). The larvae must have been living in shallow pools or swampy regions not part of the main lake.

Distribution. Afrotropical region, circum-Mediterranean and Arabian Peninsula.

Chironomus formosipennis Kieffer

Chironomus formosipennis, Freeman 1957; Dejoux 1970b.

Dejoux (1970b) associated all three stages and his association was confirmed by the Ethiopian material. Freeman (1957) and Dejoux describe the hypopygium, and Dejoux describes the pupa and larva in detail.

Adult male (N = 2 mounted). Freeman's description is augmented as follows:

Wing length 4.3-4.4 mm.

Head. AR 3.7. Frontal tubercles on a short stalk, about 2× as long as broad. Palp segments: 62, 78, 202, 186, 280 µm, 4 subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals nil, dorsocentrals about 40 bi- or triserial, posterior prealars 8 uniserial, scutellars about 20 per side biserial.

Wing. With clouds as illustrated by Freeman; spot over cross vein and spots in cells are also visible in mounts and result from refraction by microtrichia. Setation: R 52, R_1 35, R_{4+5} 44, squama 18.

Leg. LR fore 1.3, mid 0.5, hind 0.7. Sensilla chaetica on tarsomere 1: midleg 15, hindleg 10. Tarsomeres 1 & 2 of foreleg with beard.

Hypopygium. As described by Freeman and Dejoux, with base of superior volsella larger than usual for the genus (Fig. 13), ventral part with small setae almost obscured by dense long microtrichia, and digitiform apex broad and curved. Inferior volsella with about 45 strong curved setae. In addition, tergal bands meet anterior to, and demarcate, the anterior edge of oval area with median anal tergite setae.

Adult female (N = 3 mounted). Wing length 4.8 mm.

Head. AR 0.5. Frontal tubercles about 2× as long as wide, on short stalk. Palp segments: 78, 91, 169, 208, 273 µm. Four subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals nil, dorsocentrals about 36 bi- and triserial, posterior prealars 7 uniserial, scutellars about 30 per side biserial.

Wing. Setation R 42, R_1 30, R_{4+5} 54.

Leg. LR fore missing on all specimens, mid 0.58, hind 0.68. Sensilla chaetica: On tarsomere 1: midleg 64, hindleg 84; On tarsomere 2: midleg 18, hindleg 21; On tarsomere 3: midleg 9, hindleg 11.

Genitalia (Figs 14-16). Strongly chitinized setigerous ventral ridge of VIII opposite dorsomesal lobe of gonopophysis (Fig. 15), posteroventral edge of tergite VIII partly covering setigerous portion of segment X. Dorsomesal lobe of gonopophysis VIII large, microtrichia not extending to edge. Ventrolateral lobe (Fig. 15, right) narrow with small microtrichia. Apodeme lobe (Fig. 15, left) with base strongly chitinized, with long microtrichia. Gonocoxapodeme narrow and not joined. Coxosternapodeme almost black, curved. Gonocoxite IX small, visible in lateral view only (Fig. 16), three setae. Segment X with about 15 setae per side. Postgenital plate (Fig. 14) pointed. Labia without microtrichia. Seminal capsules almost spherical, 133 µm diameter, spermathecal ducts with common opening.

Pupa (N = 4 mounted). As described by Dejoux, and as follows:

Cephalothorax. Granulose with small scutal tubercles. Three very small precorneals, 2 minute antepronotals, 4 dorsocentrals, one of each pair large and dark, the other very small.

Abdomen. Shagreen on tergites, as for genus. Length of spines: anterior about 6 µm grading to posterior 37 µm; hook row almost full width of tergite II; pedes spuri B on II, and A on sternite IV with

large transparent hooks. Postero-lateral patches of spines on tergites V-VII. Conjunctives IV/V and V/VI with fine shagreen. Posterolateral spur of VIII broad and dark with 4 points. Segment I with 1 L seta, II and III with 3 and IV with 4, V-VII with 4 lamelliform L setae and VIII with 5. Anal lobe with frings of about 110 setae.

Larva (N = 3 mounted). As described by Dejoux and as follows:

Head capsule length 845-900 µm.

Antenna. Typical for genus.

Labrum. S I appears pectinate with about 20 teeth on one side only, other S setae as for genus. Pecten epipharynx with about 16 teeth, premandible with 3 teeth and brush.

Mandible. Dorsal tooth pale, 3 other teeth dark, seta subdentalis simple, radially arranged grooves basally on outer surface.

Mentum. Central tooth simple, the two smaller outer toothlets which make the central tooth of other species appear trifid are here attached to the first lateral teeth, making each of them appear trifid.

Maxilla. Similar to *C. alluaudi*.

Body, Similar to generic definition, with lateral tubules and 2 pairs of ventral tubules; anal tubules as long as, or longer than the prolegs.

Specimens examined. Adults: Numerous ♂♂ and ♀♀, at lights, Lake Ziway, 82/12/31. Larvae and pupae: One with pharate ♂, Bulbulla Shet, ET.34, flowing out of L. Ziway, 84/2/24.

Comments. This species has a number of distinctive features. The superior volsella of the male resembles that of the subgenus *Lobochironomus* (Cranston et al.). The female has sensilla chaetica on tarsomeres 2 and 3 in addition to those on tarsomere 1, on mid and hind legs; and gonocoxite IX is very small. The pupa has posterolateral patches of spines on tergites V-VII. The larva has a pectinate S I with teeth on one side only, and a mentum with a simple central tooth and trifid first lateral teeth. It is premature to allocate this species to any subgenus until much more is known about all life stages of the genus.

Ecology. Larvae were not found in Lake Ziway (Tudorancea et al. 1989), but in the slow-flowing Bulbulla Shet. Those adults captured at lights appeared to come from a shallow pool behind the reed beds of the lake, not the main lake. Dejoux found them in L. Chad (Dejoux 1970b, 1983).

Distribution. Most of Africa south of the Sahara.

Chironomus imicola Kieffer

Chironomus imicola, Freeman 1957; Freeman & Cranston 1980.

Freeman describes the male and its hypopygium and gives a short description of the female. Further details of the male and female are given here. Unfortunately the pupa and larva were not found.

Adult male (N = 2 mounted). Close to generic definition except for details given here.

Wing length 4.8 mm.

Head. AR 3.4. Frontal tubercles nearly 3× as long as broad. Palp segments: 91, 78, 260, 260, 403 µm. 7 subapical sensilla on segment 3.

Thorax. Small scutal tubercle present. Setation: Lateral antepronotals 5, dorsocentrals 31 biserial, posterior prealars 8, scutellars 10 per side partly biserial.

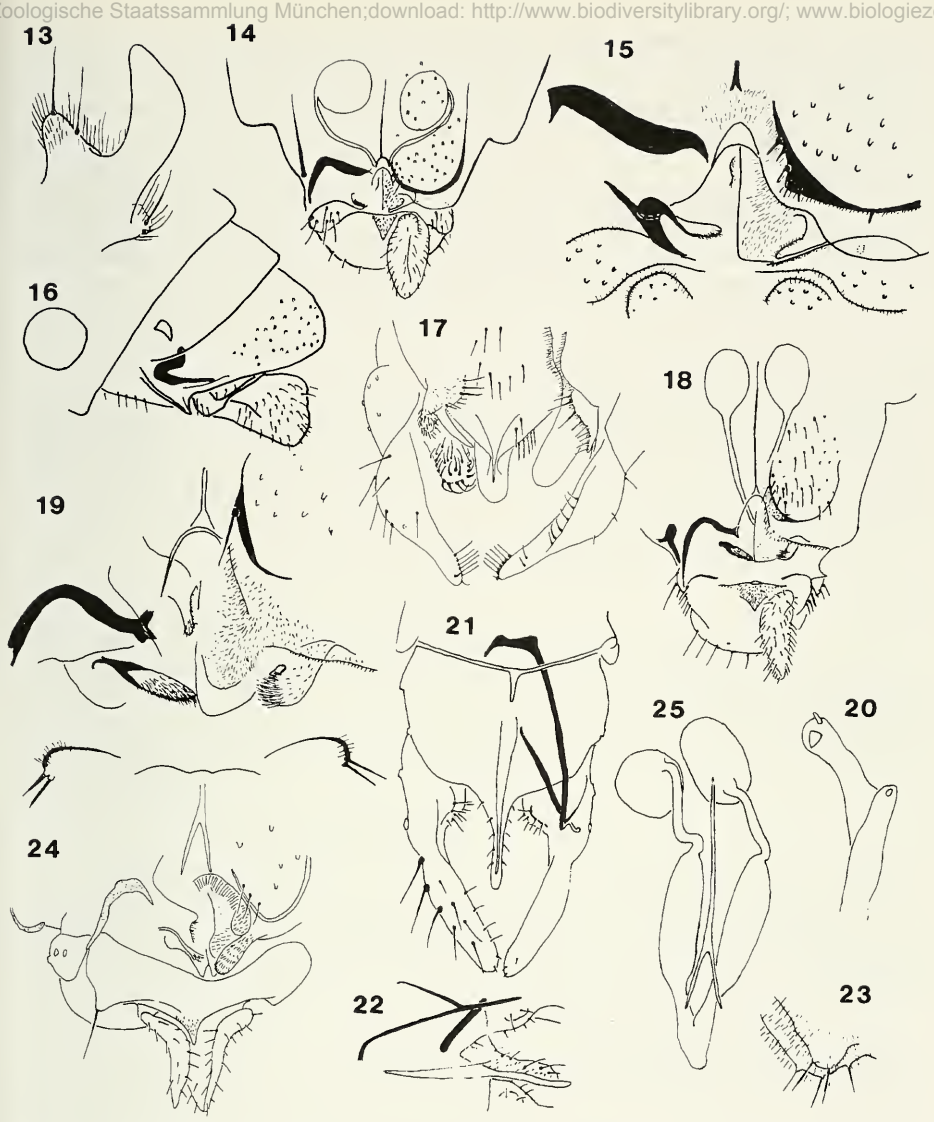
Wing. Setation: Brachiolum 3, R 53, R_1 35, R_{4+5} 45, squama 57 bi- or multiserial.

Leg. LR fore 1.7. mid 0.6-0.7, hind 0.6-0.8. Sensilla chaetica on tarsomere 1: midleg 5-8, hind leg 5-13. No beard on foreleg.

Hypopygium (Fig. 17). Strong anal tergite bands (not in figure) meeting to delineate anterior margin of roughly oval area with about 15 median anal tergite setae. About 12 apical anal setae per side. Anal point strongly down turned. Superior volsella broad, strongly setose, digitform apex arising dorsomedialy. Inferior volsella with about 30 strong, curved setae.

Adult female (N = 1 mounted). Wing length 4.8 mm.

Head. AR 0.4. Frontal tubercles as for male. Palp segments: 65, 91, 273, 286, 442 µm. 7 subterminal sensory setae on segment 3.



Figs 13-16. *Chironomus formosipennis*. Adult: 13. Superior volsella. 14. ♀ genitalia, ventral. 15. Apodeme and ventrolateral lobes. 16. ♀ genitalia, lateral.
Figs 17-19. *Chironomus imicola*. Adult: 17. Hypopygium. 18. ♀ genitalia, ventral. 19. ♀ genitalia, apodeme and ventrolateral lobes.
Figs 20-25. *Harnischia curtilamellata*. Adult ♂: 20. Tentorium, 21. Hypopygium, 22. Anal point, lateral. 23. Superior volsella. Adult ♀: 24. Genitalia, ventral. 25. Seminal vesicles, ducts.

Thorax. Small scutal tubercle. Setation: Lateral anteprontals 5, dorsocentrals about 30, posterior prealars 5, scutellum broken.

Wing. Setation: Brachiolum 5, R 57, R_1 53, R_{4+5} 90, squama about 56 bi- or multiserial.

Leg. LR fore missing, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: mid 76, hind 102.

Genitalia (Figs 18, 19). Chitinized ventral ridge of VIII weak with one seta. Dorsomesal lobe of gonopophysis VIII large, microtrichia not extending to edge. Ventrolateral lobe (Fig. 19, right) with long microtrichia. Apodeme lobe (Fig. 19, left) relatively large with well chitinized base and long microtrichia. Gonocoxapodeme narrow but broad towards ventral mid line, not joined (Fig. 18). Coxosternapodeme narrow and curved. Gonocoxite IX well developed with 4 setae. Segment X with about 10 setae per side, post genital plate pointed. Labia without microtrichia. Seminal capsules ovoid with short neck, 155 µm long, ducts almost straight with common opening.

Specimens examined. 2♂♂ netted near Lake Awasa, 84/2/11; 1♂, 1♀ netted near L. Awasa, 84/8/25.

Comments. Freeman considered this species to be similar to the Palaearctic species *C. paganus* Meigen because of the structure of the superior volsella. This species is used for the diagnosis of the genus *Einfeldia* by Cranston et al. (1989).

Nevertheless, *imicola* only resembles their concept of *Einfeldia* in the structure of the superior volsella. It differs in that the scutum has a tubercle, the squama has a large number of setae, and the anal bands are strong, joining anteriorly to the anal tergite setae. The female genitalia are very similar to those of the other species of *Chironomus* described here, except *formosipennis* and those of *plumosus* (L) (Saether 1977), but differ markedly from those of *E. pagana* in that the gonocoxapodemes of VIII are not joined mesally anterior to the vagina (Saether 1977).

C. imicola may belong to the subgenus *Lobochironomus*, but this placement must wait until this subgenus has been defined for the female and immatures, and the immatures of *imicola* have been described.

Ecology. Although adults were netted near the shore of Lake Awasa no larvae were found during an extensive survey (Tilahun Kibret & Harrison 1989). The larvae must have been developing in the swampy area near the lake.

Distribution. Most of Afrotropical region as far south as the Transvaal, also Madagascar (ZSM unpubl.).

Chironomus transvaalensis Kieffer

Chironomus transvaalensis, Freeman 1957.

Only one male was collected.

Adult male (N = 1 mounted). The male has been described well by Freeman and is not detailed again here.

The larva and pupa are described by McLachlan (1969).

Specimen examined. 1♂, at lights, Lake Ziway, 82/12/31.

Distribution. Afrotropical region, Israel (Laville & Reiss 1993).

Cryptochironomus diceras Kieffer

Chironomus (Cryptochironomus) diceras, Freeman 1957.
Cryptochironomus diceras, McLachlan 1969; Freeman & Cranston 1980; Cranston & Judd 1989.

The male adult only is described.

Adult male (N = 1 mounted). Freeman's description is supplemented as follows:
Wing length 2.2 mm.

Head. AR 2.3. Frontal tubercles absent. Palp segments: 37, 47, 133, 115, 171 µm. Two subapical sensilla on segment 3.

Thorax. Scutal tubercle absent. Setation: Lateral anteprontals 4, dorsocentrals 12 uniserial, posterior prealars 4, scutellars 8 per side biserial.

Wing. Setation: Brachiolum 2, R 14, R_1 8, R_{4+5} 16, squama 4.

Leg. LR fore 1.7, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: mid 11, hind 5.

Hypopygium (Fig. 26). Strong anal tergite bands joining well anterior to anal point and extending to point as a broad ridge; anal point fairly broad with dorsal ridge extending forwards a short distance onto the anal tergite. Superior volsella small, bent with 2 setae. Inferior volsella very small with two setae (Fig. 26, right). Gonostylus fused with gonocoxite.

Adult female. Freeman (1957) gives a short description but does not illustrate the genitalia.

Pupa. McLachlan (1969) states that the pupa is similar to those of *C. lindneri* and *C. neonilicola*.

Larva. McLachlan shows that the larva differs from that of *lindneri* in that it has a fine seta subdentalis on the mandible and the 4th tooth on the mentum is much taller than the inner teeth.

Specimens examined. Adults: 1♂ caught at lights, Lake Langano, 83/3/14; 3♂♂ at lights, L. Langano, 83/12/11.

Comments. The superior volsella does not cover the inferior in all specimens and lies well dorsal to it.

Ecology. Although all the adults were caught on the shores of Lake Langano no larvae that could belong to this species were caught in the lake, or in the outflow stream of the lake or in any of the lakes nearby.

Distribution. Over most of sub-Saharan Africa and in the Arabian Peninsula (Cranston & Judd 1989).

Cryptochironomus lindneri (Freeman)

Chironomus (*Cryptochironomus*) *lindneri* Freeman, 1957.
Cryptochironomus lindneri, McLachlan 1969; Freeman & Cranston 1980.

The male adult, the pupa and the larva were associated by means of a male pupa with larval head capsule attached. No adult female was found but some information is available from a female pupa.

Adult male (N = 3 mounted). Freeman's description is augmented as follows: Wing length 3.4 mm.

Head. AR 3.0. Frontal tubercles present. Palp segments: 86, 81, 152, 136, 236 µm. No subapical sensilla on segment 3.

Thorax. Scutum not projecting over antepronotum; very small scutal tubercle present. Setation: Lateral antepronotals 4, dorsocentrals 18 irregularly biserial, posterior prealars 6, scutellars 6 per side biserial.

Wing. Setation: Brachiolum nil, R 21, R_1 nil, R_{4+5} 6 towards tip, squama 24.

Leg. LR fore 1.4, mid 0.5, hind 0.4. Sensilla chaetica on tarsomere 1: mid 3-7, hind 4-5; one male had one sensilla on tarsomere 2 of one midleg. Slight beard on tarsomeres 1 and 2 of foreleg.

Hypopygium (Fig. 27). Anal point dorsally is smooth and runs forward as a ridge a short distance onto the anal tergite; ventrally there is a narrow setigerous portion extending just over halfway to the tip. The inferior volsella is under the superior, strongly chitinized with three marginal setae.

Adult female. No females were collected but some information was obtained from a developing female in a pupa; chitinization was at an early stage so some details could not be seen.

Genitalia (Fig. 28). Similar to generic definition. Gonocoxapodeme VIII joined mesally. Gonopophysis: dorsomesal lobe with long microtrichia, ventrolateral lobe broad with long microtrichia; apodeme lobe present, shape indistinct, with microtrichia. Gonocoxite IX too undeveloped to show seta.

Notum thin with small ramus dorsal to anterior part of dorsomesal lobe of VIII. Post genital plate triangular, cerci normal, 155 µm. Seminal capsules ovoid, 109 µm, ducts straight, with common opening.

Pupa (N = 2 mounted). The specimens were whole pupae, not exuviae; dark brown in colour and strongly chitinized.

