A revision of the East African *Nebrioporus abyssinicus* group (Coleoptera, Dytiscidae)

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The four species of the *Nebrioporus abyssinicus* (Sharp, 1882) group, confined to East Africa, are revised and a key is given for their identification. Lectotypes are designated for the following nominal species: *Deronectes abyssinicus* Sharp, 1882, *Hydroporus tellinii* Régimbart, 1904, *Hydroporus atratus* Régimbart, 1908, *Hydroporus flavidus* Régimbart, 1908, *Deronectes cooperi* Omer-Cooper, 1931, and *Deronectes scotti* Omer-Cooper, 1931. *Hydroporus septemvittatus* Régimbart, 1883, is listed as a species dubium. The third-instar larva of the group is described for the first time.

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1. Introduction

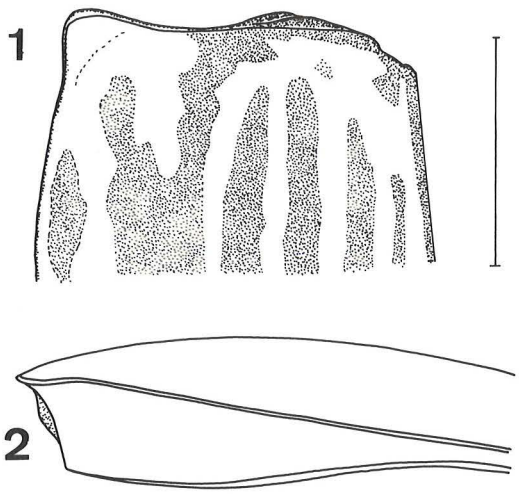
The *Deronectes* group of genera in the Hydroporini were recently reclassified by Nilsson & Angus (1992). Consequently, *Potamonectes* Zimmermann is now a junior synonym of *Nebrioporus* Régimbart. Within that genus, Nilsson & Angus (1992) recognized three species groups within the subgenus *Nebrioporus*. Whereas most species of the subgenus belong to the chiefly holarctic *N. depressus* group, the monobasic *N. kilimandjarensis* (Régimbart, 1906) group is restricted to Mt. Kilimanjaro in Tanzania, and the small *N. abyssinicus* group is known from Ethiopia, Sudan and Kenya.

Revision of the *abyssinicus* group was started when a large amount of material became available for study as a result of Mr. S. Persson's collecting in Ethiopia, and because species identification was more or less impossible using existing identification keys (e.g. Guignot 1959a).

2. Material and methods

Material was studied from the following museums:

BMNH	British Museum (Natural History) / Natural History Museum (London)
HNHM	Hungarian Natural History Museum Budapest
MCSNG	Museo Civico di Storia Naturale "Giacomo Doria" Genova
MRAC	Musee Royal de l'Afrique Centrale Tervuren
MZH	Zoological Museum University of Helsinki
MZSF	Museo Zoologico de "La Specola" Firenze
NMNHP	National Museum of Natural History Paris, and
SMNH	Swedish Museum of Natural History Stockholm.



Figs. 1–2. *Nebrioporus cooperi* (Omer-Cooper), ♀, anterior part of left elytron. — 1. Dorsal aspect. — 2. Lateral aspect. — Scale bar = 1 mm.

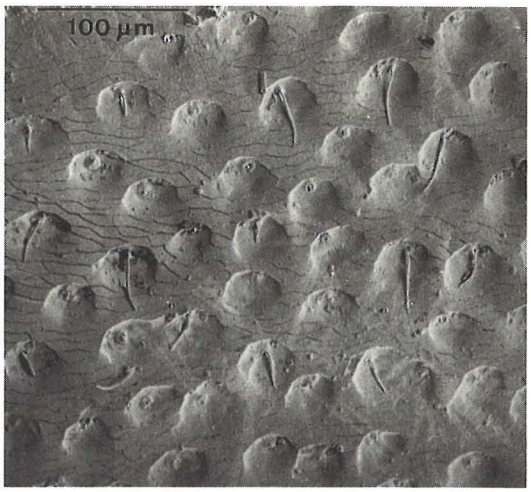


Fig. 3. *Nebrioporus abyssinicus* (Sharp), sculpture of metacoxal plate. SEM micrograph: R.B. Angus.

The material collected in Ethiopia by Mr S. Persson in 1988 and 1989 is kept at the Entomological Museum in Lund, coll. Persson, and as part of the author's personal collection.

In the descriptions, the following abbreviations are used:

HL	total head length
HW	maximum head width
LAS	last abdominal segment
MW	maximum body width
PD	posterodorsal
TL	total body length (from anterior head margin to elytral apex)
U1	basal segment of urogomphus
U2	apical segment of urogomphus
WC/WS	ratio between width of metacoxa and width of metasternal wing (measured inside bead) along line at point of closest approximation of mesocoxa to metacoxal plate.

3. The *Nebrioporus abyssinicus* group

Apomorphy unique within genus:

elytron with anterolateral sinuation, lateral margin ventrally deflexed near anteriorly produced anteroexternal angle (Figs. 1 and 2).

Apomorphies shared with some other *Nebrioporus* species:

1) elytron with subapical spine;
2) elytron with apex produced in female;
3) paramere with subapical membraneous sac.

Plesiomorphies within genus:

1) paramere with apical hook-like sclerotization;
2) metafemur ventrally without dense punctation;
3) metatibia ventrally with single longitudinal row of spiniferous punctures only;
4) ventral surface of body microreticulate between sparse punctures (Fig. 3);
5) mesepisternum microreticulate, not punctate;
6) elytron with smooth surface, without raised longitudinal ridges;
7) male protarsal claws simple.

The combination of derived characters like the apically hooked parameres and elytra with a subapical spine, and a plesiomorphic ventral body sculpture has caused some problems in the generic assignment of the group. Sharp (1882:431) listed *N. abyssinicus* among the species later placed in *Potamonectes*, and this classification was adopted by Zimmermann (1920). In a footnote, Zimmermann (1933:187) later transferred this species to *Scarodytes*, used as a subgenus of *Deronectes*. Guignot (1936:34) confirmed this

classification but gave *Scarodytes* generic status. Later, however, Guignot (1959a:454) — without an explanation — returned to Sharp's (1882) original classification with *N. abyssinicus* in *Potamonectes*, but in a new species group — the *laeviventris* group. As this group was defined only by plesiomorphic characters it is not used here.