Cephalothorax. Surface granulose, denticles broadly rounded. Cephalic tubercles unbranched, elongate, curved forwards with very small subterminal seta. No cephalic warts; thoracic horn plumose with many fine branches, basal ring oval; prealar tubercle blunt. Setation: Precorneals 2, antepronotals 2, dorsocentrals 2 pairs.

Abdomen (Figs 29-31). Surface of all tergites and sternites I-VIII strongly reticulate (not shown in figures). Tergite I with no spines; II with hook row interrupted medially (Fig. 29); III-VI with posterior

row of about 20 irregular, strong spines. Pedes spurii B anterior on segment I, posterior on II (Fig. 29); pedes spurii A on IV. Sternite I with large anterolateral tubercles covered with triangular spines, and with wide anteromedial tubercle; posterior row of large spines on sternites I-VII. Segment VIII without posterolateral spine or comb. Segment I without L setae, II-IV with 3, V-VI with 4 lamelliform L setae and VIII with 5. Anal lobe well developed with complete fringe of about 85 lamelliform setae and one dorsal lamelliform seta. Fig. 30 shows male from dorsal aspect and Fig. 31 shows female from ventral aspect.

Larva (N = 12 mounted). Head Capsule length 0.6 mm.

Antenna (Fig. 32). AR 1.25, basal segment slightly shorter than flagellum, blade arising in distal half of segment 2, accessory blade short. Lauterborn organs absent.

Labrum. Very similar to that illustrated by Pinder & Reiss (1983), with blade-like S I and S II. Pecten epipharynx (Fig. 33) a triangular plate divided into 3 lobes, central lobe pointed. Premandible with 5 teeth, brush present.

Mandible (Fig. 34). Teeth almost black, seta subdentalis broad; seta interna present but not in figure. Pecten mandibularis absent.

Mentum (Fig. 35). Teeth almost black except for pale central tooth; 6 lateral teeth; actual shape of medial portion could not be seen clearly on any specimens. Ventromedial plate wide, wrapping around head capsule laterally.

Maxilla (Fig. 36). Palp large and long, a-seta present but b-seta could not be seen, chaetulae of palpiger reduced to 3, sensilla basicona long. Paraxial seta small, antaxial seta very long and curved, very few lacinal setae.

Body. Claws of anterior parapod serrate, mostly long and thin, posterior claws simple. Anal tubercles short and conical.

Specimens examined. Adults: 1♂ at lights, Lake Ziway, 81/4/15; 3♂♂ at lights, L. Awasa, 81/4/15; 1♂, at lights, L. Ziway 82/12/31; 3♂♂, at lights, L. Langano, 83/12/11; 1♂, swarming at dusk, near L. Abijata, 85/6/18. Pupae: 1♂ with larval exuviae attached, and 1♀, L. Ziway, Jan. 1985. Larvae: Numerous specimens from L. Ziway (col. C. Tudorancea) during 1985, and from L. Awasa (col. ADH) during 1983.

Comments. This species conforms closely to the generic definition but the pupa differs in that it has pedes spurii B on segment II and no posterolateral spines or combs on VIII. It is notable that *C. supplicans* Meigen (Pinder & Reiss 1986, Langton 1984) also lacks these structures. The larva differs from *C.* sp. (Pinder & Reiss 1983) as the central lobe of the pecten hypopharynx has one point, not two; it also has a broad seta subdentalis on the mandible. McLachlan's pupa is very similar; his figure of the larval mandible also shows the broad seta subdentalis, and his mentum is similar.

Ecology. The larvae were found living in the muddy bottom of the shallow Lake Ziway (Tudorancea et al. 1989) and from the bottom of L. Awasa (Tilahun Kibret & Harrison 1989). McLachlan (1969) found them in a similar habitat on the bottom of L. Kariba, Zimbabwe.

Distribution. Most of sub-Saharan Africa (Freeman 1957).

Cryptochironomus sp. A

One unassociated female was collected from Lake Awasa.

Adult female (N = 1 mounted). Wing length 1.8 mm.

Head. AR 0.7. Frontal tubercles minute. Palp segments 47, 40, 93, 124, 186 µm. 3 subapical sensilla on segment 3. Thorax. Scutal tubercle present. Setation: Lateral antepronotals nil, dorsocentrals 12, posterior prealars 4, scutellars 6 per side.

Wing. Setation: Brachiolum 2, R 12, R_1 6, R_{4+5} 11, squama 14.

Leg. LR fore 1.5, mid 0.5, hind 0.6. Sensilla chaetica on tarsomere 1: midleg about 50 biserial, hindleg nil.

Genitalia (Figs 37, 38). Ventral ridge of VIII small. Dorsomesal lobe with long microtrichia; ventrolateral lobes large; apodeme lobes (Fig. 37, left) with small chitinized base and microtrichia. Gonocoxapodemes narrow and joined. Coxosternapodemes dark and curved. Gonocoxite IX with 2 setae. Segment X with 3 setae per side; postgenital plate pointed. Labia without microtrichia. Seminal capsules (Fig. 38) ovoid, 99 µm long, ducts almost straight, wider in lower half and with common opening.

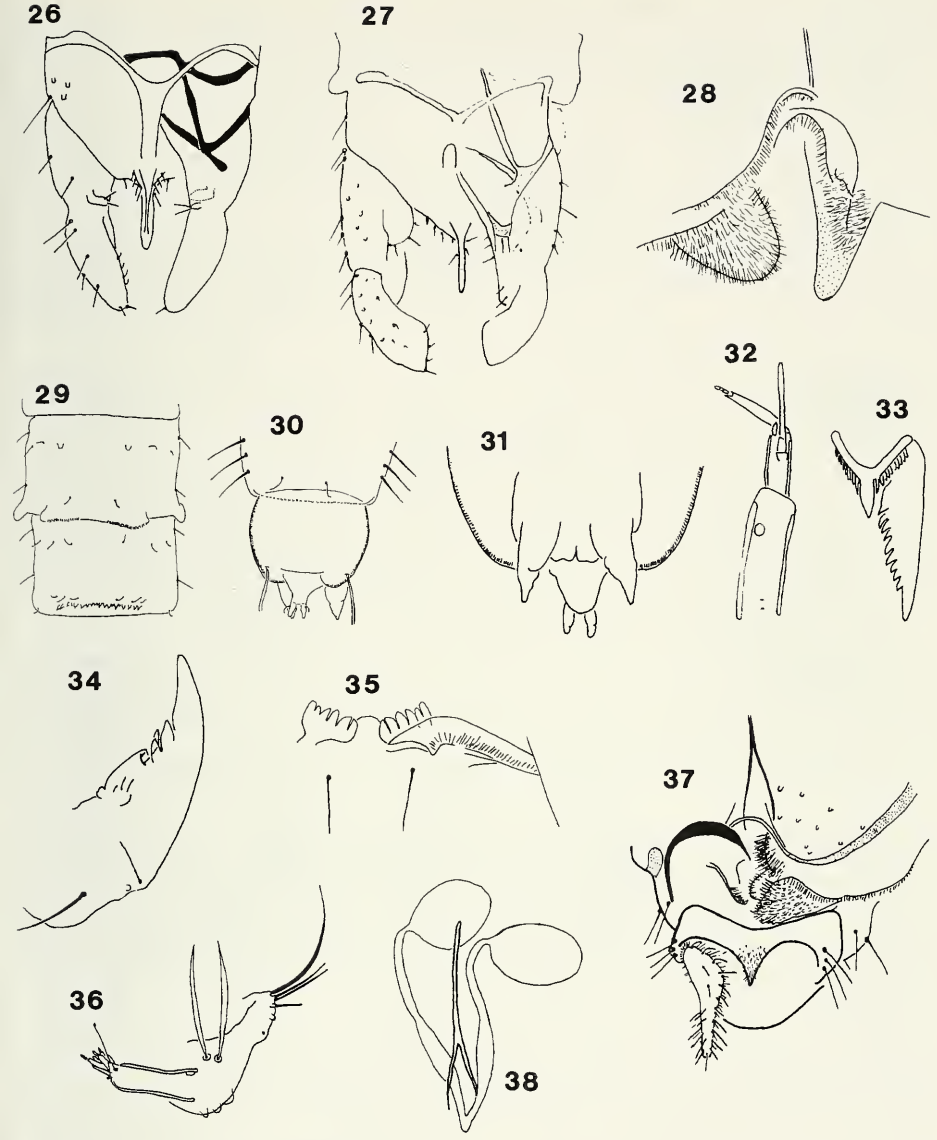


Fig. 26. *Cryptochironomus diceras*. Hypopygium.
Figs 27-36. *Cryptochironomus lindneri*. Adult: 27. Hypopygium, 28. Female genitalia. Pupa: 29. Abdomen, tergites II, III. 30. ♂ abdomen, dorsal. 31. ♀ abdomen, ventral. Larva: 32. Antenna. 33. Pecten epipharynx, chaetula. 34. Mandible. 35. Mentum. 36. Maxilla.
Figs 37-38. *Cryptochironomus* sp. A. 37. ♀ genitalia, ventral. 38. Seminal capsules, ducts.

Specimen examined. 1♀ netted on shore of Lake Awasa, 84/2/11.

Comments. This female has been assigned to *Cryptochironomus* as it has a small dorsomesal lobe and a large ventrolateral lobe and other features described for this genus by Saether (1977). It does not seem

to be the female of *C. diceras* as the male of this species has no scutal tubercle whereas this female has one.

Ecology. The larva may have been living in the weed beds of L. Awasa.

Distribution. Ethiopian Rift Valley.

Dicrotendipes fusconotatus (Kieffer)

Chironomus (*Dicrotendipes*) *fusconotatus*, Freeman 1957.
Dicrotendipes fusconotatus, Freeman & Cranston 1980; Contreras-Lichtenberg 1986; Epler 1988.

Freeman describes the male and gives a short description of the female, Contreras-Lichtenberg describes the larva, pupa and male and Epler describes the larva and pupa. The female is described here.

Adult male (N = 2 mounted). Wing length 1.8 mm.

Head. AR 2.4. Small frontal tubercles. Palp segments: 31, 43, 105, 130, 208 µm. No sensilla on segment 3.

Thorax. Scutal tubercle present, Setation: Lateral antepronotals nil, dorsocentrals 20 partly biserial, posterior prealars 4, scutellars 10 per side partly biserial.

Wing. With markings as in Freeman plate 1d. Setation: Brachiolum 2, R 23, R_1 8, R_{4+5} nil, squama 16.

Leg. LR fore 1.5, mid 0.45, hind 0.63-0.67. Distal stripe on femur, knee light, proximal stripe on tibia. Sensilla chaetica on tarsomere 1: mid 5-6, hind nil. Hypopygium. As described by Contreras-Lichtenburg and Freeman, and as follows. Pair of membranous processes (hyaline lobes) lateral to anal point. Superior volsella has one terminal seta (Fig. 39). Inferior volsella (Fig. 40, dorsal aspect) has 7 large setae irregularly arranged at tip, plus 3 small ones; the branch has 5 large setae in a row.

Adult female (N = 3 mounted). Wing length 2.5 mm.

Head. AR 0.5. Small frontal tubercles. Palp segments: 37, 47, 136, 130, 192-202 µm. No subterminal sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral anteprontals nil, dorsocentrals 32 partly biserial, posterior prealars 5, scutellars 12 per side biserial.

Wing. Markings similar to male. Setation: Brachiolum 2, R 21, R_1 17, R_{4+5} 23, squama 18.

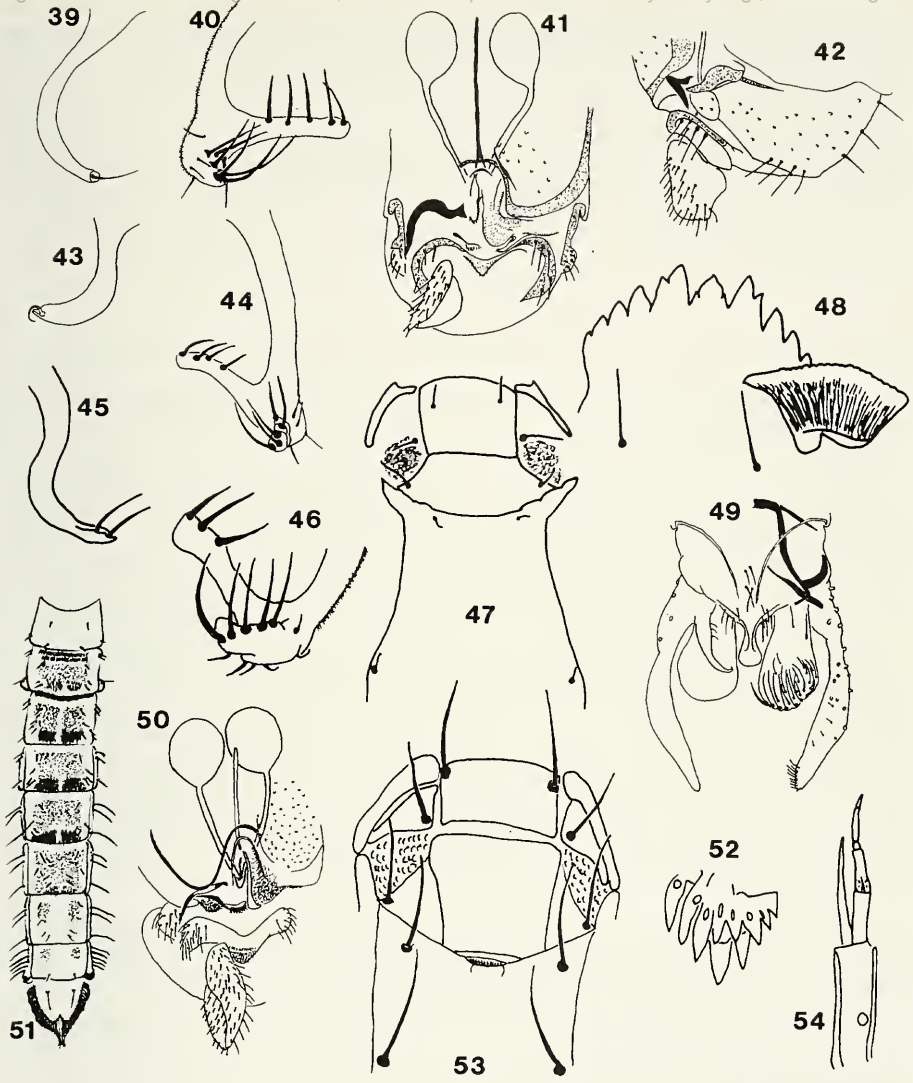
Leg. LR fore 1.4, mid 0.5, hind 0.6. Markings as in male. Sensilla chaetica on tarsomere 1: mid 50 biserial, hind nil.

Genitalia (Figs 41, 42). Sternite VIII brown as it is well chitinized. Ventral ridge of VIII small but strongly chitinized. Dorsomesal lobe large, microtrichia extending to edge (Fig. 41, right). Ventrolateral lobe appears small in ventral view (Fig. 41, right) but is large and lies ventro-dorsally; microtrichia short. Apodeme lobe (Fig. 41, left) with small chitinized base and long microtrichia. Gonocoxapodemes broad and joined. Coxosternapodemes dark and curved. Gonocoxite IX small with 3 setae, strongly chitinized (Figs 41, 42). Segment X with 5 setae per side, strongly chitinized, postgenital plate pointed. Labia without microtrichia. Seminal capsules ovoid with short neck; 109 µm long, ducts almost straight, wider central part glandular, with common opening.

Pupa (N = 2 mounted). Similar to those described for this species by Contreras-Lichtenberg and by Epler. Tergite II has 58-60 hooklets in the posterior row. There is some variation in the number of caudolateral spines on segment VIII, the one pupa has 2 on the left and 3 on the right and the other has 3 on the left and 4 on the right. Segment I without L setae, II with 1 and II and IV with 2, V-VII with 4 lamelliform L setae and VIII with 5. Anal fin with about 60 setae.

Larva (N = 10 mounted). Ethiopian larvae closely resemble those described by Contreras-Lichtenburg and by Epler. The maxilla is similar to that ilustrated by Epler (his Fig. 7B & C). The chaetulae of the palpiger are numerous and with points but longer than those he illustrated; a-seta is present and one lacinal chaeta is pectinate.

Specimens examined. Adults: Numerous ♂♂ and some ♀♀, at lights, Lake Ziway, 81/4/15, 82/12/31; ♂♂ and ♀♀, at lights, L. Awasa, 81/4/15, 84/2/10; 1♂, mountains behind Addis Ababa, 81/4/14; ♂♂ and ♀♀, at lights, L. Langano, 83/3/14; ♂♂ and ♀♀, at lights, L. Abaya, 84/2/26; 1♀, Amibara Irrigation Project, middle Awash River, 84/11/10; 1♂ bred out in lab from water collected in pool on Abo River, ET.1, 85/5. Pupae: 2, Hora Kela Shet, ET 33, 84/2/24. Larvae: 3, L. Awasa, 1983; 7, Lake Ziway, 1984, 1, Hora Kela Shet, ET.33, 84/2/24.



Figs 39-42. *Dicrotendipes fusconotatus*. Adult: 39. Superior volsella. 40. Inferior volsella. 41. ♀ genitalia, ventral. 42. ♀ genitalia, lateral.
Figs 43-44. *Dicrotendipes peringueyanus*. Adult: 43. Superior volsella. 44. Inferior volsella.
Figs 45-48. *Dicrotendipes sudanicus*. Adult: 45. Superior volsella. 46. Inferior volsella. Larva: 47. Dorsal surface of Head. 48. Mentum.
Figs 49-54. *Kiefferulus chloronotus*. Adult: 49. Hypopygium, ventral. 50. ♀ genitalia, ventral. Pupa: 51. Abdomen. 52. Anal comb. Larva: 53. Dorsal surface of Head. 54. Antenna.

Comments. The inferior volsella (Fig. 40) is very similar to that illustrated by Contreras-Lichtenberg. The female is distinctive because of the strong chitinization of the genitalia.

Freeman (1957) and Epler (1988) have suggested that *Dicrotendipes peringueyanus* Kieffer may be a

variant of *D. fuconotatus*, in spite of its different pattern of wing spots. However, Figs 43 and 44 show that there are also differences in the hypopygial structure: the superior volsella is much shorter and has one curved seta at the tip; the inferior volsella has 5 large setae at the tip and 4 setae on the branch. (Specimen from Upington, Orange River, South Africa 1992 col. O. R. Palmer.)

Ecology. Larvae were found on the shallow bottom of L. Ziway (Tudorancea et al. 1989) and in the weed beds of L. Awasa (Tilahun Kibret & Harrison 1989). Larvae and pupae were found in the slow-flowing Hora Kela Shet, the outlet of Lake Langano. Adults were caught near small water bodies above Addis Ababa, at the Amibara Irrigation Project, and one was bred out from water from a pool in a torrential mountain stream.

Distribution. Afro-tropical Region, eastern Mediterranean Region, and North Africa (Contreras-Lichtenberg 1986).

Dicrotendipes sudanicus Freeman

Chironomus (*Dicrotendipes*) *sudanicus* Freeman, 1957; *Dicrotendipes sudanicus*, McLachlan 1969; Freeman & Cranston 1980; Cranston & Judd 1984; Epler 1988.

Only males were collected in Ethiopia.

Adult male (N = 3 mounted). Colour. As in Freeman; wings with no discrete spots but clouds present over cross veins, posterior fork and Cu and in anal angle.

Wing length 1.6-1.9 mm.

Head. AR 2.4. Frontal tubercles small and narrow, about 3.5× as long and wide. Palp segments: 37, 53, 124, 130, 208 µm. No sensilla on palp segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals nil, dorsocentrals 13 uniserial, posterior prealars 5, scutellars 6 uniserial.

Wing. As in Freeman. Setation: Brachiolum 2, R 15, R_1 7, R_{4+5} 5, squama 7.

Leg. LR foreleg 1.8, midleg 0.47-0.52, hindleg 0.64-0.65. Sensilla chaetica on tarsomere 1: midleg 9, hindleg nil.

Hypopygium (Figs 45, 46): Both Freeman and Epler state that the hypopygium is very similar to that of *D. fusconotatus*. However, the three specimens examined here show consistent differences. The superior volsella (Fig. 45) has two terminal setae whereas that of *fusconotatus* (Fig. 39) has only one. The inferior volsella (Fig. 46) has 5 large terminal setae and the branch has 3, whereas *fusconotatus* has seven irregularly arranged large terminal setae with 5 on the branch (Fig. 40). Contreras-Lichtenberg (1986) gives a similar illustration of the inferior volsella of *fusconotatus*.

Adult female. Freeman says that the female is very similar to the male.

Pupa. Epler says that the pupa is similar to that of *D. fusconotatus* but that it is smaller, has fewer anal lobe setae (35-47 instead of 61-78) and that dorsocentral seta 2 is closer to Dc_1 instead of to Dc_3. McLachlan's illustration shows 4 posterolateral spines on the abdomen, 2 large and 2 small.

Larva. Both McLachlan and Epler describe the larva. Most of the appendages on the head capsule are similar to those of *D. fusconotatus*, but the second lateral tooth of the mentum is adpressed to the first lateral, whereas in *fusconotatus* it is separate. The ventromental plates have mostly smooth anterior margins or sometimes with "extremely shallow crenulations" (Epler).

McLachlan's specimens came from Lake Kariba, Zimbabwe. A number of 4th instar larvae from this lake, collected by Dr. P. Boon, (N = 21 mounted) were examined and gave the following extra details:

Dorsal surface of head (Fig. 47). Frontal apotome: centre of anterior margin smooth, with no frontal process or mark on any of the specimens. Labial sclerites 1 and 4 appear to be fused and 3 is not clearly defined.

Mentum (Fig. 48). This figure shows an unworn mentum; central tooth has a notch on either side and second lateral tooth is clearly fused to first. Ventromental plates have shallow crenulations; there are about 26 strial ridges.

Specimens examined. 3♂♂, at lights, Amibara Irrigation Project, Middle Awash River, 84/11/10; 21 larvae, Lake Kariba, Zimbabwe, 1982.

Comments. Epler seems to doubt the validity of this species. However, it is clearly distinct from all other species known from the Afrotropical region. Both male and female adults can be distinguished by their distinctive wing pattern of clouds over the veins, instead of spots in the cells. The larva can be distinguished by the mentum with the first and second lateral teeth fused in combination with the anterior crenulations of the ventromental plate, and by the frontal apotome with no frontal process or mark.

Ecology. This species appeared to be breeding, with *fusconotatus*, in the irrigation ditches or nearby ponds at the irrigation works at the middle Awash. In Lake Kariba it was found in the weed beds.

Distribution. Throughout tropical Africa, but not yet found south of Zimbabwe.

Harnischia curtilamellata (Malloch)

Chironomus (*Cryptochironomus*) *nudiforceps* Kieffer, Freeman 1957; *Harnischia curtilamellata*, Freeman and Cranston 1980.

The male is described, and a female that is considered to belong to the same species.

Adult male (N = 5 mounted). Similar to generic definition although the gonostyli are longer and more curved than is typical for the genus.

Wing length 1.6 mm.

Colour. Mostly green in life, thoracic vittae brown, abdomen plain green.

Head. AR 1.8. Eye of *Harnischia* type, with long, parallel-sided dorsomedial extension; frontal tubercles vestigial; dorsal part of tentorium normal (Fig. 20). Palp segments: 49, 31, 124, 127, 171 µm. No subapical sensory sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 2-5, dorsocentrals 7-8, acrostichals 3, posterior prealars 3-4, scutellars 4 per side uniserial.

Wing. With distinct anal lobe. Setation: Brachiolum 1 or 2, R6-9, R_1 nil, R_{4+5} nil, squama 7-8.

Leg. LR fore 1.8-2.0, mid 0.5, hind 0.7. Apex of fore tibia with low rounded projection. Combs of mid and hind tibia contiguous, each with one spur. Sensilla chaetica on tarsomere 1: mid 3, hind nil.

Hypopygium (Fig. 21). Anal tergite bands joined, no median setae, apical setae weak. Anal point long with central ridge running forward onto anal tergite to form a high keel; tip of anal point bare but setae and microtrichia ventrally almost to tip (Fig. 22). Superior volsella vestigial, more obvious in some specimens than in others (Fig. 23). Inferior volsella also vestigial or absent. Gonostylus of moderate length, inner margin weakly concave, fused basally with gonocoxite.

Adult female (N = 1 mounted). Colour and general structure of thorax and combs on legs similar to male.

Wing length 1.6 mm.

Head. Antennae broken. Eyes of *Harnischia* type with long, parallel-sided dorsomedial extensions. Frontal tubercles minute, 6 µm long. Palp segments: 47, 43, 102, 121, 192 µm.

Thorax. Antepronotum similar to male, notched but not completely divided dorsomedially; scutal tubercle present. Setation: Lateral antepronotals 4, dorsocentrals 10, posterior prealars 4, scutellars 6 per side.

Wing. Shape and venation similar to male. Setation: Brachiolum 2, R 14, R_1 9, R_{4+5} 8, squama 9.

Leg. LR fore 1.5, mid 0.55, hind 0.58. Projection on fore tibia, and combs and spurs on mid and hind tibia similar to male. Sensilla chaetica on tarsomere 1: mid 24, hind nil.

Genitalia (Figs. 24, 25). Gonocoxapodeme VIII rounded caudally but not joined mesally. Gonopophysis VIII with small dorsomesal lobe and large ventrolateral lobe. Apodeme lobe weak but with microtrichia. Coxosternapodeme weak and yellowish. Gonocoxite IX rounded with 3 setae. Segment X with one seta per side, postgenital plate pointed. Labia without microtrichia. Seminal capsules (Fig. 25) ovoid and aligned in a dorsoventral position. Spermathecal ducts attached ventrally, proximal narrow portion slightly convoluted but becoming greatly widened and straight with common opening.

Pupa and larva. For pupa see Pinder & Reiss (1986) and for larva Pinder & Reiss (1983).

Specimens examined. 1♂ and 1♀, at lights, Lake Ziway, 82/12/31; 2♂♂, at lights, L. Langano, 83/12/11; 2♂♂ swarming at dusk near L. Abijata, 85/1/18.

Comments. According to Dr. F. Reiss (personal communication) this is a very variable species but "specific is the longitudinal central ridge of the broadened anal point in combination with its setation reaching nearly to the tip" The female resembles that illustrated for this species by Saether (1977) with its small dorsomesal lobe and large dorsolateral lobe of gonopophysis VIII, but the peculiar spermathecal ducts are unlike those he describes. In fact they are unlike any others he describes for the Chironomidae.

Ecology. *Harnischia* larvae occur in the soft sediments of lakes and larger rivers (Pinder & Reiss 1983) but none was caught during the survey of the Ethiopian lakes.

Distribution. Africa, Holarctic and Australasian region (Dr. F. Reiss, private communication).

Kiefferulus chloronotus (Kieffer)

Chironomus (*Dicrotendipes*) *chloronotus*, Freeman 1957; *Dicrotendipes chloronotus*, McLachlan 1969; *Kiefferulus chloronotus*, Freeman & Cranston 1980.

Freeman describes the male and gives a short description of the female; McLachlan describes the larva and pupa. More details of these stages and a description of the female is given here.

Adult male (N = 1 mounted). Wing length 3.1 mm.

Head. AR 2.5. Frontal tubercles very small. Palp segments: 59, 53, 186, 202, 295. 3 or 4 subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals nil, dorsocentrals 9 uniserial, posterior prealars 4, scutellars 4.

Wing. Setation: Brachiolum 2, R 34, R_1 33, R_{4+5} 34, squama 8.

Leg. LR fore 1.8, mid 0.5, hind 0.7. Sensilla chaetica on tarsomere 1: midleg 9, hindleg 5.

Hypopygium (Fig. 49). Anal tergite bands strong, 4 median anal tergite setae beween bands, about 6 apical anal tergite setae per side; anal point apically broad and downturned. Superior volsella inwardly curved, dorsal setae and microtrichia on base. Inferior volsella very broad distally with long curved setae. Gonostylus distally constricted bearing 10 curved setae at tip.

Adult female. No adult females were available but the following information is from a pharate specimen:

Thorax. Setation: Lateral antepronotals nil, dorsocentrals 24 partly biserial, posterior prealars 8, scutellars 8.

Leg. Sensilla chaetica on tarsomere 1: midleg 86 mostly biserial, hindleg about 52.

Genitalia (Fig. 50). Sternite VIII well chitinized and brown, ventral ridge poorly developed. Gonocoxapodemes brown, narrow and joined (left). Dorsomesal lobe large, microtrichia do not extend to edge (Fig. 50, right). Ventrolateral lobe small (left). Apodeme lobe (left) large with microtrichia and well chitinized base. Coxosternapodemes small and dark only at extremities. Gonocoxite IX large with about 10 setae (left). Segment X with 14-15 setae per side, postgenital plate broadly rounded. Labia without microtrichia. Seminal capsules broadly ovoid with no necks, 146 µm long, ducts almost straight, glandular for most of length, with common opening.

Pupa (N = 8 mounted). Cephalothorax. Cephalic tubercles very small and short, width equals height, short seta almost terminal; cephalic surface very finely pebbled, humeral callous coarsely pebbled. Setation: All setae small, precorneals 2, antepronotals 2, dorsocentrals 4 close together.

Abdomen (Fig. 51). All tergites, except I, have some shagreen: II-V almost completely covered, shagreen points on II-V become large spines posteriorly, but smaller on V; II has also a longitudinal patch of larger spines anteriorly; no spinules in conjunctives. Hook row on II with no median division. Pedes spurii B on segment II, but no pedes spurii A. Anal comb on segment VIII (Fig. 52) with about 10 brown, strong spines. Abdominal setation as in Figure 51. Segment I with 1 L seta, II-IV with 3, V with 3 lamelliform setae, VI and VII with 3 or 4 lamelliform setae, the 4th is very small and not shown in the figure, VIII with 5 lamelliform setae, the 5th is very small. Anal lobe with long lamelliform dorsal setae in addition to fringe of about 180 setae.

Larva (N = 14 mounted). Colour. Dorsal surface of head capsule light brown, ventral surface dark brown.

Head capsule length 754-793 µm.

Dorsal surface of head (Fig. 53). Frontal apotome with transverse eliptical pit on anterior margin, margin smooth, labial sclerites 1 and 2 clearly separated.

Antenna (Fig. 54). Blade reaching to base of the 4th segment, accessory blade only about 0.25× length of segment 2, Lauterborn organs and small style distally on segment 2.

Labrum (Fig. 55). S I palmate with 7-8 points, S II large and simple. Pecten epipharynx with about 21 teeth of irregular length; premandible (not in figure) with 6 pointed teeth and brush.

Mandible (Fig. 56). Dorsal tooth pale, other teeth dark. Seta subdentalis short with many points (see Comments).

Mentum (Fig. 57). Trifid central tooth with 6 lateral teeth per side, second lateral tooth largely fused to first; 4th lateral tooth smaller and shorter than 5th. Ventromental plate wider than mentum, dorsal margin finely crenate.

Maxilla (Fig. 58). Pectinate chaeta almost as long as lacina, one of the shorter dorsal chaetae also pectinate; large dorsal group of chaetulae of palpiger, some as long as the palp. Paraxial and antaxial setae both small.

Body. Claws of anterior parapods short, small and in definite rows, tips serrate; claws of posterior parapods simple; anal tubules shorter than parapod, with bluntly rounded tips.

Specimens examined. 1♂, at lights, Lake Langano, 83/12/11; numerous larvae and pupae, L. Ziway, 84/10/5, 85/4/1 (col. C. Tudorancea).

Comments. The female genitalia differ markedly from those described for *Kiefferulus dux* (Joh.): gonocoxapodemes of VIII are joined mesally and gonocoxite IX is not small and has many setae. Spatulate shape of seta subdentalis of larval mandible could be produced by wear as end seems to be ragged in appearance; this is borne out by the fact that McLachlan's specimen has a seta with a single point reaching up to the 3rd tooth.

Ecology. McLachlan's specimens were found on dead submerged trees in Lake Kariba, Zimbabwe; those from L. Ziway were found during extensive sampling of the bottom of this shallow lake; they were in a few, dense patches (Tudorancea et al. 1989).

Distribution. Most of Afrotropical region including southern tip of South Africa, Israel (Laville & Reiss 1993).

Kiefferulus disparilis (Goetghebuer)

Chironomus (*Endochironomus*) *disparilus*, Freeman 1957;
Endochironomus disparilis, Freeman & Cranston 1980;
Kiefferulus disparilis, Cranston & Judd 1989.

Freeman describes the male and gives a short description of the female; Cranston & Judd give detailed descriptions of the male, the pupa and the larva. Some further details of the male, the pupa and the larva, and a description of the female are given here.

Adult male (N = 4 mounted). As Cranston & Judd point out, this species does not conform closely to the generic definition.

Wing length 3.6 mm.

Head. AR 3.0. Frontal tubercles small, 15 µm long, 6 µm wide. Palp segments: 62, 56, 158, 180, 242 µm. About 5 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 18 uniserial, posterior prealars 7, scutellars 9 per side partly biserial.

Wing. Setation: Brachiolum 3, R 31, R_1 26, R_{4+5} 30, squama 14.

Leg. LR fore 1.4, mid 0.5, hind 0.65. Sensilla chaetica on tarsomere 1: midleg 15, hindleg 12.

Hypopygium. As per Freeman, and Cranston & Judd.

Adult female (N = 3 mounted). Wing length 3.7 mm.

Head. AR 0.38. Small frontal tubercles, similar to male. Palp segments: 96, 52, 171, 192, 233 µm. 4 or 5 subapical sensilla on segment 3.

Thorax. Very small scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 11, posterior prealars 7, scutellars 5 per side.

Wing. Setation: Brachiolum 3, R 37, R_1 32, R_{4+5} 35, squama 14.

Leg. LR fore 0.69, mid 0.64, 0.61. Sensilla chaetica on tarsomere 1: midleg 28, hindleg 24.

Genitalia (Figs 59, 60). Sternite VIII brown, well chitinized; ventral ridge well developed. Dorsomesal lobe large, microtrichia extending almost to edge (Fig. 59, right). Ventrolateral lobe appears small when seen edge on (Fig. 59, right) but is large when compressed into a lateral position. Apodeme lobe large with microtrichia and well chitinized base (Fig. 59, left). Gonocoxapodemes narrow and inner part obscure, not joined. Coxosternapodemes dark. Gonocoxite IX small with 3 setae, base chitinized (Figs 59, 60). Segment X with about 30 setae per side. Postgenital plate pointed. Labia without microtrichia. Seminal capsules almost spherical with short necks, 118 µm across, ducts slightly curved, wider central part gladular, with common opening.

Pupa (N = 5 mounted). Not similar to generic definition as it lacks postlateral spurs; it has been described by Cranston & Judd, but a few extra details are given here.

Cephalothorax. Cephalic tubercles short. Frontal setae short, inserted subterminally (similar to *Kiefferulus* I, Pinder & Reiss 1986); cephalic surface finely pebbled. Setation: Precorneals 2 very small, antepronotals 1 very small, 4 small dorsocentrals, 3 and 4 close together.

Abdomen. Hook row on tergite II with narrow median division; pattern of shagreen and spines on tergites as in Cranston & Judd. Pedes spurii B on segment II and pedes spurii A on segment 4. No postlateral spurs but some specimens have a small rudiment of 2 spines (as in Cranston & Judd). The condition of the specimens was too poor to determine the L setae accurately but the anal fins had about 120 setae.

Larva (N = 3 mounted). As described by Cranston & Judd, and as follows:

Head capsule length 650-715 µm.

Dorsal surface of Head. Anterior margin of frons has an oval pit and a distinct clypeus.

Labrum. 7-toothed premandible present.

Mandible. Has a short, apically broadened seta subdentalis with many points in unworn specimens, and an extended mola; lateral teeth 2-5 of the mentum are in the form of bicuspid molars.

Maxilla (Fig. 61, ventral). Has a large dorsal group of long chaetulae of the palpiger with multiple points, some shown in figure; pectinate chaeta is large and a-seta on the palp long.

Body. All claws of anterior and posterior parapods plain; anal tubules short and rounded.

Specimens examined. Numerous ♂♂, ♀♀, larvae and pupae from the crater Lake Aranguadi, near Debre Zeit, 82/12/29; numerous ♂♂, ♀♀, larvae and pupae from L. Abijata, 83/5/29, and 85/1/18, and from L. Shala 85/1/17.

Ecology. All the larvae were found in saline lakes. See Tudorancea & Harrison (1988) and Tudorancea et al. (1989)

Distribution. Afrotropical region and Saudi Arabia.

Kloosia africana Reiss

Kloosia africana Reiss, 1988.