Key to species of the *Nebrioporus abyssinicus* group

1. Abdominal sterna 1 and 2 with large, isolated punctures. Metasternal wing broad (Figs. 22–25), WC/WS in most specimens less than 3.2. Anterior male protarsal claw at most slightly shorter than posterior claw (Figs. 28–35) 2
— Abdominal sterna 1 and 2 with punctation fine and dense. Metasternal wing narrow (Figs. 26 and 27), WC/WS in most specimens 3.2 or more. Anterior male protarsal claw markedly shorter than extended posterior claw (Figs. 36–39) ..... *tellinii*
2. Head relatively larger (Figs. 10 and 13); HW/MW ratio 0.60–0.62. Metacoxal lines weakly diverging anteriorly; width at level of contact with metasternum less than width of processes. Paramere without subapical membraneous sac and with ventral subapical at a right or an acute angle (Figs. 54 and 55). Body length 4.6–5.2 mm 3
— Head relatively smaller (Figs. 4, 5); HW/MW ratio 0.54–0.57. Metacoxal lines strongly diverging anteriorly; width at level of contact with metasternum exceeding width of processes. Paramere with subapical membraneous sac and with ventral subapical broadly rounded angle (Figs. 52 and 53). Body length 4.2–4.8 mm ..... *abyssinicus*
3. Body length 4.6–5.0 mm. Paramere with ventral subapical at a right angle (Fig. 55). Metatibia piceous to black ..... *scotti*
— Body length 5.2–6.0 mm. Paramere with ventral subapical at a slightly acute angle (Fig. 54). Metatibia yellowish brown ..... *cooperi*

4. Descriptions of species

Nebrioporus abyssinicus (Sharp)

Figs. 4–9, 22, 23, 28–31, 40–43, 52 and 53

Deronectes abyssinicus Sharp, 1882:431 + pl. 12:153 (orig. descr.); Régimbart 1887:637 (descr., faun.); Omer-Cooper 1931:780, 781 (faun.).

Deronectes (*Potamodytes*) *abyssinicus* Sharp: Zimmermann 1920:121 (cat.).

Deronectes (*Scarodytes*) *abyssinicus* Sharp: Zimmermann 1933:187 (syst.).

Hydroporus abyssinicus (Sharp): Régimbart 1895:18, 19 (descr.); Régimbart 1905:201, 202 (faun.); Régimbart 1922:528 (faun.).

Hydroporus (*Deronectes*) *abyssinicus* (Sharp): Régimbart 1906:237 (descr., faun.).

Hydroporus abyssinicus var. *atratus* Régimbart, 1908:2 (orig. descr.).

Hydroporus abyssinicus var. *flavidus* Régimbart, 1908:2, 3 (orig. descr.).

Potamonectes abyssinicus (Sharp): Guignot 1959a:457, 458 (descr., faun.); Rocchi 1975:270–273 (descr.).

Scarodytes abyssinicus (Sharp): Guignot 1936:34 (syst., faun.).

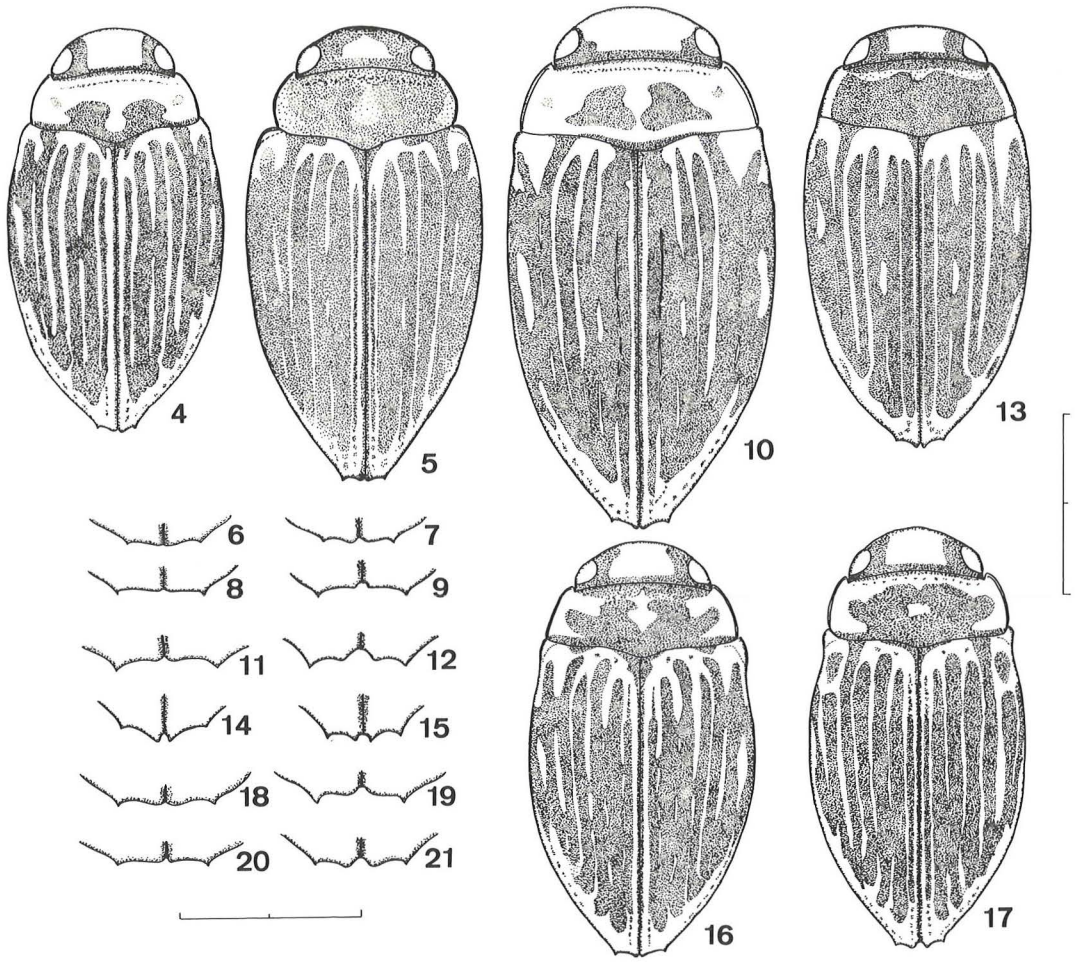
Type locality. *N. abyssinicus*: Abyssinia (=Ethiopia); *atratus*: Mt. Meru, 3500 m, Tanzania; *flavidus*: L. Nakuru, alt. 2000 m, Kenya.

Type material. Lectotype ♂ of *N. abyssinicus* here designated: "*Deronectes abyssinicus*. Ind. typ. D.S. Abyssinia, Raffray.", "cotype", "Abyssinia", "Sharp Coll. 1905-313", and my lectotype label (BMNH). — Lectotype ♂ of *atratus* here designated: "Meru Regenwald", "3 jan.", "Meru Sjöstedt", "*Hydroporus abyssinicus* var. *atratus* Rég. n. var.", and my lectotype label (SMNH). — Lectotype ♂ of *flavidus* here designated: "Lac de Nacuro Rift Valley 2000", "Museum Paris coll. Maurice Régimbart 1908", and my lectotype and identification labels (NMNHP).