Reiss (1988) describes the male and the pupa. The female and additional male features are described here.

Adult male (N = 4 mounted). Wing length 1.8 mm.

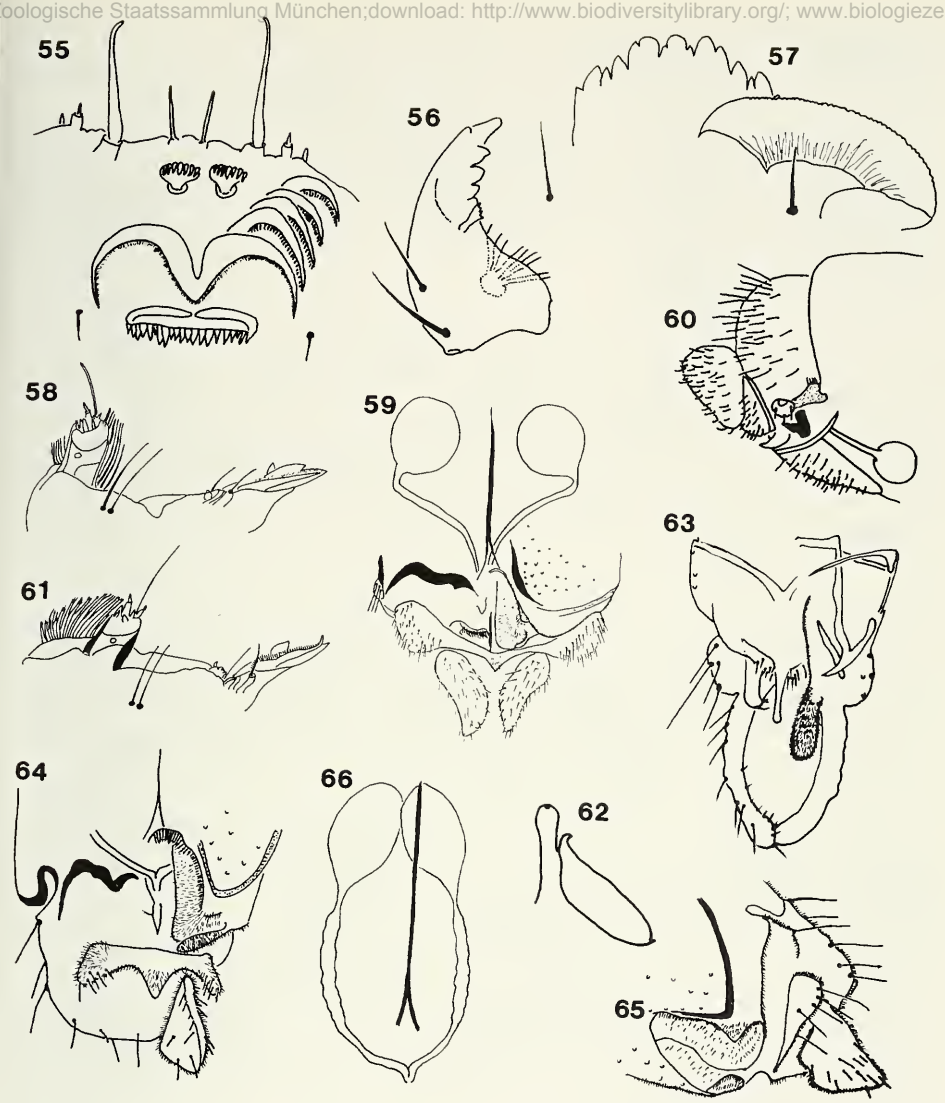
Head. AR 1.3. No frontal tubercles. Tentorium as in Fig. 62. Palp segments: 37, 40, 99, 102, 155 µm. No subapical sensilla on segment 3.

Thorax. Anteprontal lobes small, fused dorsally, not visible from above. No scutal tubercle. Setation: Lateral anteprontals nil, dorsocentrals 10-13, posterior prealars 3, scutellars 4 per side.

Wing. Setation: Brachiolum 1, R 5-10, R_1 nil, R_{4+5} nil, squama nil.

Leg. LR fore 1.3, mid 0.5, hind 0.6. Sensilla chaetica on tarsomere 1: midleg 3, hindleg nil.

Hypopygium (Fig. 63). Anal tergite bands Y-shaped; 9 or 10 apical anal setae per side; anal point slender, slightly widened apically and slightly downturned. Superior volsella with no microtrichia;



Figs 55-66. *Kiefferulus chloronotus*. 55. Labrum. 56. Mandible. 57. Mentum. 58. Maxilla.
Figs 59-61. *Kiefferulus disparilis* Adult: 59. ♀ genitalia, ventral. 60. ♀ genitalia, lateral. Larva: 61. Maxilla.
Figs 62-66. *Kloosia africana*. Adult: 62. ♂ head, tentorium. 63. Hypopygium. 64. ♀ genitalia, ventral. 65. ♀ genitalia, lateral. 66. Seminal capsules.

apex bearing two medial setae, and additional setae ventrally. Inferior volsella widening distally, rather flat, poorly chitinized, with dense microtrichia but no macrotrichia.

Adult female (N = 2 mounted). Wing length 1.6 mm.

Head. AR 0.44. No frontal tubercles. Palp segments: 40, 37, 99, 105, 177 µm; no subapical sensilla on segment 3.

Thorax. General structure similar to male. Setation: Lateral antepronotals nil, dorsocentrals 12, posterior prealars 4, scutellars 4 per side.

Wing. Shape and venation similar to male. Setation: Brachiolum 1, R 13, R_1 8, R_{4+5} 20, squama nil.

Leg. LR fore 1.4, mid 0.5, hind 0.6. Sensilla chaetica on tarsomere 1: midleg 5, hindleg nil.

Genitalia (Figs 64-66). Dorsomesal lobe of VIII large; ventrolateral lobe well-developed; apodeme lobe not visible. Gonocoxapodemes not joined. Coxosternapodemes dark and sinuous. Gonocoxite IX reduced to small ridge with one large seta (Fig. 65). Segment X with 5 setae per side, postgenital plate pointed. Labia without microtrichia. Seminal capsules ovoid with long, narrow necks (Fig. 66), 62 µm long, excluding neck, ducts almost straight, glandular, with distinct wider section joining neck, with common opening.

Pupa. Described by Reiss (1988).

Larva. Unknown.

Specimens examined. Adults: 3♂♂ and 2♀♀, at lights, Lake Langano, 83/3/14; 2♂♂, at lights, L. Langano, 83/12/11. South African specimens: 1♂, at lights, Standerton, Transvaal, 59/11/12; 1♂, Vaal River, Morgenzon-Amersfoort road, 60/12/6.

Ecology. No larvae possible for this species were found in Lake Langano but the adults could have come from slow-flowing sections of streams running into the lake. The South African specimens must have emerged from the Vaal River, probably from slow-flowing sections. Reiss's male adults were caught near a fast-flowing stream with a sandy bed.

Distribution. Northern Kenya, Ethiopian highlands and the Highveld of the Transvaal, S. Africa.

Microchironomus deribae Freeman

Chironomus (Cryptochironomus) deribae Freeman,1957.
Microchironomus deribae, Freeman & Cranston 1980; Cranston, Dillon, Pinder & Reiss 1989; Cranston & Judd 1989.

Males, females, pupae and larvae were associated by means of pupae containing pharate adults, one with larval head capsule attached.

Adult Male (N = 2 mounted). The hypopygium is illustrated by Freeman 1957, Cranston et al. 1989 and Cranston & Judd 1989, and is not described again here.

Wing length 1.7-2.3 mm.

Head. AR 3.0. Minute frontal tubercles. Palp segments: 31, 43, 105, 130, 186 µm. No subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 4, dorsocentrals 9 uniserial, posterior prealars 3, scutellars 4 per side uniserial.

Wing. Setation: Brachiolum 2, R 3, R1 nil, R_{4+5} nil, squama about 30.

Leg. LR fore 1.36, mid 0.5, hind 0.68. Sensilla chaetica on tarsomere 1: midleg 12, hindleg nil.

Hypopygium. Very similar to those described by the authors listed above.

Adult female (N = 3 mounted). Wing length 2.5 mm.

Head. AR 0.7. Minute frontal tubercles. Palp segments: 47, 50, 90, 121, 180 µm. No subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 3, dorsocentrals 12 uniserial, posterior prealars 4, scutellars 5 per side.

Wing. Setation: Brachiolum 3, R 14, R_1 6, R_{4+5} 14, squama about 30.

Leg. LR fore 1.3, mid 0.58, hind 0.64. Sensilla chaetica on tarsomere 1: midleg 35, hindleg nil.

Genitalia (Figs 67-69). Dorsomesal lobes of VIII comparatively small (Fig. 68). Ventrolateral lobes large (Fig. 67). Apodeme lobe small with a few microtrichia (Fig. 67, left). Gonocoxapodemes light brown, not joined. Coxosternapodemes large, light brown. Gonocoxite IX large but closely applied, with 5 setae (Fig. 69). Segment X with 4 setae per side, postgenital plate pointed. Labia without microtrichia. Seminal capsules ovoid with short, narrow necks, 108 µm long, including neck, ducts almost straight with common opening.

Pupa (N = 2 mounted). Length 6.0-6.6 mm.

Cephalothorax. Dorsum finely granulose anteriorly, scutal tubercles small. Setation: Precorneals 2, antepronotals 1, dorsocentrals 4 in close pairs.

Figs 67-77. *Microchironomus deribae*. Adult: 67. ♀ genitalia, ventral. 68. Dorsomesal lobes. 69. ♀ genitalia, lateral. Pupa: 70. Abdomen, 71. Anal comb. Larva: 72. Dorsal surface of head capsule. 73. Antenna. 74. Pecten epipharynx. 75. Mandible. 76. Mentum. 77. Maxilla.
Fig. 78. *Microchironomus tener*. Hypopygium.
Figs 79-85. *Microchironomus*, Larva 1. 79. Antenna. 80. Labrum. 81. Pecten epipharynx and premandible. 82. Mandible. 83. Mentum. 84. Maxilla. 85. Chaetulae of palpiger.

Abdomen (Figs 70, 71). Tergite I bare; II with paired patches of shagreen; III-VI with large dorsal patch of shagreen; VII and VIII with paired anterior patches; tergites III-VI with posterior rows of spines. Hook row of II interrupted medially with gap about one third of row. Pedes spurii B on I and II,

small pedes spurii A on VI, and small spine patches posterolaterally on sternites V and VI. A row of spines anteriorly on sternite II. Segment VIII with small single or double posterolateral spines (Fig. 71). Setation as in Fig. 70. Segment I without L setae. II-IV with 2, V-VII with 3 lamelliform setae, VIII with 5. Anal fin with about 90 setae.

Larva (N = 6 mounted). Head capsule length about 455 µm.

Dorsal surface of head capsule (Fig. 72). Clypeus and frontal apotome separate.

Antenna (Fig. 73). 5 segments, basal segment longer than flagellum, with large ring organ in basal third. Blade reaching to about the base of terminal segment, accessory blade about half as long as blade. Lauterborn organs not developed, small style on segment 2.

Labrum. Similar to that illustrated by Pinder & Reiss (1983) for *M. tener*, but S I smaller in proportion to S II, and pecten epipharynx with 3 lobes (Fig. 74).

Mandible (Fig. 75). Dorsal tooth absent, length of apical tooth about equal to the combined lengths of the two inner teeth; all teeth dark brown. Seta subdentalis small and slender. Seta interna with 4 branches.

Mentum (Fig. 76). All teeth dark brown, median tooth trifid but central point notched laterally to form shoulders; 6 pairs of lateral teeth, fourth pair small, fifth and sixth pairs set forward. Ventromental plate slightly wider than mentum, dorsal margin crenate.

Maxilla (Fig. 77). Dorsal patch of leaf-like chaetulae of palpiger only partly visible in figure; one lacinal chaeta pectinate.

Body. Claws of anterior and posterior parapods simple. Anal tubules very short and blunt.

Specimens examined. Adults: Large numbers of ♂♂ and ♀♀, at lights, saline crater Lake Chitu, 83/2/4; ♂♂ and ♀♀, L. Langano, 83/3/14, 83/12/11; large numbers of ♂♂ and ♀♀, netted, L. Abijata, 83/5/29; ♂♂ and ♀♀ emerging from surface of L. Shala, 85/1/17. Larvae and pupae: Large numbers of larvae and two pupae, dredged from 5 m, L. Abijata 85/1/18; numerous larvae, dredged from 90 cm from L. Shala, 85/1/17.

Ecology. Larvae found in saline (soda) lakes at conductivities of 14 000-21 000 µS cm^{-1}. See Tudorancea & Harrison (1988), for details. Some adults were emerging from Lake Langano which was only slightly saline. Vareschi & Jacobs (1985) found them in the saline L. Nakuru, Kenya, and Cranston & Judd (1989) report them from from the soda/saline L. Van in eastern Turkey.

Distribution. Palaearctic region and northern part of Afrotropical region.

Microchironomus lendli Kieffer

Chironomus (Cryptochironomus) stilifer, Freeman 1957.
Microchironomus stilifer, Freeman & Cranston 1980.
Microchironomus lendli, Cranston & Judd 1989.

The male is described by Freeman 1954, 1957, and by Cranston & Judd 1989. Some further details are given here.

Adult male (N = 4 mounted). Wing length 1.4-1.5 mm.

Head. AR 1.6. Small frontal tubercles. Palp segments: 37, 34, 84, 115, 143 µm. No subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil-1, dorsocentrals 8, posterior prealars 4, scutellars 6 per side.

Wing. Setation: Brachiolum 2, R 4-6, R_1 nil, R_{4+5} nil, squama 8.

Leg. LR fore 1.7, mid 0.54, hind 0.62 µm. Sensilla chaetica on tarsomere 1: midleg 6-7, hindleg nil.

Hypopygium. Described by Freeman 1957, and Cranston & Judd 1989. The Ethiopian hypopygia are very similar, with inner basal expansion of gonostylus exaggerated, with elongated superior volsella about half the length of the gonostylus, and with setulose swelling about halfway along the long anal point, which is flanked by a pair of setulose projections.

Microchironomus tener Kieffer

Chironomus (Cryptochironomus) forcipatus, Freeman 1957.
Microchironomus tener, Cranston & Judd 1989.

Only males were collected.

Adult male (N = 2 mounted). Wing length 1.9 mm.

Head. AR 1.8. Frontal tubercles present. Palp segments: 46, 43, 102, 140, 158 µm; no subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 2, dorsocentrals 11 uniserial, posterior prealars 4, scutellars 2 per side.

Wing. Setation: Brachiolum 2, R 3, R_1 nil, R_{4+5} nil, squama 8.

Leg. LR fore 1.6, mid 0.5, hind 0.6. Sensilla chaetica on tarsomere 1: midleg nil, hindleg nil.

Hypopygium (Fig. 76). Anal tergite bands join with central extension about one third distance to anal point. Superior volsella narrow with 3 setae. Inferior volsella reduced (right of figure) with 3 setae.

Specimens examined. 2♂♂, netted, Lake Awasa, 84/5/27, 84/8/25.

Ecology. Appeared to be breeding in the lake, probably in weed beds.

Distribution. Palaearctic, Afrotropical, Oriental and Australopacific regions.

Microchironomus larvae

Three further larvae of *Microchironomus* were collected which differ from that of *M. deribae* in that their frontal apotome and clypeus are fused and that they have no pectinate lacinal chaeta on the maxilla.

Microchironomus larva 1

(N = 7 mounted). Colour. Head capsule yellowish. Body uniformly pale.

Head capsule length 325-390 µm.

Dorsal surface of Head. Clypeus and frontal apotome are fused.

Antenna (Fig. 79). Blade longer than segments 2-4, style well-developed.

Labrum (Figs 80, 81). SI and S II blade-like and about the same length, S III simple and long, S IV B?, peg-like. Labral lamella small. Pecten epipharynx (Fig. 81) with three pointed lobes. Premandible bifid with brush.

Mandible (Fig. 82). Teeth brown, no dorsal tooth, 2 flat inner teeth, seta subdentalis broad, seta interna with 4 plumose branches.

Mentum (Fig. 83). Teeth brown, median tooth pointed and trifid, 4th tooth smaller than 5th.

Maxilla (Figs 84, 85). Both paraxial and antaxial setae well-developed. No pectinate lacinal chaetae. Chaetulae of palpiger (Fig. 85) small and blunt.

Body. Claws of anterior parapod are thin, pointed and simple; those of posterior hook-shaped and simple. Anal setae and supraanal setae long. Anal tubules short and bluntly pointed.

Specimens examined. 1, Lake Awasa, 83/12/9; 2, L. Ziway, 1985; 4, L. Chamo, 84/9/29.

Ecology. The larva from Lake Awasa came from weed beds but those from L. Ziway and L. Chamo were dredged from the bottom at depths of 4-5 m and 7.5-10 m respectively.

Distribution. Ethiopian Rift Valley.

Microchironomus larva 2

(N = 8 mounted). Colour. Head capsule yellowish dorsally, mostly brown ventrally. Body yellowish.

Head capsule length 325 µm.

Dorsal surface of Head. Clypeus and frontal apotome are fused.

Antenna (Fig. 86). Blade well developed, reaching to base of segment 4. Style could not be discerned but there was some small structure near tip of segment 2.

Labrum (Fig. 87). Very similar to that illustrated by Pinder & Reiss (1983).

Mandible (Fig. 88). Very similar to that illustrated by Pinder & Reiss (1983).

Mentum (Fig. 89). Median tooth pointed and trifid; one specimen has a notch on one side. The 5th lateral tooth is larger than 4th and 6th and is set forward.

Maxilla (Fig. 90). Palp is moderately long but foreshortened in the figure as it tends to point ventrally. No a-seta; chaetulae of the palpiger are small. Paraxial seta long and points forwards; the antaxial seta absent.

Body. Claws of anterior parapods very fine and not serrate; those of posterior parapod hooklike and simple. Anal tubules short and pointed.

Specimens examined. 6 larvae, Lake Awasa, 1983; 2 larvae, L. Chamo, 84/9/29.

Ecology. Larvae from Lake Awasa were netted from weed beds. Those from L. Chamo were dredged from 7.5-10 m.

Distribution. Lakes of the Ethiopian Rift Valley.

Microchironomus larva 3

(N = 1 mounted). This larva is very similar to larva 2 in size and colour and most morphological details but differs as follows:

The pecten epipharynx (Fig. 91) is entire but is divided into three regions by two ridges; the mandible (Fig. 92) has a very small seta subdentalis; the ventromental plates of the mentum (Fig. 93) are pointed on both inner and outer surfaces and the posterior lacinal chaeta of the maxilla (Fig. 94) is much broader than in larva 2.

Specimen examined: 1, Lake Awasa, 1984.

Ecology. Netted from weed beds.

Comments on unassociated larvae. Larva 2 is very similar to that of *M. tener* as illustrated by Pinder and Reiss (1983) but this has the antennal blade longer than segments 2-4, and the ventromental plate of a different shape, more like those of larva 3. These small differences may be shown eventually to fall within the natural variation of this widely distributed species.

Larva 1 and the larva of of *M. deribae* both have the pecten epipharynx distally divided into 3 lobes, as reported for some species by Pinder & Reiss (1983). *M. deribae* differs from the others as it has one pectinate lacinal chaeta.

Larva 2 and larva 3 both have no antaxial seta on the maxilla.

Microtendipes lentiginosus Freeman

Microtendipes lentiginosus Freeman, 1957.

Only one female was collected but was easily identified by the characteristic pattern of spots on the wings.

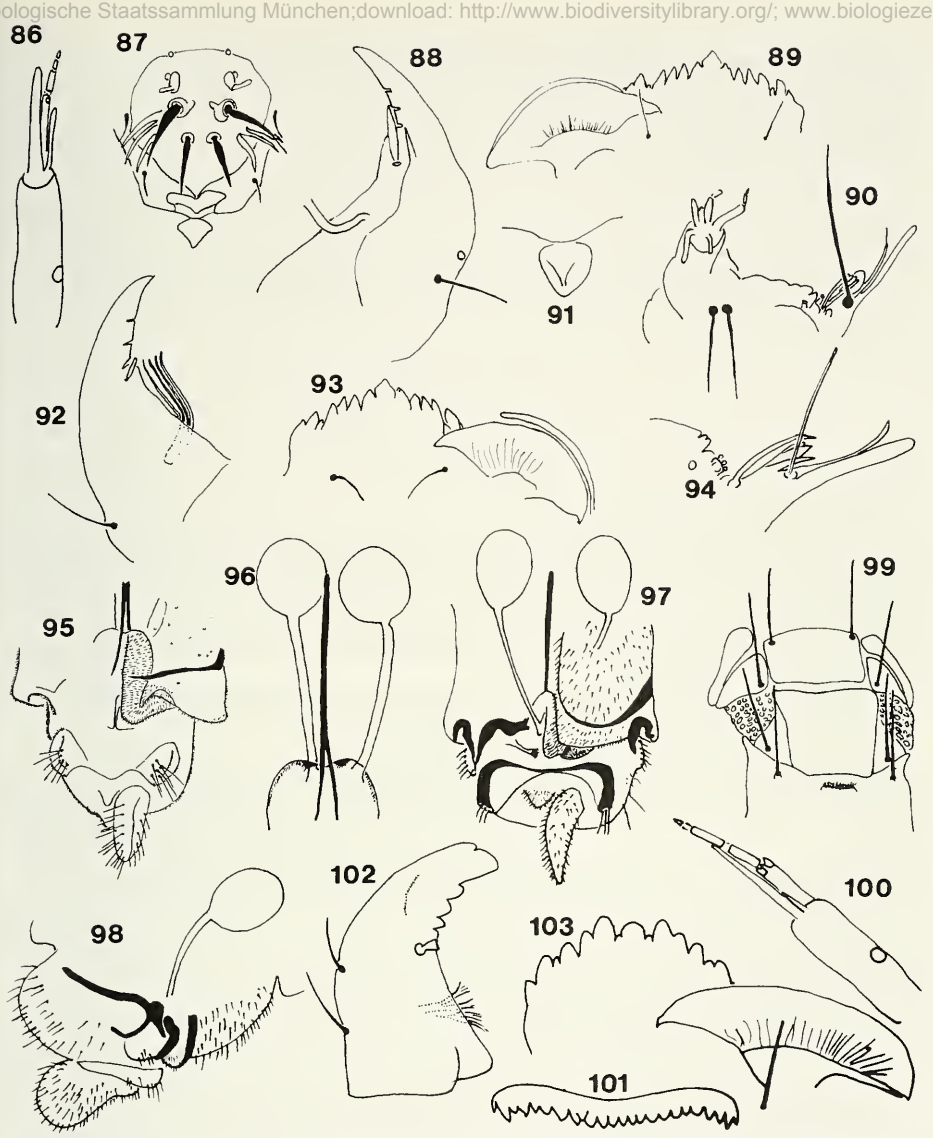
Freeman (1957) describes only the wing pattern of the holotype and paratype females, and implies that the male has a similar wing pattern. He says that this species is very similar to *M. albus* Goetghebuer, the male of which has the generically characteristic, proximally directed setae on the anterior femur, even if these are poorly developed. A more detailed description of a female is given here.

Adult female (N = 1). Wing length 2.9 mm.

Head. AR 0.4. No frontal tubercles. Palp segments: 77, 53, 155, 202, 285 µm. No subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals 2, dorsocentrals 18, posterior prealars 5, scutellars 12 per side partly biserial.

Wing. Shows the peculiar wing pattern as illustrated by Freeman 1957, "composed of numerous small rounded dark spots with blotches at the cross veins, posterior fork and apex". Setation: Brachio-



Figs 86-90. *Microchiromomus*, Larva 2. 86. Antenna. 87. Labrum. 88. Mandible. 89. Mentum. 90. Maxilla.
Figs 91-94. *Microchironomus*, Larva 3. 91. Pecten epipharynx. 92. Mandible. 93. Mentum. 94. Lacinal chaetae of maxilla.
Figs 95-96. *Microtendipes lentiginosus*. 95. ♀ genitalia, ventral. 96. Seminal capsules and spermathecal ducts.
Figs 97-103. *Nilodorum brevibucca*. Adult: 97. ♀ genitalia, ventral. 98. ♀ genitalia, lateral. Larva: 99. Dorsal surface of Head. 100. Antenna. 101. Pecten epipharynx. 102. Mandible. 103. Mentum.

lum 2, R 24, R_1 25, R_{4+5} 34, squama 11.

Leg. LR fore 1.1, mid 0.6, hind 0.8. Fore femur does not have two rows of proximally directed setae. Sensilla chaetica on tarsomere 1: midleg 8 on distal half, hindleg nil.

Genitalia (Figs 95, 96). Gonopophysis VIII simple with strong microtrichia. Gonocoxapodeme strong and dark, posterior part straight, ending on gonopophysis VIII; apodeme lobe not discernible. Tergite IX with small rounded caudal projection. Coxosternapodeme rudimentary (Fig. 95, left). Gonocoxite IX reduced to a low bulge with no setae. Segment X normal with 6 setae per side, postgenital plate roundly pointed, cerci about 121 µm. Seminal capsules small and spherical, 68 µm, spermathecal ducts straight (Fig. 96); appear to widen distally but the ends could not be discerned.

Pupa and Larva. The immatures are described from Ghana by Amakye & Saether (1992)

Specimen examined. One ♀, trapped alongside a pond near Dinsha, Bale Mountains at 3200 m, 84/10/20 (coll. Dr. Hillman).

Comments. Gonocoxite IX and the coxosternapodeme are both rudimentary; in two other species illustrated by Saether (1977) these are similarly very small or rudimentary.

Ecology. Appears to breed in standing water.

Distribution: Ethiopia, Kenya, Zaire, Natal, South Africa.

Nilodorum brevibucca Kieffer

Chironomus (*Nilodorum*) *brevibucca*, Freeman 1957; Dejoux 1970a.
Nilodorum brevibucca, Freeman & Cranston 1980.

Freeman (1957) describes the male and, briefly, the female. Dejoux (1970a) describes in detail the male hypopygium and the pupa. Extra details of the male, and a description of the female and the larva are given here.

Adult male (N = 1 mounted). Wing length 4.0 mm.

Head. AR 5.7. Frontal tubercles absent. 4 or 5 subapical sensilla on palp segment 3. Palp very short, segments: 56, 53, 109, 83, 31 µm.

Thorax. Small scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 25 partly biserial, posterior prealars 7, scutellars 10 or 11, mostly biserial.

Wing. Setation: Brachiolum 3, R 6-7, R_1 nil, R_{4+5} nil, squama 26.

Leg. LR fore 1.2, mid 0.5, hind 0.6. Sensilla chaetica on tarsomere 1: midleg 33, hindleg 13.

Hypopygium. Very similar to Dejoux (1970a), but his description and that of Freeman (1956) do not show the strong anal tergite bands that join centrally to form a narrow V with a short posterior extension.

Adult female (N = 3 mounted). Saether (1977) does not define *Nilodorum* (s. str.).

Wing length 4.2 mm.

Head. AR 0.4. No frontal tubercles. 4 or 5 subapical sensilla on palp segment 3. Palp very short, segments: 81, 40, 76, 65, 71 µm.

Thorax. Small scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 23, posterior prelars 8, scutellars 11 or 12 per side biserial.

Wing. Setation: Brachiolum 3, R 14, R_1 3 or 4 towards tip, R_{4+5} 9-10 towards tip, squama about 30.

Leg. LR fore 1.3, mid 0.5, hind 0.6. Sensilla chaetica on tarsomere 1: midleg about 112 biserial, hindleg about 60 mostly uniserial.

Genitalia (Figs 97, 98). Tergite VIII strongly chitinized and brown, also obvious in unmounted specimens; strong ventral ridges bearing setae (Fig. 97, right). Gonocoxapodemes rounded caudally not joined. Gonopophysis VIII divided into large dorsomedial lobe and smaller ventrolateral lobe. Apodeme lobe well developed with microtrichia (Fig. 97, left). Coxosternapodeme dark and curved. Gonocoxite IX closely applied, 6 or 7 setae. Segment X with strongly chitinized and brown portion antero-laterally (Figs 97, 98) and with 7 to 8 setae per side. Postgential plate triangular, cerci normal. Labium without microtrichia. Seminal capsules ovoid, 155 µm long, ducts almost straight, glandular for full length and with common opening.

Pupa (N = 1 mounted). The pupa is described in detail by Dejoux (1970a) and by Pinder & Reiss (1986). The Ethiopian pupa was very similar with a narrow hook row anterior on tergite II and the anal combs consisting of 8 short teeth with window-like pits at the base. Segment I with 1 L seta, II-IV with 3, V-VIII with 4 lamelliform L setae. Anal fin with about 250 setae.

Larva (N = 12 mounted). Head capsule length 780-845 µm.

Dorsal surface of head (Fig. 99). Anterior margin of frontal apotome concave, but convex in centre anterior to reticulated pit. Labial sclerites 1 and 2 present. Similar to *N. rugosum* (Pinder & Reiss 1983).

Antenna (Fig. 100). With 5 segments, ring organ in proximal third of basal segment. Blade reaching to 4th antennal segment. Lauterborn organs well-developed, style small, on second antennal segment.

Labrum. Similar to that of *N. rugosum* (Pinder & Reiss 1983) but pecten epipharynx not so convex (Fig. 101) and teeth rather short; may be result of wear as in some specimens the teeth were almost worn away. Premandible with 7 teeth.

Mandible (Fig. 102). dorsal tooth pale, the others dark with 4th somewhat lighter. Seta subdentalis short and broad and with irregular fine teeth; in some specimens it was somewhat longer with distal end rounded and no obvious teeth; may be result of wear. Dorsal pecten mandibularis with long teeth, only bases of these indicated in Fig. 102.

Mentum (Fig. 103). Median tooth trifid, first lateral tooth higher than median, and 4th lateral tooth lower than 5th. Ventromental plates with about 100 striae.

Maxilla. Similar to that of *Kiefferulus chloronotus* (Fig. 58).

Body. One pair of short ventral tubules; anal tubules with blunt rounded tips, shorter than parapods; anterior and posterior claws simple.

Specimens examined. Adults: numerous ♂♂ and ♀♀, at lights, Lake Ziway, 81/4/15, 82/12/31; 1♂, at lights, L. Awasa 83/6/31, 1♂ and 1♀, netted, L. Awasa, 84/2/11; a few ♂♂ and ♀♀, at lights, L. Langano, 83/3/14. Pupae and larvae: 1 pupa, Hora Kela Shet, outflow of Lake Langano, 84/2/24. Numerous larvae, Hora Kela Shet, 84/2/24.

Ecology. The only larvae captured were from aquatic weeds on muddy bottom of a slow-flowing river. The numerous adults from Lake Ziway must have come from larvae living in the swampy shallows around the lake; they were not found on the bottom of the open lake (Tudorancea et al. 1989). Dejoux (1983) found the larvae among aquatic weed and *Cyperus papyrus* in L. Chad. The mouthparts of the Ethiopian larvae were all moderately to badly worn indicating that the larvae were ingesting sand particles.

Distribution. Most of Afrotropical Region as far south as Natal, Israel (Laville & Reiss 1993).

Nilodorum brevipalpis Kieffer

Chironomus (*Nilodorum*) *brevipalpis*, Freeman 1975; Dejoux 1970a.
Nilodorum brevipalpis, Freeman & Cranston 1980.

Freeman (1957) describes the male and Dejoux (1970a) gives a detailed description of the male hypopygium and of the pupa. Further details of the male, and descriptions of the female and larva are given here.

Adult male (N = 4 mounted). Wing length 3.1-3.2 mm.

Head. AR 3.5-3.6. Minute frontal tubercles. 4 subapical sensilla on palp segment 3. Palp very short, segments: 47, 47, 80, 78, 62 µm.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 12, posterior prealars 9, scutellars 8 per side.

Wing. Setation: Brachiolum 3, R 6-8, R_1 nil, R_{4+5} nil, squama 26.

Leg. LR fore 1.3, mid 0.45, hind 0.52. Sensilla chaetica on tarsomere 1: midleg 16, hindleg 8.

Hypopygium. Dejoux's (1970a) description is detailed but he does not show that the strong anal tergite bands meet to form a broad V, with a long extension almost to base of anal point.

Adult female (N = 3 mounted). Wing length 3.2 mm.

Head. AR 0.5. Minute frontal tubercles. Palp segment 3 with 4 subapical sensilla. Palp very short, segments: 47, 43, 56, 65, 56 µm.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 13, posterior prealars 11, scutellars 6 per side.

Wing. Setation: Brachiolum 3, R 18-22, R_1 20-25, R_{4+5} 10-18 near tip, squama about 30.

Leg. LR fore 1.4, mid 0.4, hind 0.5. Sensilla chaetica on tarsomere 1: midleg 46 biserial, hindleg 37 partly biserial.

Genitalia (Figs 104, 105). Tergite VIII not strongly chitinized; strong ventral ridges bearing a few setae (Fig. 104, right). Gonocoxapodemes rounded laterally, not joined. Gonopophysis VIII divided into large dorsomedial lobe and smaller ventrolateral lobe. Apodeme lobe well-developed (Fig. 104, left). Coxosternapodeme dark and curved. Gonocoxite IX small and closely applied with no setae (Fig. 105) or one seta (Fig. 104, left). Segment X with strongly chitinized portion anterolaterally, with 9-14 setae per side. Postgenital plate triangular, cerci normal. Labium without microtrichia. Seminal capsules ovoid, 140 µm long, ducts almost straight, glandular for full length and with common opening (Fig. 106).

Pupa. No pupae were collected, but Dejoux (1970a) gives a full description. The anal combs on segment VIII are reduced to scales borne on well-differentiated pads, not strongly chitinized.

Larva (N = 6 mounted). Head capsule length 650-715 µm.

Dorsal surface of Head. Similar to *N. brevibucca*, anterior margin of frontal apotome concave, but somewhat flattened anterior to the reticulated pit which is not as well developed as in *brevibucca*.

Antenna. Similar to *brevibucca*. Blade reaching to about the centre of antennal segment 4.

Labrum. Similar to *N. rugosum* (Pinder & Reiss 1983) and *brevibucca*; premandible with 7 teeth, pecten epipharynx with teeth longer than *brevibucca*, probably because they were not worn.

Mandible (Fig. 107). Dorsal and 4th interior tooth light, the rest dark; seta subdentalis widening distally with small teeth. Pecten mandibularis with long teeth.

Mentum (Fig. 108). Central tooth notched laterally, Ventromental plates with about 50 striae.

Maxilla. Similar to that of *Kiefferulus chloronotus* (Fig. 58).

Body. One pair of short ventral tubules; anal tubules shorter than parapods, with blunt rounded tips and slighly narrower at their bases. Anterior and posterior claws simple.

Specimens examined. Adults: Numerous ♂♂ and ♀♀, at lights, Lake Ziway, 81/4/15, 82/12/31; numerous ♂♂ and ♀♀, at lights L. Awasa, 81/4/15, 83/1/31; 1♂, netted, L. Awasa, 84/2/11; a few ♂♂ and ♀♀, at lights, L. Langano, 83/3/14. Numerous larvae collected in L. Awasa 1983-84, and L. Ziway 1984-85 (C.Tudorancea).

Ecology. The larvae from Lake Awasa were collected from the marginal weed beds and from the lake bottom near the weed beds (Tilahun Kibret & Harrison, 1989); those from Lake Ziway from the shallow lake bottom (Tudorancea et al. 1989).

Distribution. Most of Afrotropical region as far south as Zimbabwe and Namibia, also known from Lower Egypt (coll. ZSM unpubl.).

Parachironomus acutus Goetghebuer

Chironomus (Cryptochironomus) acutus, Freeman 1957.
Parachironomus acutus, Hare & Carter 1987.

Males only were collected.

Adult Male (N = 2 mounted). Similar to generic definition.

Wing length. 1.9-2.1 mm.

Head. AR 1.9. Small frontal tubercles. Tentorium similar to that of *Parachironomus* sp. of Cranston et al. (1989). Palp segments: 31, 25, 109, 133, 202 µm, one subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 5-6, dorsocentrals 13-14 uniserial, posterior prealars 7, scutellars 6 per side.