Lectotype of *abyssinicus* selected among seven syntypes in BMNH and two syntypes in MCSNG. A male paralectotype in BMNH belongs to *N. tellinii* (Régimbart). The dense, fine punctation of the body, and the extended posterior male protarsal claw mentioned in the original description indicate that it was based on this male. However, as this is only an indication, I have chosen a lectotype that will best promote stability. Guignot (1959a:457) stated erroneously that the *flavidus* types were in SMNH.

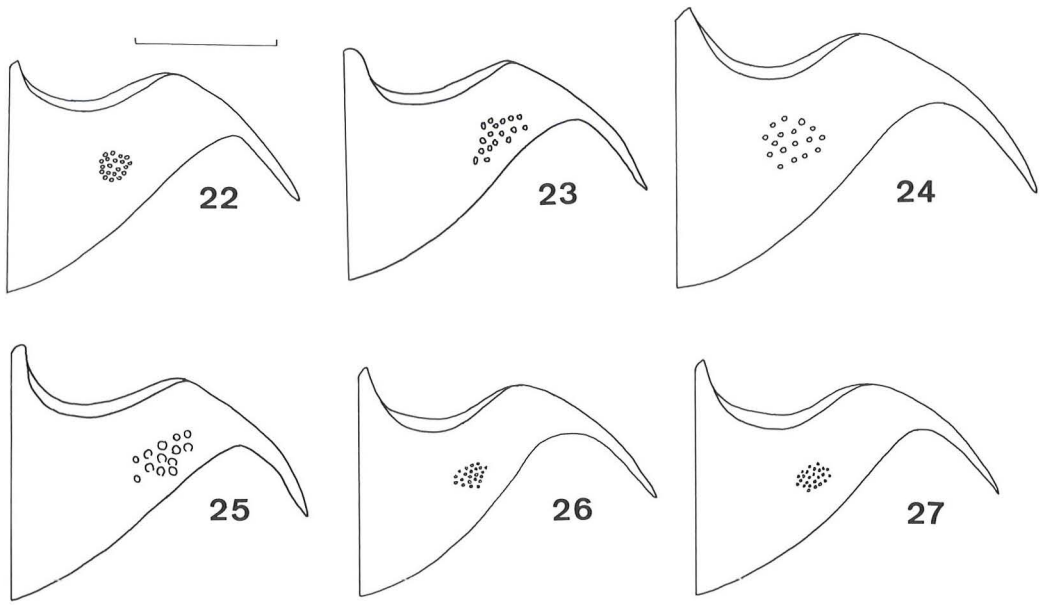
Description

Size and shape. Body length 4.2–4.8 mm (TL 4.43±0.14, MW 2.36±0.09, TL/MW 1.88±0.03, 5♂5♀ Asella, Arssi province, 2400 m). Head relatively small; maximum width 0.54–0.57 of MW. Lateral outline with marked constriction at level of pronotal base or not (Figs. 4 and 5). — *Colour* (Figs. 4 and 5). Head yellow with black colour more or less spreading from the narrow base to cover the entire head except for the interocular spot. Pronotum yellow with black colour restricted to pair of mediobasal spots or more spread; sometimes entire pronotum black. Legs rufotestaceous to piceous. — *Sculpture*. Metasternal wing and metacoxal plate with fine reticulation and subrugose punctation; size of



Figs. 4–21. *Nebrioporus*, habitus (4, 5, 10, 13, 16, 17) (vertical scale bar = 2.0 mm), and apex of elytra (6–9, 11, 12, 14, 15, 18–21) (horizontal scale bar = 1.0 mm), dorsal aspect. — 4–9. *N. abyssinicus* (Sharp); 4, 6, 7 Ethiopia, Arssi province; 5, 8, 9. Tanzania, Mt. Kilimanjaro. — 10–12. *N. cooperi* (Omer-Cooper), Ethiopia, Arssi province. — 13–15. *N. scotti* (Omer-Cooper), Ethiopia, Gondar province. — 16–21. *N. tellinii* (Régimbart), Ethiopia, Arssi province; 16, 18, 19 Ashabaka River; 17, 20, 21. Bilalo. — Male 6, 8, 10, 11, 13, 14, 18, 20; female 4, 5, 7, 9, 12, 15–17, 19, 21.

punctures varying from relatively small to large (Figs. 22 and 23). Abdominal sterna with fine reticulation and coarse punctation; punctures on sterna 1 and 2 often larger than those on metasternal wing; punctation on sternum 6 fine and dense. — *Structural features*. Elytron with anterolateral sinuation weak or absent; subapical spine delicate; apical projection slight (Figs. 6–9). Metasternal wing relatively broad (Figs. 22 and 23), WC/WS 2.3–3.0 (2.58±0.13, 5♂5♀ as above). Metacoxal lines strongly diverging anteriorly. — *Male*. Anterior protarsal claw slightly shorter than posterior claw or not (Figs. 28–31). Median lobe of aedeagus relatively robust (Figs. 40–43); paramere with subapical membraneous sac and ventral subapical broadly rounded angle (Figs. 52 and 53). — *Female*. Pronotum narrowed; in most specimens only slightly, but sometimes very strongly and at level of hind angles much narrower than elytra (Fig. 5). Abdominal sternum 6 with slight apical projection. — *Variation*. Specimens from Mt. Kili-



Figs. 22–27. *Nebrioporus*, left metasternal wing, ventral aspect. Punctation shown only for a restricted area. — 22–23. *N. abyssinicus* (Sharp); 22 Ethiopia, Arssi province; 23 Tanzania, Mt. Kilimanjaro. — 24. *N. cooperi* (Omer-Cooper), Ethiopia, Arssi province. — 25. *N. scotti* (Omer-Cooper), Ethiopia, Gondar province. — 26–27. *N. tellinii* (Régimbart), Ethiopia, Arssi province; 26 Ashabaka River; 27 Bilalo. — Scale bar = 0.5 mm.

manjaro and Mt. Meru differ from those of the Arssi province mainly in the following characters: (1) male protarsal claws of equal length, (2) female pronotum narrow with lateral margins strongly narrowed towards base, and (3) body of dark colour with head and pronotum mostly black. However, a series from Fagliena in Eritrea (in MCSNG) agree with the former in characters 1 and 3. Variation is also found in body size and shape, and coarseness of ventral punctation. The Kilimanjaro and Meru populations may merit subspecific rank, chiefly due to the unique shape of the female pronotum, with the available name *atratus*. However, the material at hand is too limited to allow firm conclusions on geographic variation.

Distribution

Specimens were examined from the following provinces in Ethiopia: Eritrea, Wollo, Shoa and Arssi. Régimbart (1922) reported it from Illubabur. Outside Ethiopia it is known from Mt. Kilimanjaro and Mt. Meru in Tanzania and from Lake Nakuru in Kenya. The specimens mentioned by Guignot (1936) from Kijabé in Kenya have not been studied, and their identity must be regarded as uncertain.