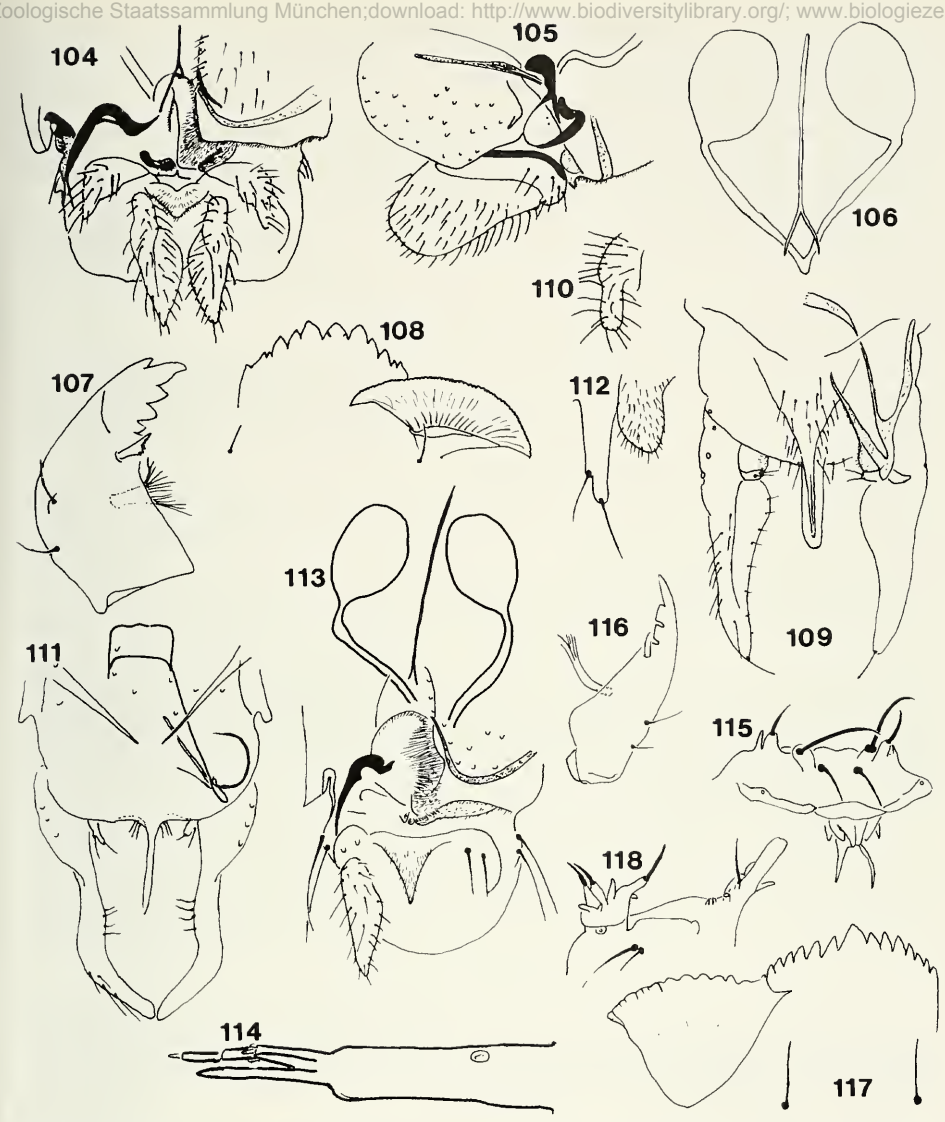
Wing. Setation: Brachiolum 2, R 26, R_1 18, R_{4+5} 28, squama 7.

Leg. LR fore 1.6, mid 0.6, hind 0.6. Sensilla chaetica on tarsomere 1: midleg 13, hindleg nil.

Hypopygium (Figs 109, 110). Anal tergite bands narrow, not joining centrally. Anal tergite setae not divided into median and apical patches. Anal point long but broader than in other species. Superior volsella small, pointing medially, with 2 setae. Inferior volsella reduced to microtrichous lobe with ventral process (Fig. 110). Gonostylus broad at base and fused with gonocoxite.

Specimens examined. 3♂♂, at lights, Lake Awasa, 81/4/15; numerous ♂♂, fish harbour, L. Awasa, 84/2/11; 2♂♂, fish harbour, L. Awasa, 84/5/27.

Comments. Hare & Carter (1987) reared this species from the larval stage confirming its generic placement.



Figs 104-108. *Nilodorum brevipalpis*. Adult. 104. ♀ genitalia, ventral. 105. ♀ genitalia, lateral. 106. Seminal capsules, ducts. Larva: 107. Mandible. 108. Mentum.
Figs 109-110. *Parachironomus acutus*. 109. Hypopygium. 110. Inferior volsella, ventral.
Figs 111-113. *Parachironomus dewulfianus*. 111. Hypopygium. 112. Superior and inferior volsellae. 113. ♀ genitalia, ventral.
Figs 114-118. *Parachironomus*, Larva A. 114. Antenna. 115. Labrum. 116. Mandible. 117. Mentum. 118. Maxilla.

Ecology. Breeds in lakes.

Distribution. Most of Afro-tropical region, Turkey and Egypt (Laville & Reiss 1993).

Chironomus (*Cryptochironomus*) *dewulfianus*, Freeman 1957.
Parachironomus dewulfianus, Freeman & Cranston 1980.

Males of this species and of *P. acutus*, and two different females of this genus were netted together. The female without frontal tubercles is described here as the probable female of *P. dewulfianus*. The male is described by Freeman (1957) but a more detailed description is given here.

Adult male (N = 3 mounted). Wing length 2.0-2.1 mm.

Head. AR 2.0. No frontal tubercles. Palp segments: 47, 37, 127, 140, 236 µm. No subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 3-4, dorsocentrals 20 partly biserial, posterior prealars 5, scutellars 8.

Wing. Setation: Brachiolum 3, R 30, R_1 18, R_{4+5} 31, squama 9.

Leg. LR fore 1.6, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: midleg 9, hindleg nil.

Hypopygium (Figs 111, 112). Anal tergite bands not meeting in centre. Anal point long and slender. Superior volsella small with two setae, one subterminal. Inferior volsella membranous with microtrichia. Gonostyli bent.

Adult female (probable) (N = 1). Wing length 2.0 mm.

Head. AR 0.47. No frontal tubercles. Palp segments: 47, 37, 124, 130, 208 µm. No subapical sensilla on segment 3.

Thorax. Scutal tubercle present. Setation: Lateral antepronotals 4, dorsocentrals 28 partly biserial, posterior prealars 6, scutellars 8 per side.

Wing. Setation: Brachiolum 2, R 22, R_1 21, R_{4+5} 44, squama 8.

Leg. LR fore, tarsus missing, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: midleg 20, hindleg nil.

Genitalia (Fig. 113). Sternite VIII with small ventral ridges. Dorsomesal lobe large with long oromesal microtrichia. Ventrolateral lobe smaller. Apodeme lobe (Fig. 113, left) weak, no microtrichia visible. Gonocoxapodemes narrow, not joined. Coxosternapodemes dark and curved. Gonocoxite IX closely applied with 2 setae. Segment X with 2 setae per side, postgenital plate pointed. Labia with microtrichia. Seminal capsules ovoid, about 78 µm long, with narrow necks, ducts slightly curved, with common opening. Cerci normal.

Specimens examined. 1♂, at lights, Lake Awasa, 83/12/10; numerous ♂♂, L. Awasa, 84/2/11; 2♂♂, L. Awasa, 84/5/27; 1 probable ♀, L. Awasa, 84/2/11. 2♂♂ L. Abaya, 84/2/26.

Ecology. Adults were emerging from the lake.

Distribution. Afrotropical region as far south as Zimbabwe, Algeria and Egypt (Laville & Reiss 1993).

Parachironomus, Larva A

This larva was collected from Lake Awasa near where the two species of male adults were netted, but it cannot be associated with either of them.

Larva (N = 1 mounted). Similar to generic definition.

Head capsule length 0.33 mm.

Body length 4.4mm. Dorsal surface of head: Anterior edge of frontal apotome convex.

Antenna (Fig. 114). 5-segmented, basal segment longer than flagellum. Blade reaches to middle of segment 4. Small style and small Lauterborn organs at tip of segment 2.

Labrum (Fig. 115). S I blade-like and smaller than S II. Pecten epipharynx a wide plate with 4 teeth. Premandible (not illustrated) with 2 broad teeth and no brush.

Mandible (Fig. 116). No dorsal tooth. Apical tooth long with 2 inner teeth. Seta subdentalis short; seta interna with 4 branches.

Mentum (Fig. 117). Median tooth simple, 7 pairs of lateral teeth, light brown in colour. Anterior margin of ventromental plates strongly scalloped.

Maxilla (Fig. 118). Palp short, no a-seta, setae maxillaris unequal. Antaxial seta present but paraxial seta absent.

Body. Anterior and posterior claws simple. Anal tubules short and broad with rounded or broadly tapered tips.

Specimens examined. Two larvae, weed beds, Lake Awasa during survey 1983-84, coll. Tilahun Kibret & Harrison (1989).

Comments. According to key in Pinder & Reiss (1983) these larvae belong to *arcuatus*-group.

Ecology. Lake weed beds.

Distribution. Ethiopian Rift Valley.

Paratendipes striatus Kieffer

Paratendipes striatus, Freeman 1957.

One female only was collected.

Adult female (N = 1 mounted). Close to generic definition.

Wing length 2.0 mm.

Head. AR 0.44. No frontal tubercles. Palps short, segments: 62, 50, 115, 102, 171 µm. 2 subapical sensory setae on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 13, posterior prealars 3, scutellars 4.

Wing. Colour pattern similar to male (Freeman 1957): "vague clouding in form of seams along the veins, cell r_5 with a faint quadrate spot near centre and a smaller rounded one below the apex of R_{4+5}". Setation: Brachiolum 2 or 3, R 16, R_1 8, R_{4+5} 19, squama 10.

Leg. LR fore, tarsi missing, mid 0.75, hind 0.67. Markings as in male (Freeman 1957). Sensilla chaetica on tarsomere 1: midleg nil, hindleg nil.

Genitalia (Figs 119, 120). Gonopophysis VIII simple, not divided into dorsomesal and ventrolateral lobes. Apodeme lobe (Fig. 119, left) very weak, no obvious microtrichia. Gonocoxapodemes strong, joining mesally. Coxosternapodeme strong and curved. Gonocoxite IX small with 2 setae. Segment X with no setae. Postgenital plate appears to be folded dorsally and there is an undetermined internal structure dorsal to plate. Labia without microtrichia. Seminal capsules (Fig. 120) ovoid with neck, 65 µm long without neck, ducts almost straight, joining to common opening.

Specimen examined. 1♀, at lights, Amibara Irrigation Project, Middle Awash River, 800 m, 84/11/10.

Ecology. Appeared to be breeding in irrigation canals.

Distribution. Egypt, Sudan, and Ethiopian Rift Valley at lower altitude.

Polypedilum (Pentapedilum) vittatum Freeman

Polypedilum (*Pentapedilum*) *vittatum* Freeman, 1958.

One male only was collected. Freeman points out that this species is easily distinguished from other similar species by the broad bands basally on the abdominal segments. He does not illustrate the hypopygium.

Adult male (N = 1). Wing length 2.5 mm.

Colour. As in Freeman (1958).

Head. AR (antennae missing) Freeman gives 1.7-2.0. No frontal tubercles. Palp segments: 37, 53, 202, 155, 223 µm. 4 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 14 uniserial, posterior prealars 5, scutellars 4 per side.

Wing. Anal lobe moderately developed, setae evenly distributed over wing membrane but not dense. Setation of veins: Brachiolum 1, R 34, R_1 36, R_{4+5} 66, M 8, cross vein 1, squama 14.

Leg. LR fore missing (Freeman gives 1.5), mid 0.5, hind 0.8. Sensilla chaetica on tarsomere 1: midleg nil, hindleg nil.

Hypopygium (Fig. 121). Anal tergite bands fused basally but continue posteriorly on either side of field of anal tergite setae; these are separate from the apical setae. Tergite IX tapered, anal point narrow. Superior volsella simple, gently curved with one seta. Inferior volsella with apical seta on distinct process.

Specimen examined. 1♂, at lights, Addis Ababa, 83/10.

Ecology. Not fully known; seems to occur at higher altitudes in the tropics. In Zimbabwe they were breeding in a marsh near Harare (coll. ADH, 62/5/3).

Distribution. Ethiopian Highlands, Zimbabwe, Uganda.

Polypedilum (Pentapedilum) wittei Freeman

Polypedilum (*Pentapedilum*) *wittei* Freeman, 1958; Cranston & Judd 1989.

One male only was collected. Freeman (1958) shows that this species can be distinguished from other similar species by the narrow dark bands at the apices of the abdominal segments. He shows the hypopygium, but it is illustrated in more detail here.

Adult male (N = 1). Wing length 2.2 mm.

Colour. As in Freeman (1958).

Head. AR 2.2. Minute frontal tubercles. Palp segments: 47, 40, 152, 148, 236 µm. 2 or 4 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral anteprotonotals nil, dorsocentrals 26 partly biserial, posterior prealars 5, scutellars 17 per side partly biserial.

Wing. Anal lobe moderate, setae fairly evenly distributed over wing membrane. Setation on veins: Brachiolum 2, R 50, R_1 38, R_{4+5} 70, M 12, cross vein nil, squama 10.

Leg. LR fore missing, Freeman gives 2.0, mid 0.5, hind 0.7. Sensilla chaetica on tarsomere 1: midleg nil, hindleg nil. Hypopygium (Fig. 122). Anal tergite bands fused basally to form a point mesally, and continue posteriorly on either side of field of anal tergite setae. These are separate from weak apical setae. Anal point narrow. Superior volsella sharply bent with two lateral setae and 3 medial basal setae. Inferior volsella with apical seta on indistinct process.

Specimen examined. 1♂, at lights, Lake Langano, 83/12/11.

Comments. This species differs from *P.* (*Pent.*) *vittatum* in the arrangement of the abdominal bands but also in its larger number of dorsocentral setae (26 vs. 14) and scutellars (17 per side vs. 4) on the thorax, and the larger number of setae on the veins of the wings. There are small differences in the hypopygial structure, notably of the superior volsella. Cranston & Judd illustrate only one lateral seta on the superior volsella.

Ecology. Breeds in standing waters of various sizes. In Zimbabwe it breeds in pools in rivers and streams and in small impoundments (coll. ADH 1962).

Distribution. Most of Afrotropical Region as far south as the Transvaal, and in the Arabian Peninsula, Greece and Syria (Laville & Reiss 1993).

Polypedilum (Polypedilum) abyssiniae Kieffer

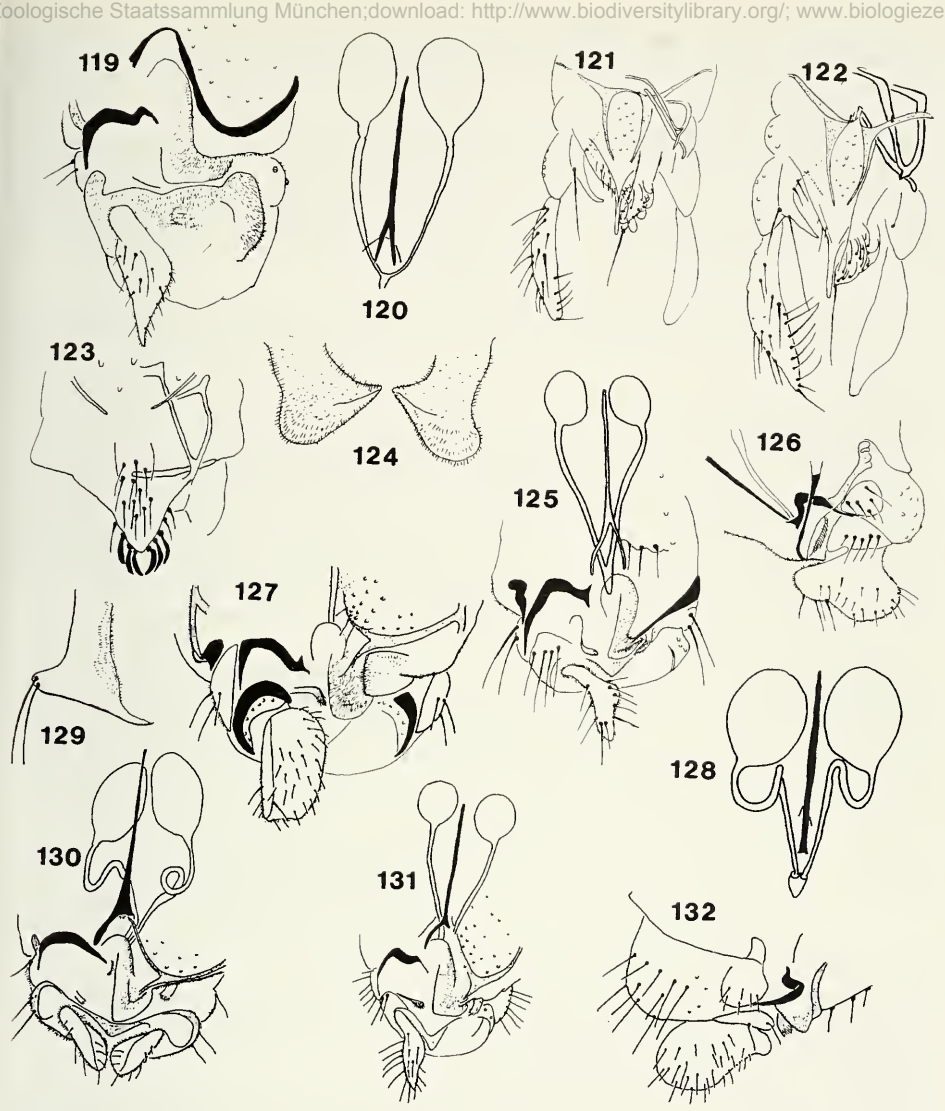
Polypedilum (*Polypedilum*) *abyssiniae*, Freeman 1958.

Freeman describes the male, and the female wing.

Adult male (N = 3 mounted). Differs from generic definition in structure of anal point and superior volsella.

Wing length 1.6 mm.

Colour. As in Freeman (1958), "a small dark species with patterned wings ". Ethiopian specimens have the same wing pattern as shown in Freeman's photograph, distinguished from similar species by the two markings only in cell r_5, and no marking on or near the cross vein. There is a discrete mark well basal to the cross vein.