Habitat

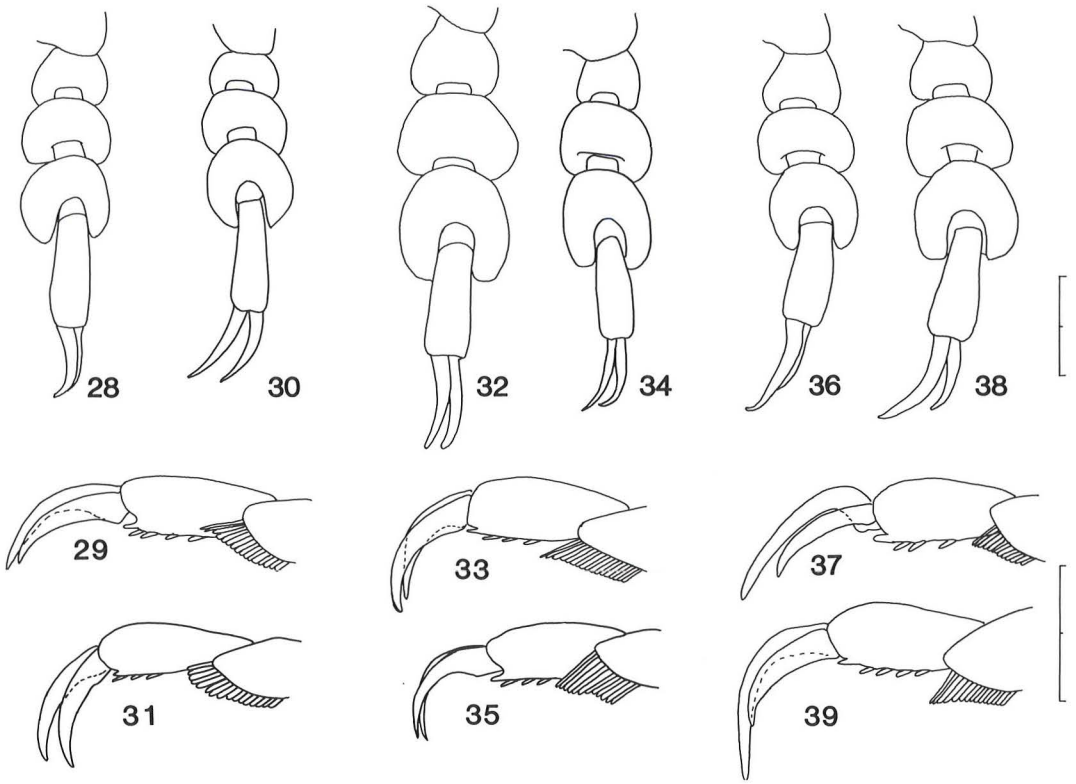
In the Arssi province, it was abundant in various running waters and ponds between 2350 and 3100 m.

Nebrioporus cooperi (Omer-Cooper)

Figs. 1, 2, 10–12, 24, 32, 33, 44, 45 and 54

Deronectes cooperi Omer-Cooper, 1931:781, 782 + pl. 9:8 (orig. descr.); Guignot 1959b:355 (faun.).
Potamonectes cooperi (Omer-Cooper): Guignot 1959a:460 (descr., faun.).

Type locality. Adis Ababa, Shoa province, Ethiopia.
Type material. Lectotype ♂ here designated: "Type", "Abyssinia: British Legation. Pond No. 1. 8,100 ft.

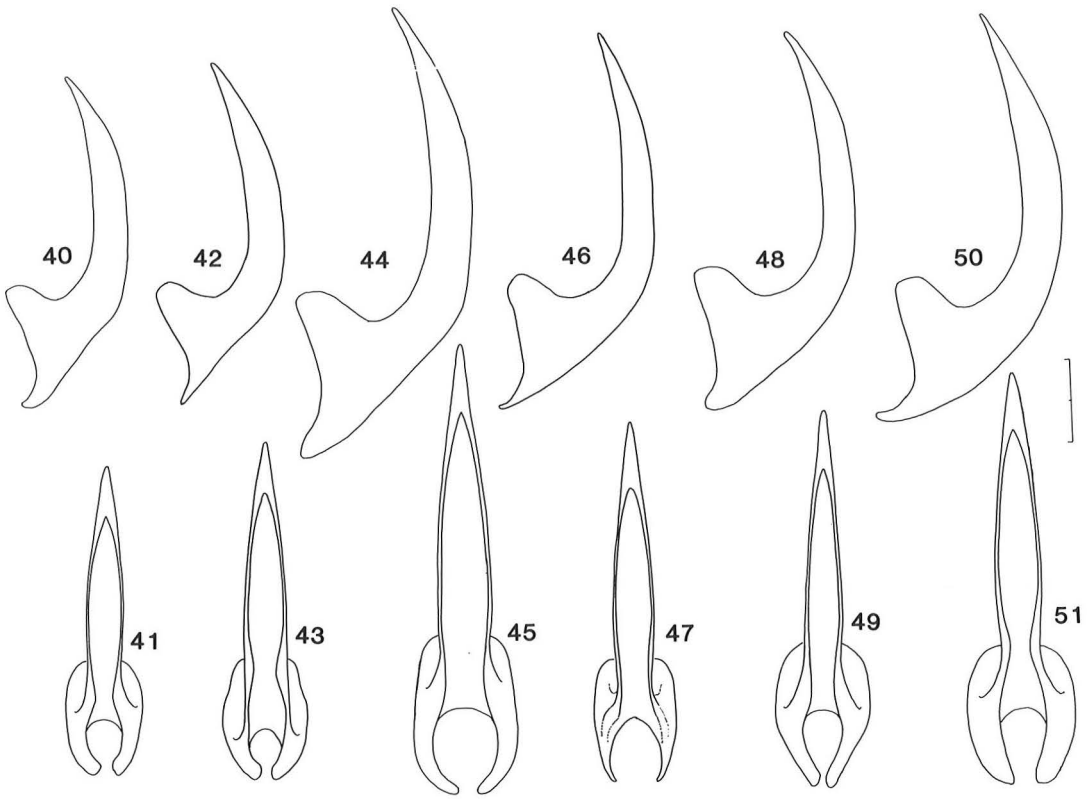


Figs. 28–39. *Nebrioporus*, male protarsus; dorsal (28, 30, 32, 34, 36, 38) or lateral (29, 31, 33, 35, 37, 39) aspect. — 28–31. *N. abyssinicus* (Sharp); 28–29 Ethiopia, Arssi province; 30–31 Tanzania, Mt. Kilimanjaro. — 32–33. *N. cooperi* (Omer-Cooper), Ethiopia, Arssi province. — 34–35. *N. scotti* (Omer-Cooper), Ethiopia, Gondar province. — 36–39. *N. tellinii* (Régimbart); 36–37 Ashabaka River; 38–39 Bilalo. — Scale bar for the even (upper) and for the odd numbers (lower) = 0.2 mm.

8.ix.1926. J. Omer-Cooper", "Brit. Mus. 1933–136", "*Deronectes Cooperi* O-C Det. J. Omer-Cooper", and my lectotype label (BMNH).

Description

Size and shape. Body length 5.2–6.0 mm (TL 5.76±0.13, MW 2.99±0.06, TL/MW 1.92±0.02, 5♂5♀ Bilalo, Arssi province, 2500 m). Head relatively large; maximum width 0.60–0.62 of MW. Lateral outline with slight constriction at level of pronotal base or not (Fig. 10). — *Colour* (Fig. 10). Head yellow with black base and interior eye margin. Pronotum yellow with black colour restricted to pair of mediobasal spots or sometimes covering entire disc. Elytral vittae more or less fused. Legs rufotestaceous, metatibia and -tarsus sometimes darker. — *Sculpture*. Metasternal wing and metacoxal plate with fine reticulation and coarse punctation; punctures well separated and relatively large (Fig. 24). Abdominal sterna with fine reticulation and coarse punctation; punctures on sterna 1 and 2 subequal in size to those on metasternal wing; punctation on sternum 6 fine and dense. — *Structural features*. Elytron with weak anterolateral sinuation; subapical spine strong; apical projection marked (Figs. 11 and 12). Metasternal wing relatively broad (Fig. 24), WC/WS 2.6–3.3 (3.06±0.23, 5♂5♀ as above). Metacoxal lines slightly diverging anteriorly. — *Male*. Protarsal claws simple, of equal length (Figs. 32 and 33). Median lobe of aedeagus relatively slender (Figs. 44 and 45);



Figs. 40–51. *Nebrioporus*, median lobe of aedeagus, lateral (even numbers) and dorsal aspect (odd numbers). — 40–43. *N. abyssinicus* (Sharp); 40–41 Ethiopia, Arssi province; 42–43 Tanzania, Mt. Kilimanjaro. — 44–45. *N. cooperi* (Omer-Cooper), Ethiopia, Arssi province. — 46–47. *N. scotti* (Omer-Cooper), Ethiopia, Gondar province. — 48–51. *N. tellinii* (Régimbart), Ethiopia, Arssi province; 48–49 Ashabaka River; 50–51 Bilalo. — Scale bar = 0.2 mm.

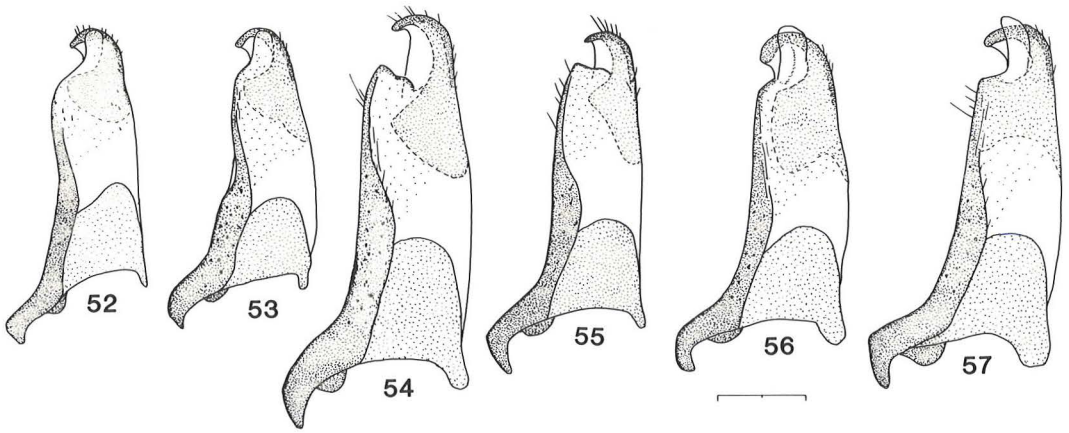
paramere without subapical membraneous sac and ventral subapical at an acute angle (Fig. 54). — *Female*. Abdominal sternum 6 with strong apical projection. — *Variation*. The individual variation in size and colour is pronounced. The metasternal wing is normally broad, but in occasional specimens more narrow. The punctation on the metasternal wing and metacoxal plate is more or less sparse and the size of the punctures shows considerable variation.

Distribution

It is known from the following provinces in Ethiopia: Gondar (Simien Mts., leg. Scott 1952, 3000 m, BMNH), Shoa (type series), Arssi (leg. S.Persson, 1988–1989 45 inds, 2350–3100 m), and Bale (Dinshu 3100 m, leg. G. de Rougemont 1971, MRAC). The specimens from Mt. Kilimanjaro in Tanzania reported on by Guignot (1959a) in fact belong to *N. abyssinicus* var. *atratus* (2♂1♀ seen in MRAC). From Shoa, I have also seen specimens from a tributary of the Abo River and from the Kosso River (Harrison & Hynes 1988, stations 2A & 17).

Habitat

In the Shoa province it occurred in various-sized ponds, with plenty of vegetation at about 2400 m (Omer-Cooper 1930:203 + pl. 3:6, 1931). At Bilalo, 5 km S of Asella it was abundant in a small stream with pools at 2500 m above sea level. At this site all species of the group, except



Figs. 52–57. *Nebrioporus*, paramere, external aspect. — 52–53. *N. abyssinicus* (Sharp); 52 Tanzania, Mt. Kilimanjaro; 53 Ethiopia, Arssi province. — 54. *N. cooperi* (Omer-Cooper), Ethiopia, Arssi province. — 55. *N. scotti* (Omer-Cooper), Ethiopia, Gondar province. — 56–57. *N. tellinii* (Régimbart), Ethiopia, Arssi province; 56 Ashabaka River; 57 Bilalo. — Scale bar = 0.2 mm.

N. scotti, were found. Most specimens were collected in late May and early June. A few specimens were found in the outlet of a small lake at Mt. Galama, 3100 m above sea level.

Nebriporus scotti (Omer-Cooper)

Figs. 13–15, 25, 34, 35, 46, 47 and 55

Deronectes scotti Omer-Cooper, 1931:781 + pl. 9:6 (orig. descr.).

Potamonectes scotti (Omer-Cooper): Guignot 1952:4, 5 (descr. male, faun.); Guignot 1959a:459, 460 (descr., distr.).

Type material. Lectotype ♀ here designated: "Type", "Abyssinia: Mulu, above Muger Valley, circa 8,000 ft. 18–23.xii.1926. Dr. H.Scott.", "Brit. Mus. 1933-136", "From mountain streams", "*Deronectes Scotti* O.-C. Det. J.Omer-Cooper", and my lectotype label (BMNH).