Figs 119-120. *Paratendipes striatus*. 119. ♀ genitalia, ventral. 120. Seminal capsules, ducts.
Fig. 121. *Polypedilum (Pentapedilum) vittatum*. Hypopygium. Fig. 122. *Polypedilum (Pentopedilum) wittei*. Hypopygium.
Figs 123-126. *Polypedilum (Polypedilum) abyssiniae*. 123. Hypopygium. 124. Superior volsella. 125. ♀ genitalia. ventral. 126. ♀ genitalia, lateral.
Figs 127-128. *Polypedilum (Polypedilum) alticola*. 127. ♀ genitalia, ventral. 128. Seminal capsules, ducts.
Figs 129-130. *Polypedilum (Polypedilum) annulatus*. 129. Superior volsella. 130. ♀ genitalia, ventral.
Figs 131-132. *Polypedilum (Polypedilum) deletum*. 131. ♀ genitalia, ventral. 132. ♀ genitalia, lateral.

Head. AR 1.12. Frontal tubercle present. Palp segments: 40, 37, 93, 108, 186 µm. 2 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 10 uniserial, posterior prealars 4, scutellars 3 per side.

Wing. Setation: Brachiolum 1, R 16, R_1 14, R_{1+5} 16, squama 4.

Leg. LR fore 1.9, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: mid leg 2 at tip, hind leg nil.

Hypopygium (Figs 123, 124). Anal tergite bands not fused. Anal point broad, conical and fringed with 3 or 4 pairs of flattened spines. Superior volsella (Fig. 124) broad, membranous, covered with microtrichia rather difficult to see, but with no setae; almost meet medially under the anal point. Inferior volsella and gonocoxite normal for the genus.

Adult female (N = 5 mounted). Wing length 1.7 mm.

Colour. Similar to male, wing pattern darker.

Head. AR 0.4. Frontal tubercles present. Palp segments: 43, 40, 96, 102, 174 µm. 3 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorscentrals 11, posterior prealars 4, scutellars 5 per side.

Wing. Setation: Brachiolum 1, R 22, R_1 18, R_{1+5} 28, squama 4.

Leg. LR fore 1.9, mid 0.5, hind 0.7. Sensilla chaetica on tarsomere 1: mid leg 4 at tip, hind leg nil.

Genitalia (Figs 125, 126). Ventral ridges on sternite VIII strong and transverse, bearing 2 or 3 setae. Dorsomesal lobe large, posterior end bending dorsally. Ventrolateral lobe small. Apodeme lobe (Fig. 125, left) small, bearing microtrichia. Gonocoxapodemes dark, straight and ending on dorsomesal lobe, not joined. Coxosterapodemes dark and curved. Gonocoxite IX with 5 setae (Fig. 126). Segment X with 5 setae per side, postgenital plate pointed. Labia without microtrichia. Seminal capsules small, almost spherical, length 47 µm, ducts almost straight with common opening.

Pupa and larva. Unknown.

Specimens examined. Adults: Numerous ♂♂ and ♀♀, at lights, Lake Awasa, 81/4/15, 83/1/31; similarly, L. Langano, 83/3/14.

Comments. This species is atypical for the genus in the structure of the anal point and superior volsella of the male, and in the transverse ventral ridge on sternite VIII and the structure of the gonocoxapodeme in the female. If larva type E belongs to this species then it also has an atypical larva. Unfortunately no pupa is available.

Ecology. Breeding in shallow lakes and slow-flowing rivers.

Distribution. Afrotropical Region as far south as the Transvaal, South Africa.

Polypedilum (Polypedilum) albosignatum Kieffer

Polypedilum (*Polypedilum*) *albosignatum*, Freeman 1958.

One male only was collected. Freeman describes the male but more details are given here.

Adult male (N = 1 mounted). Wing length 2.1 mm.

Colour. A dark fly with strongly marked wings. The Ethiopian specimen has the same wing markings as shown in Freeman's photograph: cell r_5 is nearly all dark with two light patches marking off the large central spot; cell m_{1+2} is all dark except for a light subterminal patch; m_{3+4} and the anal cell both have a large dark spot and a dark band along the edge of the wing.

Head. AR 1.8. Minute frontal tubercles. Palp segments: 37, 62, 133, 149, 248 µm. 3 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 20 partly biserial, posterior prealars 6, scutellars 14 per side biserial.

Wing. Setation: Brachiolum 1, R 24, R_1 23, R_{1+5} 43, M 1, cross vein 1, squama 10.

Leg. LR only hind present 0.4, Freeman gives 2.0 for fore. Sensilla chaetica on tarsomere 1: mid leg missing, hind leg nil.

Hypopygium. As illustrated by Freeman, and as follows. Anal point broad and strongly downturned, 20 anal tergite setae. Superior volsella very short, 3 megasetae. Inferior volsella long and thin, 4 terminal megasetae (Freeman shows 5). Gonostylus long, thin.

Specimen examined. 1♂, at lights, Lake Abaya, 84/2/26.

Ecology. Appears to breed in large rivers (Nile) and lakes at lower altitudes.

Distribution. Egypt, Sudan, Ethiopia, Uganda.

Polypedilum (Polypedilum) alticola Kieffer

Polypedilum (Polypedilum) alticola, Freeman 1958; Cranston & Judd 1989.

The above authors describe the male; further details of the male are given here, and the female is described.

Adult Male (N = 1 mounted). Wing length 2.8 mm.

Colour. Freeman describes the colour and illustrates the wing pattern. A large dark species with strongly marked wings; these have two dark spots on cell r_{4+5}, the larger spot reaching up to the cross vein; lighter spots in the other cells. Clouding along the veins.

Head. AR 1.4. Small frontal tubercles. Palp segments: 62, 62, 202, 186, 310 µm. 8 very small subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 25 partly biserial, posterior prealars 8, scutellars 12 per side biserial.

Wing. Setation: Brachiolum 1, R 29, R_1 25, R_{4+5} 40, squama 15.

Leg. LR (fore missing, Freeman gives 1.4), mid 0.4, hind 0.8. Sensilla chaetica on tarsomere 1: midleg 3, hindleg nil.

Hypopygium. Similar to descriptions by Freeman, and Cranston & Judd. Anal tergite bands moderately developed, somewhat transverse but not fused. 8 median anal tergite setae. Anal point narrow. Superior volsella narrow and almost straight as in Freeman. Inferior volsella narrow. Gonocoxites very broad.

Adult female (N = 1 mounted). Fits Saether's (1977) rather broad generic definition.

Wing length 3.4 mm.

Colour. Similar to male but wing pattern somewhat darker.

Head. AR 0.3. No frontal tubercles. Palps missing.

Thorax. Small scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 30 partly biserial, posterior prealars 8, scutellars 15 per side biserial.

Wing. Setation: Brachiolum 1, R 33, R_1 41, R_{4+5} 70, M 20, cross vein 2, squama 15.

Leg. LR fore 1.4, mid 0.5 hind 0.8. Sensilla chaetica on tarsomere 1: mid leg 22, hind leg nil.

Genitalia (Figs. 127, 128). Sternite VIII strongly chitinized and brown; anterior edge of X strongly chitinized. Small ventral ridge in sternite VIII with 3 setae. Dorsomesal lobes large and extending above the edge of X. Ventrolateral lobes large. Apodeme lobe (Fig. 127, left) fairly large and bearing microtrichia. Gonocoxapodemes light brown, with branch onto dorsomesal lobe, main branches joined. Coxosternapodemes dark and curved. Gonocoxite IX chitinized with 3 setae. Segment X with 6 or 7 setae per side, postgenital plate rounded (not in figure). Labia without microtrichia. Seminal capsules ovoid, 102 µm long, ducts with S-bend and common opening (Fig. 128).

Pupa and larva. Unknown.

Specimens examined. Adults: 1♀, Ashilo River, ET 27, 84/1/24; 1♀, Abo River, ET 2, 84/10/11; 1♂, at lights, Addis Ababa, 85/4.

Comments. The S-bend in the spermathecal ducts of the female seems to be characteristic of this species.

Ecology. Breeds in torrential mountain streams and rivers.

Distribution. Widespread in Afrotropical and Oriental regions (Cranston & Judd 1989).

Polypedilum (Polypedilum) annulatum Freeman

Polypedilum (Polypedilum) annulatum Freeman, 1958.

This species is very similar to *P.* (*Poly.*) *kibatiense* Goetghebuer (Freeman 1958) but can be distinguished by its colour: abdomen is ringed, each segment having a pale apical band occupying about one-third of the segment. The Ethiopian male was like this before it faded in spirit. Both species have plain wings.

A female collected with the male is similar in size and general colouration, and is described here as the probable female of this species. Both specimens were rather fragile and had lost some of their appendages.

Adult male (N = 1 mounted). Wing length 1.9 mm.

Head. Antennae missing. No frontal setae. Palps missing.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 13, posterior prealars 5, scutellars 4.

Wing. Condition too poor for accurate setal count.

Leg. Tibia and tarsus missing.

Hypopygium (Fig. 129). Similar to that of Freeman (1958) but superior volsella has more of a "heel".

Adult female (N = 1 mounted). Fits Saether's broad generic definition.

Wing length 1.9 mm.

Head. Antennae and palps missing. No frontal tubercles.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 12, posterior prealars 4, scutellars 4 per side.

Wing. Condition too poor for accurate setal count.

Leg. Poor condition.

Genitalia (Fig. 130). No ventral ridge on sternite VIII. Dorsomesal lobe large. Ventrolateral lobe small. Apodeme lobe (Fig. 130, left) small with microtrichia. Gonocoxapodemes light brown with branch onto dorsomesal lobe, joined centrally. Coxosternapodemes dark and curved. Gonocoxite IX small with 1 seta. Segment X with 2 setae per side. Post genital plate broadly triangular. Labia without microtrichia. Cerci small, shorter than seminal capsules. Seminal capsules ovoid with small necks, 71 µm long without neck, ducts looped, appear to have common opening.

Pupa and larva. Unknown.

Specimens examined. Adults: 1♂ and 1♀, at lights, Lake Ziway, 82/12/31.

Comments. Lehmann (1979) describes the male hypopygium of *P. kibatiense* in detail. In his figure the superior volsella is distinctly narrower than that of *P. annulatum* (Fig. 129). The female differs from most other species described so far (Saether 1977) in that the seminal capsules are longer than the cerci and the ducts are looped, not straight.

Ecology. These specimens were found near the lake and the swampy pools along its margin. Other specimens from South Africa were collected near a large river (Freeman 1958).

Distribution. Most of Afrotropical Region as far south as Cape Town.

Polypedilum (Polypedilum) deletum Goetghebuer

Polypedilum (*Polypedilum*) *deletum*, Freeman 1958; McLachlan 1969 (larva); Lehmann 1981.

The male has been described by Freeman and in more detail by Lehmann. Further details are given here, and the female is described.

Adult male (N = 2 mounted). Wing length 2.3 mm.

Colour. Freeman and Lehmann describe the colour as dark brown with a pale wing pattern (illustrated by Freeman) which can be very faint. There are three spots in cell r_{4+5}, a faint spot at the tip of m_{1+2} and in the anal cell, and the fork veins are seamed with grey.

Head. AR 1.9. Frontal tubercles present. Palp segments: 46, 37, 140, 140, 223 µm. 2 or 3 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral anteprontals nil, dorsocentrals 16 uniserial, posterior prealars 6, scutellars 7 per side partly biserial.

Wing. Setation: Brachiolum 1, R 25, R_1 20, R_{4+5} 25, squama 10.

Leg. LR fore 1.7, mid 0.6, hind 0.7. sensilla chaetica on tarsomere 1: midleg 4 at tip, hindleg nil.

Hypopygium. Illustrated by Freeman and Lehmann. Anal tergite bands fused basally but continue posteriorly on either side of field of 12-15 long setae separated from apical setae. Anal point thin. Superior volsella narrow and curved. Inferior volsella narrow. Gonocoxite short and broad.

Adult female (N = 5). Wing length 2.0-2.1 mm.

Colour. As for male.

Head. AR 0.47. Frontal tubercles present. Palp segments: 56, 37, 142, 140, 229 µm. 4 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral anteprontals nil, dorsocentrals 25, posterior prealars 6, scutelars 7 per side partly biserial.

Wing. Setation: Brachiolum 1, R 24, R_1 21, R_{4+5} 41, squama 16.

Leg. LR fore 1.7, mid 0.5, hind 0.7. Sensilla chaetica on tarsomere 1: midleg 11 towards tip, hindleg 8 towards tip.

Genitalia (Figs 131, 132). Very small ventral ridge on sternite VIII. Dorsomesal lobes large. Ventrolateral lobes small. Apodeme lobe (Fig. 131, left) well chitinized and bearing microtrichia. Gonocoxapodemes narrow and light brown, branching onto dorsomesal lobe but not obviously joining each other. Coxosternapodeme dark and curved. Gonocoxite IX with 6 setae. Segment X with 2 setae per side, postgenital plate pointed. Labia without microtrichia. Seminal capsules small and almost spherical, greatest diameter 47 µm, ducts almost straight with common opening.

Pupa. Unknown.

Larva. Described by McLachlan (1969). Antennal blade much longer than flagellum. Lauterborn organs on segment 3 large. Ventromental plates do not meet; each ends internally in a graceful point. Seta subdentalis of mandible long, thin and almost straight. This larva differs from the unassociated larvae of *Polypedilum* described below.

Specimens examined. 2♂♂, at lights, Lake Awasa, 81/4/15; abundant ♂♂ and ♀♀, at lights, L. Langano, 83/3/14.

Ecology. Breeds both in standing water and in slow running water.

Distribution. Most of Afrotropical region as far south as the Transvaal.

Polypedilum (Polypedilum) dewulfi Goetghebuer

Polypedilum (Polypedilum) dewulfi, Freeman 1958.

Freeman gives a very short description of the male but does not show the hypopygium; this is illustrated here and the female is described.

Adult male (N = 3 mounted). Wing length 2.5-2.6 mm.

Colour. Brown with plain wings.

Head. AR 1.5-1.6. Frontal tubercle minute or absent. Palp segments: 47, 47, 149, 161, 285 µm. 2 or 3 subapical sensilla in segment 3.

Thorax. No scutal tubercle. Setation: Lateral anteprontals nil, dorsocentrals 32 partly biserial, posterior prealars 10, scutellars 12 per side partly biserial.

Wing. Setation: Brachiolum 1, R 27-31, R_1 28-32, R_{4+5} 55-64, squama 16-24.

Leg. LR fore 1.6, mid 0.5, hind 0.7. Sensilla chaetica on tarsomere 1: midleg nil, hindleg nil.

Hypopygium (Fig. 133). Anal tergite bands fused basally and continue posteriorly on either side of 17-20 long anal tergite setae; these are well separated from the weaker apical setae. Anal point is downturned at tip. Superior volsella curved with 6 setae on base. Inferior volsella narrow. Gonocoxites short.

Adult female (N = 1). Wing length 3.3 mm.

Colour. Similar to male.

Head. AR 0.4. Minute frontal tubercles. Palp segments broken, about 5 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 54 bi- or triserial, posterior prealars 14, scutellars 18 per side biserial.

Wing. Setation: Brachiolum 1, R 32, R_1 46, R_{4+5} 102 on both surfaces of the wing, M 14, cross vein 2, squama 20.

Leg. LR fore missing, mid 0.5, hind 0.6. Sensilla chaetica on tarsomere 1: midleg nil, hindleg nil.

Genitalia (Figs 134, 135). Small curved ventral ridge on tergite VIII bearing 3 setae. Dorsomesal lobe large. Ventrolateral lobe small. Apodeme lobe (Fig. 134, left) large and fan-like, bearing many microtrichia. Gonocoxapodemes narrow and dark, with branch onto dorsomesal lobe, and joined centrally. Coxosternapodeme dark and curved. Gonocoxite IX with 5 setae. Segment X with 5 setae per side, postgenital plate pointed. Labia without microtrichia. Seminal capsules (Fig. 135) ovoid with short necks, 96 µm long without neck, ducts with rightangled bend and common opening.

Specimens examined. 1♂ and 1♀, netted, Abo River, ET2C, 84/10/11; 1♂, netted, Abo River waterfall, ET2, 84/10/18; 2♂♂ bred out in lab from stony run sample, Abo River, ET2, 85/5; 1 intersex, Abo-Kebene River, below ET2C, 85/11.

Ecology. Appears to breed mainly in running water, even in torrential streams.

Distribution. Most of Afrotropical region down to Cape Town.

Polypedilum (*Polypedilum*) *tesfayi*, spec. nov.

Types. Holotype: ♂, Abo River, Addis Ababa, 85/5 (ZSM). - Paratype: pupa and pharate ♂, Kechene Stream near Addis Ababa, 83/11/13 (ZSM).

This new species is based on 1 adult male, 1 pharate male and 1 pupa.

Adult male (N = 1). Wing length 2.9 mm.

Colour. The living fly is grass green with unmarked wings. When preserved it fades to light yellow.

Head. AR 1.5. No frontal tubercles. Palp segments: 65, 47, 198, 171, 279 µm. 4 subapical sensilla on segment 3.

Thorax. No scutal tubercle. Setation: Lateral antepronotals nil, dorsocentrals 19 uniserial, posterior prealars 6, scutellars 13 per side biserial.

Wing. Fig. 136 shows the wing shape. No anal lobe. Setation: Brachiolum 1, R 32, R_1 23, R_{4+5} 52, M 1, cross vein 1, squama 12.

Leg. LR fore 1.6, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: midleg nil, hindleg nil. Tibial scale on foreleg rounded with no spur but with subterminal spine. Single spurs on mid- and hindlegs long and slightly curved.

Hypopygium (Fig. 137). Anal tergite bands not fused, tips enclose field of 20 anal tergite setae; separate from apical setae. Anal point narrow, downturned at tip. Superior volsella base with microtrichia and 1 seta; tip arises subterminally and points inwardly. Inferior volsella fairly broad. Gonocoxites long and broad.