Type locality. Mulu, Shoa province, Ethiopia.

Described from two females, of which only one was found.

Description

Size and shape. Body length 4.6–5.0 mm (TL 4.89±0.11 mm, MW 2.59±0.07 mm, TL/MW 1.89±0.03, 6♂2♀, Tucul Dangia, Gondar province). Head relatively large; maximum width 0.54–0.57 of MW. Lateral outline continuous, or with a slight constriction at level of pronotal base (Fig. 13). — *Colour* (Fig. 13). Head yellow with black base and broad interior eye margin. Pronotum yellow with mediobasal black spots fused and continuous with posterior margin; frequently only lateral margins yellow. Elytron with vitta 5 in most specimens not reaching base. Legs rufopiceous; metatibia and -tarsus piceous to black. — *Sculpture*. Metasternal wing and metacoxal plate with fine reticulation and coarse punctation (Fig. 25); punctures relatively large and closely set. Abdominal sterna with fine reticulation and coarse punctation; punctures on sterna 1 and 2 subequal in size to those on metasternal wing; punctation on sternum 6 fine and dense. — *Structural features*. Elytron with weak anterolateral sinuation; subapical spine strong; apical projection marked (Figs. 14 and 15). Metasternal wing relatively broad (Fig. 25), WC/WS 2.4–3.0 (2.69±0.20, 6♂2♀ as above). Metacoxal lines slightly diverging anteriorly. — *Male*. Protarsal claws simple, of equal length (Figs. 34 and 35). Median lobe of aedeagus relatively slender (Figs. 46 and 47); paramere without subapical membraneous sac and ventral subapical at a right angle (Fig. 55). — *Female*. Pronotum slightly narrower than elytral base. Abdominal

sternum 6 with strong apical projection. — *Variation*. The limited material available for study permits no conclusions on variation.

Distribution

This species is restricted to Ethiopia. In the Shoa province, it is known from the type locality (Mulu, above Muger Valley) and from Let. Marefia (1♂ leg. Ragazzi 1885, MCSNG). The specimens from Addis Ababa listed by Guignot (1956) have not been located. Known also from Tucul Dangia, F. Maana in the Gondar province (leg. Danielli 1937, 5♂2♀ MCSNG) [specimens described by Guignot (1952)].

Habitat

At Mulu, it was collected in two small mountain streams flowing into the Muger River at 2400 m above sea level (Omer-Cooper 1930).

Nebrioporus tellinii (Régimbart)

Figs. 16–21, 26, 27, 36–39, 48–51, 56 and 57

Hydroporus tellinii Régimbart, 1904:1 (orig. descr.); Régimbart 1905:202, 203 (descr., faun.).
Deronectes (*Potamodytes*) *tellinii* (Régimbart): Zimmermann 1920:129 (cat.).
Potamonectes tellinii (Régimbart): Guignot 1959a:459 (descr., distr.); Rocchi 1975:269–273 (descr., neotype des.).
Potamonectes scotti (Omer-Cooper): Guignot 1956:395 (faun.).
Potamonectes abyssinicus (Sharp): Harrison & Hynes 1988:11 (faun.).

Type locality. Adi-Caiè (=Adi Caieh), Eritrea.
Type material. Neotype ♂ designated by Rocchi (1975), examined and kept in MZSF.

Rocchi (1975) considered the type material lost and designated a neotype from the same region and identified by Régimbart (1905) in order to establish the identity of this species.

Description

Size and shape. Body length 4.3–4.9 mm (TL 4.70±0.07 mm, MW 2.54±0.06 mm, TL/MW 1.85±0.03, 5♂5♀ Ashabaka River, 10 km S of Sagure, Arssi province, 2500 m; TL 4.77±0.09 mm, MW 2.45±0.06 mm, TL/MW 1.95±0.03, 5♂5♀ Arsi: Bilalo). Head relatively large; maximum width 0.59–0.64 of MW. Lateral outline with slight constriction at level of pronotum or not (Figs. 16 and 17). — *Colour* (Figs. 16 and 17). Head dorsally yellow with black base and internal eye margin. Pronotum yellow with black more-or-less extensive mediobasal marks that usually are fused and sometimes cover the entire disc; narrow anterior and posterior margins black. Elytron yellow with black suture and seven more-or-less fused vittae; vitta 1 reduced anteriorly and vitta 5 normally reaching base. Legs rufotestaceous to rufopiceous; metatibia and -tarsus often black. — *Sculpture*. Metasternal wing and metacoxal plate with very fine and dense punctation (Figs. 26 and 27). Abdominal sterna with fine and dense punctation. — *Structural features*. Elytron with modest to strong anterolateral sinuation; subapical spine weak; apical projection slight (Figs. 18–21). Metasternal wing narrow (Figs. 26 and 27), WC/WS 3.0–4.4 (3.91±0.27, 5♂5♀ Ashabaka River; 3.38±0.35, 5♂5♀ Bilalo). Metacoxal lines slightly diverging anteriorly. — *Male*. Anterior protarsal claw much shorter than posterior subbasally arcuate claw (Figs. 36–39). Median lobe of aedeagus relatively slender (Figs. 48–51); paramere with subapical membraneous sac and ventral subapical at a slightly acute to slightly obtuse angle (Figs. 56 and 57). — *Female*. Pronotum often narrow; normally narrower than base of elytra (Fig. 17). Abdominal sternum 6 with slight apical projection. — *Variation*. This species is highly variable in many characters. The extension of the dorsal black markings varies from very limited to extensive. The body shape varies from narrow to broad. The length of the male protarsal claws shows some variation but they are always strongly unequal. The paramere has a ventral subapical angle that varies from slightly obtuse to slightly acute, but it is always marked. In the Arssi province, the specimens from the Ashabaka River are much darker and broader than those from Bilalo or Mt. Galama. The same variation was also found in material from other parts of Ethiopia. Nine specimens from Eritrea, including the neotype, are slightly smaller (TL 4.43±0.08 mm) than those from the Arssi province. Rocchi (1975:270) gave the body length as 4.1–4.4 mm.

Distribution

The species is restricted to Ethiopia, where it has been found in the following provinces: Eritrea (neotype), Gondar (Simien Mts. 3000 m, leg. Scott 1952, BMNH), Shoa (Fallé & Let. Marefia, leg. Ragazzi 1885; Acachi leg. Ragazzi 1889 MCSNG; Addis Ababa leg. Kovacs HNHM), and Arssi (96 inds., leg. S.Persson 1988–1989, 2500–3100 m; Mts Titchio, 16 km E of Dighellu, 3200–3500 m, 1972 MAC). The specimens listed as *P. abyssinicus* by Harrison & Hynes (1988) are in fact *N. tellinii*, and I have seen specimens from their stations 1, 2A, 5, 6, 14, 17, 18 and 32 (in MZH), i.e. at 2450–2900 m in the Shoa province.

Habitat

In the Arssi province it was collected in various running waters from 2500 to 3100 m. Two streams were small and seasonal, and two others were more permanent, 3–10 m wide and with gravel on the bottom and one of them with a rich vegetation. At all four sites, *N. tellinii* co-occurred with *N. abyssinicus*, and in the more seasonal streams also with *N. cooperi*.

Species dubium: *Nebrioporus septemvittatus* (Régimbart)

Hydroporus septemvittatus Régimbart, 1883:228 (orig. descr.); Régimbart 1895:19 (descr.).
Deronectes (Potamodytes) septemvittatus (Régimbart): Zimmermann 1920:128 (cat.).
Potamonectes septemvittatus (Régimbart): Guignot 1959a:458 (descr., distr.); Rocchi 1975:273.

Type locality. "Afrique centrale: Bahr-el-Abiad" (= Sudan, White Nile).

Type material. Described from two specimens in the Dutch Museum of Natural History, Leiden. These two female syntypes were examined by Rocchi (1975) and returned to the museum where they can no longer be found (J. Krikken in litt.).

Rocchi (1975) did not select a lectotype but concluded that the identity of the species could not be established as only females were available. According to Rocchi (in litt.), one syntype is reminiscent of *N. scotti* with shiny dorsum and elytron with a strong apical projection, and the other is like *N. abyssinicus* with dull dorsum and elytron with a weak apical projection. As the White Nile partly flows from the highlands of SW Ethiopia, it seems highly probable that *N. septemvittatus* is conspecific with one of the four Ethiopian species. If the two syntypes belong to different species, a lectotype should be designated that promotes stability.

5. Larval morphology

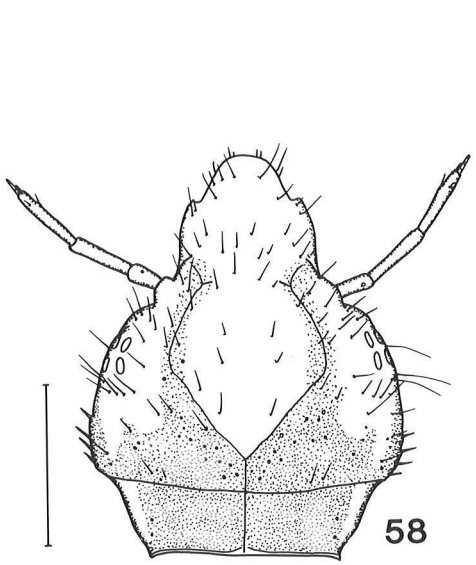
Nine larvae collected in Ethiopia, together with adults of *Nebrioporus,* were examined. In these larvae, the last abdominal segment is very short with a small siphon, and the urogomphi are very long with numerous secondary setae. The legs have setal fringes on femora, tibiae and tarsi (not protarsus).

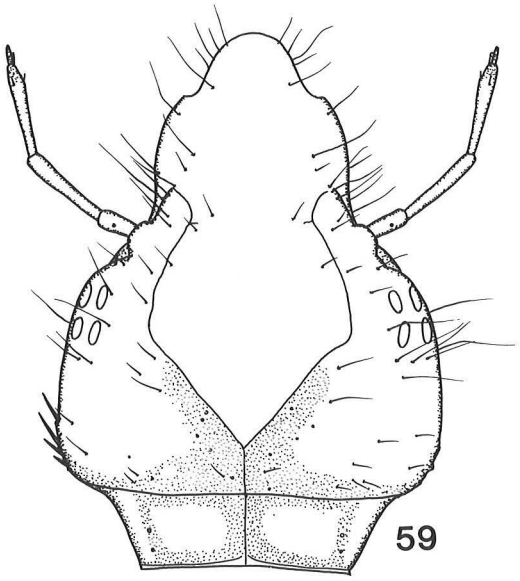
As regards the generic composition of the Hydroporini in Ethiopia (Nilsson & Persson in press), these and other characters provide evidence that the larvae belong to *Nebrioporus*; in Ethiopia only represented by the *abyssinicus* group. Larvae of *Peschetius* are unknown, but in Ethiopia this genus is only known from one record from the Illubabur province (Nilsson & Persson in press).

Two third-instar larvae of *Nebrioporus* from the Arssi province were examined. At both sites where these larvae were collected (Bilalo 22.ix.1988 & Mt. Galama 15.i.1989, leg. S. Persson), *N. abyssinicus* was strongly dominating and *N. cooperi* and *N. tellinii* were both present but rare.

One second-instar and seven third-instar larvae collected in the Shoa province (Harrison & Hynes 1988: 29.x.1983–12.i.1984) were also studied together with *N. tellinii* and *N. cooperi*. Four of the third-instar larvae (from stations 5, 17 & 18) are markedly larger than the others (from stations 5 & 17), which are very similar to those of the Arssi province.

The larger larvae differ from the smaller ones also in their more restricted dark pattern on the head, and unpigmented setal sockets ventrally on the abdomen. An interesting character observed in the studied larvae is the short internal extension of the frontal suture at the anterior bend. The length of this extension varies and it is almost





Figs. 58–59. *Nebrioporus*, third-instar larva, head without mouth-parts, dorsal aspect. — 58. *N.* type A. — 59. *N.* type B. — Scale bar = 0.5 mm.

absent in some larvae. This character is seemingly unique for the larvae of the *abyssinicus* group.