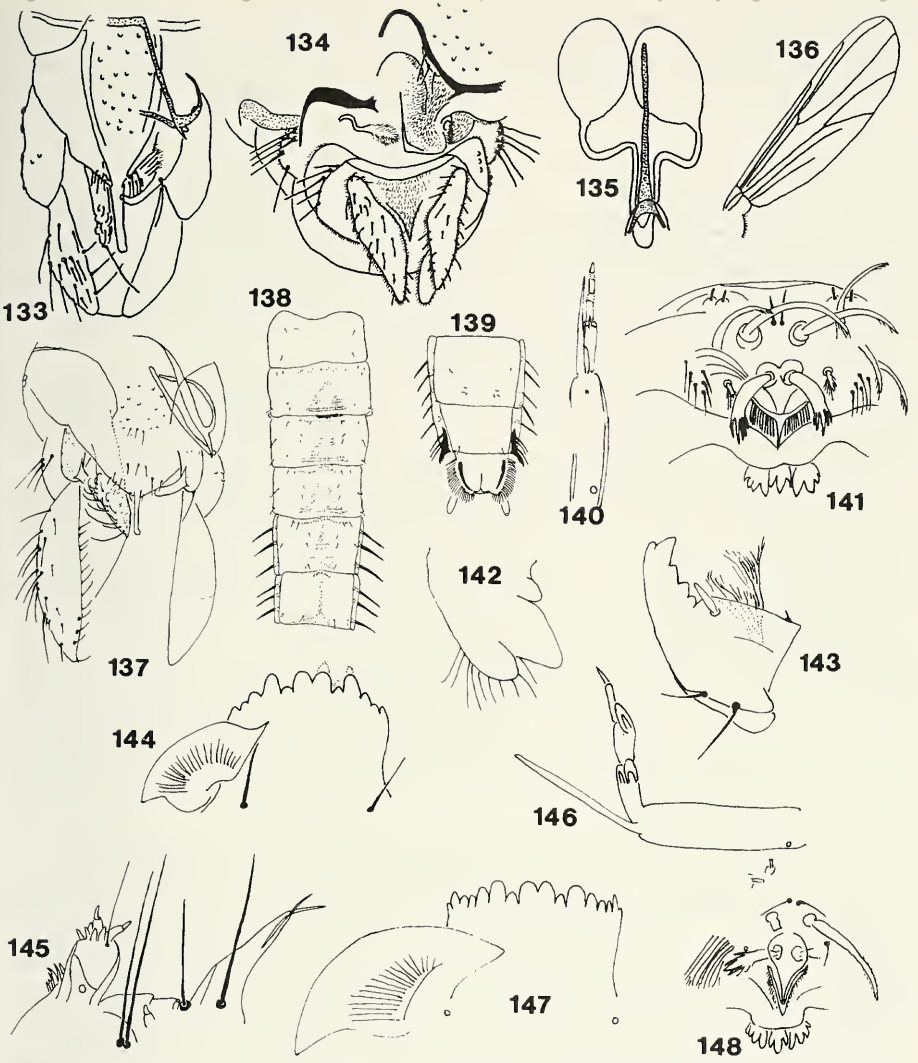
Adult female. Unknown.

Pupa with pharate male (N = 1). Cephalothorax. Surface finely granulose, fine ridges present anteriorly and dorsally. Cephalic tubercles form low humps with no frontal setae. Setae: 2 minute precorneals, no antepronotals, 2 close pairs of minute dorsocentrals, well apart.

Abdomen (Figs 138, 139). Tergites tend to overlap and some setae are reduced to rudiments. Tergite I with no shagreen or spines. Tergites II-V with anterior row of spines and roughly triangular central patches of shagreen. Tergite VI similar but shagreen patch very narrow. Tergites VII and VIII with small shagreen patches in anterior corners. No shagreen in conjunctives. Hook row on tergite II narrow. Pedes spurii A on IV and B on II. Posterolateral spurs on VIII large and dark with 3 terminal teeth (Fig. 139). Anal lobes with genital sac containing gonocoxites of pharate male. Segement I without L setae, II with 1, III and IV with 2, V and VI with 3 lamelliform setae, VII and VIII with 4. Anal fin with 30 setae.

Larva. Unknown.

Specimens examined. 1♂ (type) bred out in lab from a sample from a stony run, Abo River waterfall ET2, 85/5; 1 pupa with pharate ♂, stony run, Kechene River, ET9, 2900 m, 83/11/13.



Figs 133-135. *Polypedilum (Polypedilum) dewulfi*. 133. Hypopygium. 134. ♀ genitalia, ventral. 135. Seminal capsules, ducts.
Figs 136-139. *Polypedilum (Polyprdilum) tesfayi* spec. nov. ♂: 136. Wing. 137. Hypopygium. Pupa: 138. Abdomen, tergites I-VI. 139. Abdomen, tergites VII, VIII, anal lobe.
Figs 140-145. *Polypedilum*, Larva type A. 140. Antenna, 141. Labrum. 142. Premandible. 143. Mandible. 144. Mentum. 145. Maxilla.
Figs 146-147. *Polypedilum*, Larva type B. 146. Antenna. 147. Mentum.
Fig. 148. *Polypedilum*, Larva type C. Labrum.

Ecology. Breeds in torrential streams at high altitudes.

Distribution. Ethiopian Highlands.

Comments. This new species is named for my colleague Tesfaye Berhe, who worked on the ecology of the Abo River. The superior volsella differs from those of all other known African species.

Six larvae of *Polypedilum*, described below as Larva types A to F, were collected either in running water or in lakes. None was associated with its adult.

Larva type A

(N = 15 mounted). Colour. Head capsule yellowish to light brown. Head capsule length 216 µm.
Body length maximum about 6 mm.
Antenna (Fig. 140). Blade shorter than flagellum. Lauterborn organs small.
Labrum (Figs 141, 142). Labral lamella with strong central bar, inner chaeta separated from the others and palmate. Premandible (Fig. 142) with three teeth, outer tooth shorter than middle.
Mandible (Fig. 143). All teeth dark, mola with one spine.
Mentum (Fig. 144). Two central teeth, second lateral tooth higher than others. Dotted line on figure shows height in less worn specimens. Medial edge of ventromental plate finely pointed and turned slightly forward.
Maxilla (Fig. 145). Both long lacinal chaetae pointed, chaetulae of palpiger small, a-seta present on palp and both paraxial and antaxial setae well developed.
Body. No markings. Anterior and posterior claws simple, anal tubules short and bluntly pointed.

Specimens examined. 3, Upper Kechene Stream, ET9, 83/11/13; 2, Abo River waterfall, ET2, 83/11/17; numerous, Kebena River, 1984-1985.

Ecology. Common in stony runs in mountain streams and rivers, but sensitive to organic pollution (Tesfaye Berhe et al. 1989).

Distribution. Ethiopian Highlands.

Larva type B

(N = 1). Close to generic definition, except for antenna.
Colour. Head capsule light yellow.
Head capsule length 86 µm.
Body length 4 mm.
Antenna (Fig. 146). Blade reaches segment 4, Lauterborn organs large, on segments 2 and 3.
Labrum. Similar to Type A but S II broadly palmate, like S I. Premandible similar to Type A.
Mandible. Similar to Type A.
Mentum (Fig. 147). Second and sixth lateral teeth higher than the rest. Medial edge of ventromental plate broadly pointed.
Maxilla. Similar to Type A but anterior long chaeta broad not narrow.
Body. No markings; anterior and posterior claws simple; anal tubules short and bluntly pointed.

Specimen examined. 1, stream behind Wendo Genet Hotel, ET 4, 83/10/23.

Comments. Pinder & Reiss (1983) report alternate Lauterborn organs in *Polypedilum nubifer* Skuse, a species atypical in all stages.

Ecology. The specimen came from a stony torrent, partly shaded by riparian vegetation.

Distribution. Ethiopian Highlands.

Larva Type C

(N = 8). Colour. Head capsule light yellowish dorsally, dark brown ventrally.
Head capsule length 1.6 µm.
Body length 3.6 mm maximum.
Antenna. Similar to Type A but Lauterborn organs smaller.

Labrum (Fig. 148). Labral lamella more V-shaped. Inner chaeta reduced and simple, not large and palmate as in Type A.

Premandible similar to Type A.

Mandible. Similar to Type A.

Mentum. Similar to Type A.

Maxilla. Similar to Type A.

Body. No markings. Anterior and posterior claws simple. Anal tubles short and sharply pointed.

Specimens examined. 8, Kebena River, below ET2C, 1984-85.

Ecology. From stony runs in a mountain stream as it entered Addis Ababa. Larva seemed to benefit from mild organic enrichment; the situation is described by Tesaye Berhe et al. 1989.

Distribution. Ethiopian Highlands.

Larva Type D

(N = 15). Head capsule length 130-144 µm.

Body length 4.8 mm.

Antenna (Fig. 149). Blade longer than flagellum, in some specimens straighter than in figure. Segments 3-5 short. Lauterborn organs almost as long as segment 3.

Labrum (Fig. 150). Labral lamella with no central bar.

Mandible (Fig. 151). All teeth dark, mola with 3 spines.

Mentum (Fig. 152). Lateral tooth 1 slightly shorter than 2 and 3. Medial edge of ventromental plate with sharp point turned forward.

Maxilla (Fig. 153). Anterior long lacinal chaeta broad.

Body. No markings. Anterior and posterior claws simple; anal tubules short and pointed.

Specimens examined. 6, stream behind Wendo Genet Hotel, ET 4, 83/10/23; 1, Chancho Stream, ET5, 83/10/29; 2, tributary of Upper Dima River, ET10, 83//20; 4, Upper Abo River, ET2, 83/11/17; 1, Dadi River, ET1, 83/10; 1, Werka Stream, Wendo Genet, ET12, 83/12/10; 2, Sekord River, ET14, 83/12/29.

Ecology. Larvae in stony runs and marginal vegetation of torrential mountain streams.

Distribution. Ethiopian Highlands.

Larva Type E

(N = 10). Differs from generic definition as ventromental plates are contiguous medially.

Colour. Body of preserved specimens orange to orange-red.

Head capsule length 96 µm.

Body length 3.6-5.0 mm.

Antenna (Fig. 154). Blade almost 2× as long as flagellum. Segment 3 very short. Segment 5 reduced to knob in all specimens examined. Lauterborn organs longer than segment 3.

Labrum. Similar to Type D.

Mandible (Fig. 155). All teeth dark; seta subdentalis long and curved; mola with 3 spines.

Mentum (Fig. 156). Lateral tooth 1 very short, lateral tooth 2 much higher than the rest. Ventromental plates blunt medially and contiguous.

Maxilla. Similar to Type D.

Body. No markings. Narrow, longest specimen 5.0 mm long and 0.3 mm wide. Anterior and posterior claws simple. Anal tubules very short and blunt.

Specimens examined. Numerous specimens from Lake Awasa, 1983-84.

Ecology. Common on muddy bottoms near or under weed beds in shallow parts of the lake. The habitat is described by Tilahun Kibret & Harrison (1989).

Distribution. Lake Awasa, Ethiopian Rift Valley.

(N = 4). Close to generic definition, except for antennal structure.

Colour. Head capsule mostly light yellow with darker posterior ventral patch. Body with no markings, green in life.

Head capsule length 72-105 µm.

Body length 3.0-5.5 mm.

Antenna (Fig. 157). Blade shorter than flagellum. Lauterborn organs on segments 2 and 3.

Labrum. Seta S I large and fan-shaped (Fig 158). Otherwise similar to Type D.

Mandible (Fig. 159). All teeth dark; seta subdentalis long and curved; mola with 2 spines.

Mentum (Fig. 160). Lateral tooth 1 very short, 2 and 3 higher than other laterals. Medial edge of ventromental plates with blunt points, not contiguous.

Maxilla. Similar to Type D.

Body. Anterior and posterior claws simple; anal tubules short and pointed.

Specimens examined. 4, Lake Awasa, 1983-84.

Ecology. Netted in weed beds in lake; these are described by Tilahun Kibret and Harrison (1989).

Distribution. Ethiopian Rift Valley.

Stictochironomus caffrarius Kieffer

Stictochironomus caffrarius, Freeman 1958; McLachlan 1969 (larvae).

One male and a number of larvae were collected.

Adult Male (N = 1). Wing length 2.3 mm.

Colour. As in Freeman 1958; wings with pattern of gray spots as in Freeman's photograph.

Head. AR 2.0. Frontal tubercles small. Palp segments: 46, 62, 124, 130, 211 µm. 3-4 subapical sensilla on segment 3.

Thorax. Setation: Lateral antepronotals nil, dorsocentrals 17 partly biserial, posterior prealars 5. scutellars 8.

Wing. Setation: Brachiolum 1, R 16, R_1 11, R_{4+5} 7, squama 16.

Leg. LR fore 1.4, mid 0.6, hind 0.7. Sensilla chaetica on tarsomere 1: midleg 4, hindleg nil.

Hypopygium. Illustrated by Freeman 1958 and similar to that of *S. varius* (Townes) (Cranston et al. 1989). Freeman does not show that the anal tergite bands are strong, joining anterior to the field of 12 anal setae, which are separated from the apical anal setae.

Pupa. Cranston et al. (1989) state that the pupa referred to as Chironomini genus F by Pinder & Reiss (1986) belongs to *S. caffrarius*. It differs from the more usual *Stictochironomus* pupae, and those of other genera, by the long, rigid frontal setae, the three prealar tubercles at the base of the wings and the anal comb with broad apical teeth and needle-like basal teeth.

Larva (N = 6 mounted). Colour. Head capsule yellow dorsally, brown ventrally. Body orange when preserved, with no darker markings.

Head capsule length 390-468 µm.

Body length 3.6-5.0 mm.

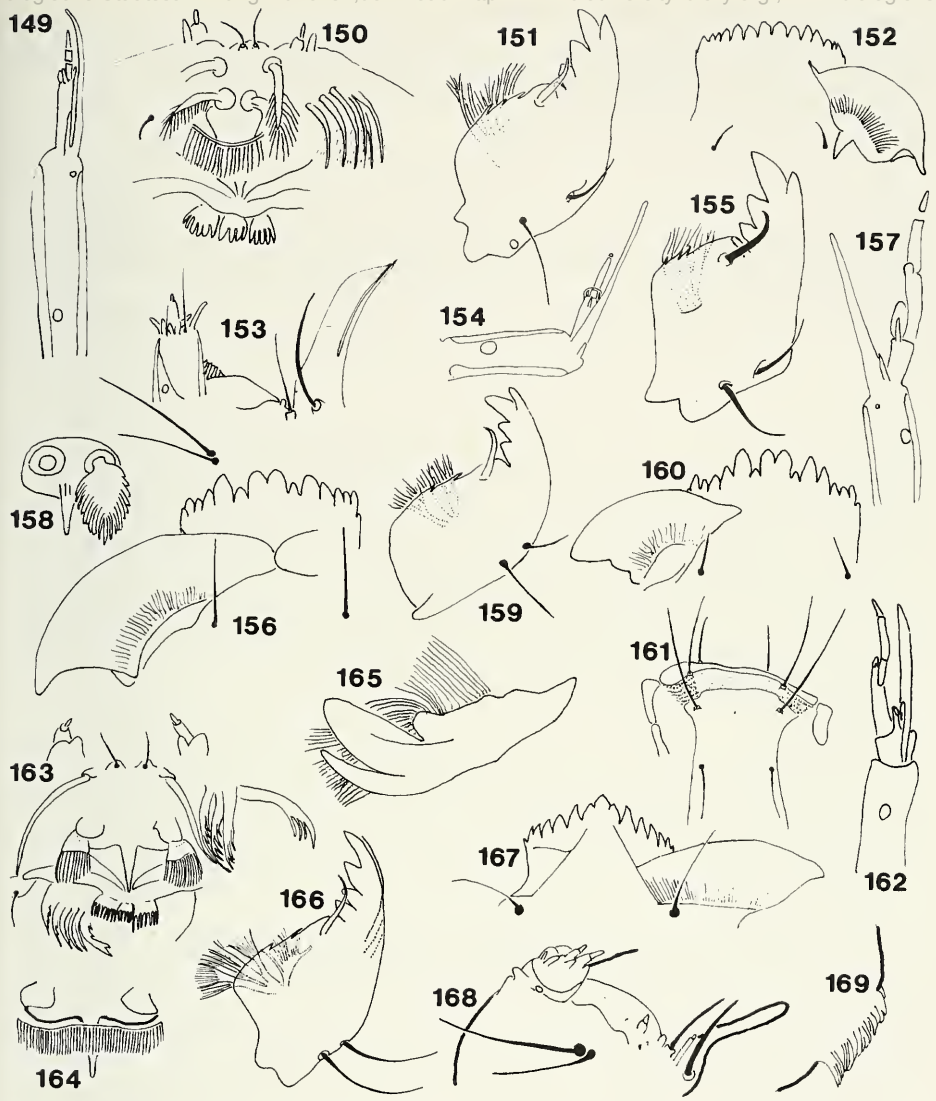
Dorsal surface of head (Fig. 161). Frontoclypeal apotome and labral sclerite 2 present, labral sclerite 1 absent.

Antenna (Fig. 162). 6 segments, basal segment shorter than flagellum; ring organ in distal half of basal segment; blade slightly shorter than flagellum; Lauterborn organs alternate on segments 2 and 3; style on segment 2.

Labrum (Figs 163-165). Bases of S I fused onto common plate with distinct point; S I plumose, S II simple, S III small and simple, S IV large. Labral lamella (Fig. 164) normal. Seta premandibularis normal. Pecten epipharynx with 3 serrated plates. Premandible (Fig. 165) with 3 teeth and brush.

Mandible (Fig. 166). Dorsal tooth absent. 3 inner teeth. All teeth dark. Seta subdentalis long, narrow and curved.

Mentum (Fig. 167). All teeth dark. Trifid central tooth with 6 pairs of lateral teeth. Ventromental



Figs 149-153. *Polypedilum*, Larva type D. 149. Antenna. 150. Labrum. 151. Mandible. 152. Mentum. 153. Maxilla.
Figs 154-156. *Polypedilum*, Larva type E. 154. Antenna. 155. Mandible. 156. Mentum.
Figs 157-160. *Polypedilum*, Larva type F. 157. Antenna. 158. Seta S 1. 159. Mandible. 160. Mentum.
Figs 161-169. *Stictochironomus caffrarius* larva. 161. Dorsal surface of Head. 162. Antenna. 163. Labrum. 164. Labral lamella. 165. Premandible. 166. Mandible. 167. Mentum. 168. Maxilla. 169. Chaetulae of palpiger.

plates separated by more than ⅓× width of mentum; somewhat wider than mentum.

Maxilla (Figs 168, 169). Palp short with small a-seta, chaetulae of palpiger (Fig. 169) normal. Paraxial and antaxial setae present.

Body. Anterior and posterior claws simple. Lateral and ventral tubules absent. Anal tubules short and pointed.

Specimens examined. 1♂ at lights, Lake Langano, 83/12/11; 6 larvae, Lake Chamo, 84/9/29, (col. C. Tudorancea).

Comments. The are similar to those described by McLachlan (1969) but more details are given here.

Ecology. The larvae were dredged from the shallows of Lake Chamo.

Distribution. Most of Africa, Natal to Egypt.

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