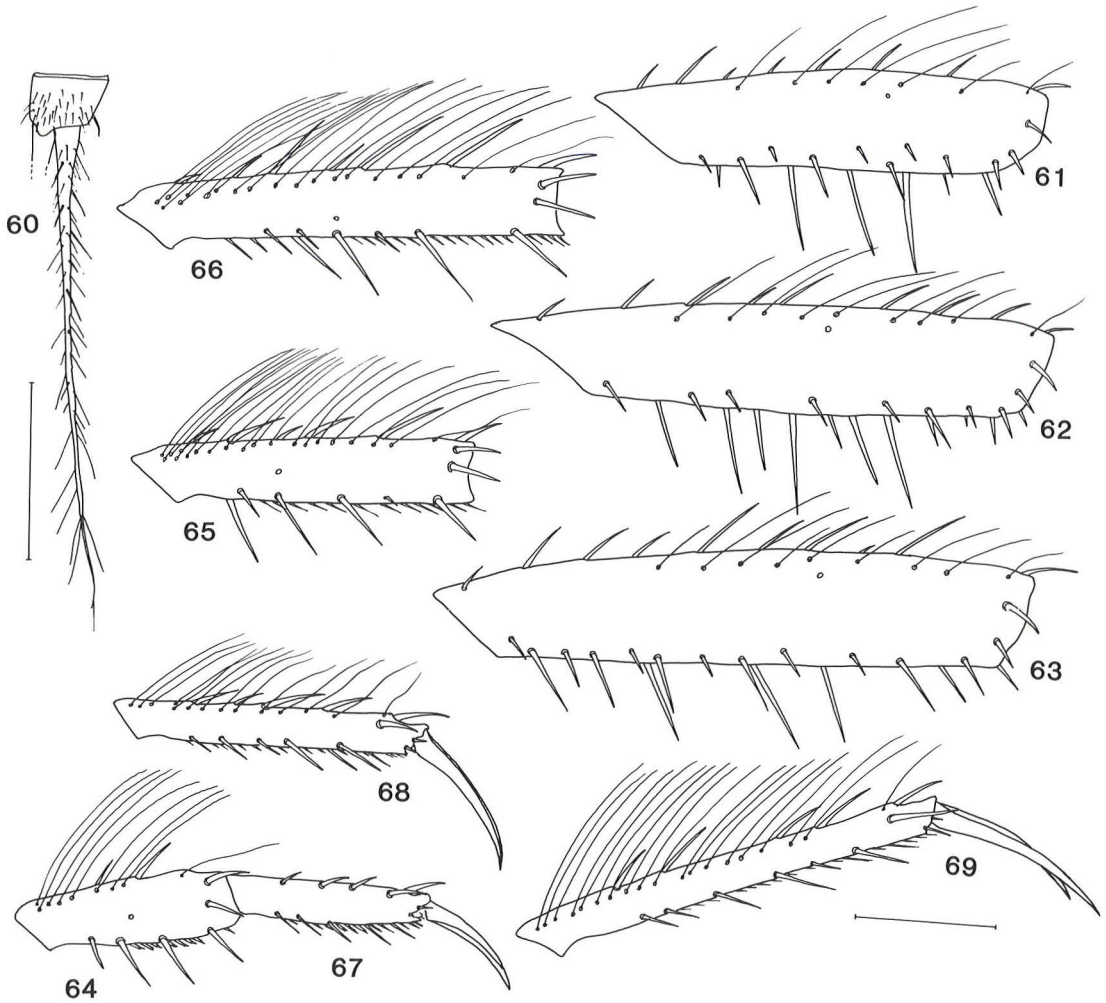
The two types of third-instar larvae recognized are described separately below. Most likely, the larger type (B) represents *N. cooperi* and the smaller type (A) *N. abyssinicus* and/or *N. tellinii*.

Nebrioporus type A

Colour. Head (Fig. 58) pale yellowish brown; neck brown, except sublaterally and along frontal suture; antenna and palpi pale yellow, apically brown. Body dorsally brown; thoracic terga with sublateral yellowish streaks; abdominal terga 1–4 with submedian yellowish streaks. Abdominal segments 1–6 ventrally with setal sockets pigmented. Legs and urogomphus testaceous. — *Head* (Fig. 58). HL 1.23–1.33 mm; HW 0.97–0.99 mm; HL/HW 1.27–1.35. With 6–7 temporal spines. Nasale with distinct lateral notches. Frontal suture with short internal extension at anterior bend. — *Body*. Length about 4.9 mm. Length of LAS 0.34–0.36 mm; siphon short (Fig. 60). Length of U1 2.28–2.44 mm; length of U2 about 0.5 mm; urogomphus with numerous secondary setae (Fig. 60); seta on U2 subapically attached. — *Legs* (Figs. 61–68). Each coxa, femur, tibia and tarsus with numerous secondary setae, including long natatorial PD setae in the following numbers: femur 6, 8, 8, tibia 8, 19, 18, and tarsus 0, 13, 18, on fore-, mid- and hindleg, respectively.

Nebrioporus type B

Colour. Head (Fig. 59) pale yellowish brown with neck partly and frontal suture basally brown. Thoracic terga testaceous with ill-defined brown spots; abdominal terga brownish, terga 7 and 8 of a lighter colour. Abdominal terga 1–6 ventrally with setal sockets not pigmented. — *Head* (Fig. 59). HL 1.54–1.66 mm; HW 1.19–1.23 mm; HL/HW 1.27–1.39. With 7–9 temporal spines. Nasale with distinct lateral notches. Frontal sutures with short internal extensions at anterior bend or not. — *Body*. Length 6.5–8.0 mm. Length of LAS 0.40 mm; siphon short. Length of U1 2.67–2.85 mm; urogomphus with numerous secondary setae. — *Legs*. Each coxa, femur, tibia and tarsus with numerous secondary setae, including long natatorial setae in the following numbers: femur 8, 11, 6, tibia 7, 19, 21, and tarsus 0, 19, 23, on fore-, mid- and hindleg, respectively.



Figs. 60–69. *Nebrioporus* type A, third-instar larva. — 60. Last abdominal segment and right urogomphus, dorsolateral aspect. — 61–68. Leg segments, posterior aspect; 61–63 Femur; 64–66 Tibia; 67–69 Tarsus; 61, 64, 67 Fore leg; 62, 65, 68 Mid leg; 63, 66, 69 Hind leg. — Different scale bars for 60 (vertical = 1.0 mm), and 61–69 (horizontal = 0.2 mm).

6. Discussion

The monophyly of the *abyssinicus* group is established from the shared presence of an anterior sinuation of the lateral elytral margin (Figs. 1 and 2). The sculpture of the ventral body surface makes this group one of the more basal lineages of the subgenus *Nebrioporus*. In this subgenus, a similar state was only observed in *N. kilimandjarensis*, but in this species the microreticulation is reduced (almost as in *Scarodytes*) and the metacoxal plate is rugose. Other unique characters of this species are the laterally reduced pronotum, the thickened dorsal part of the metacoxal processes, and the large size. I have found no synapomorphy of *N. kilimandjarensis* and the *abyssinicus* group.

Of the South African species, *N. vagrans* (Omer-Cooper, 1953) and *N. solivagus* (Omer-Cooper, 1965) both lack the subapical elytral spine and were assigned to the subgenus *Zimmermannius* Guignot by Nilsson & Angus (1992) with some reservation. *N. capensis* (Omer-Cooper, 1953) has the elytral spine, the ventral

surface, including the metafemur posterior of the setal row, and the dense punctation of most species of the subgenus *Nebrioporus*. This species was placed in the *depressus* group by Nilsson & Angus (1992). Consequently, a close relationship between the *abyssinicus* group and any of the South African species is rejected as they all lack the anterolateral sinuation of the elytron.

The reconstruction of the phylogeny of the four species of the *abyssinicus* group is made difficult by the low number of useful characters found. The strongly modified male protarsal claws and the fine and dense ventral body punctation both seemingly represent autapomorphies of *N. tellinii*.

The shape of the ventral subapical angle of the paramere and the presence or absence of a membraneous sac provide two characters of potential phylogenetic value. However, as the polarities of these two characters are difficult to establish, I have decided not to carry the analysis further at this stage.

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