A mountain of millipedes VII: The genus *Eviulisoma* Silvestri, 1910, in the Udzungwa Mountains, Tanzania, and related species from other Eastern Arc Mountains. With notes on *Eoseviulisoma* Brolemann, 1920, and *Suohelisoma* Hoffman, 1963 (Diplopoda, Polydesmida, Paradoxosomatidae)

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**Abstract.** Twenty-two new species of the genus *Eviulisoma* Silvestri, 1910, from the Eastern Arc Mountains, Tanzania, are described: *E. acaciae* sp. nov., *E. aequilobatum* sp. nov., *E. akkariae* sp. nov., *E. angulatum* sp. nov., *E. articulatum* sp. nov., *E. biquintum* sp. nov., *E. cetafi* sp. nov., *E. chitense* sp. nov., *E. commelina* sp. nov., *E. coxale* sp. nov., *E. ejti* sp. nov., *E. grumslingslak* sp. nov., *E. kalimbausiense* sp. nov., *E. navuncus* sp. nov., *E. nessiteras* sp. nov., *E. ottokrausi* sp. nov., *E. paradiisiacum* sp. nov., *E. sternale* sp. nov. and *E. zebra* sp. nov. from the Udzungwa Mts, *E. culter* sp. nov. from the Rubeho Mts and *E. kangense* sp. nov. from the Kanga Mts. *Eviulisoma kwabuniense* Kraus, 1958, and *E. dabagaense* Kraus, 1958, both from the Udzungwa Mts, are redescribed based on new material. Notes are provided on *E. iuloideum* (Verhoeff, 1941) based on type material. *Eoseviulisoma* Brolemann, 1920, is synonymized under *Eviulisoma*, based on newly collected material of *E. julinum* (Attems, 1909), type species of *Eoseviulisoma*. New material of *Suohelisoma ulugurense* Hoffman, 1964, type species of *Suohelisoma* Hoffman, 1964, has revealed that the gonopod structure is more similar to that of *Eviulisoma* than originally thought, but *Suohelisoma* is retained as a valid genus. Four species groups are recognized among *Eviulisoma* species from the Udzungwa Mts, but the need for a revision of the entire genus is emphasized. Two types of epizoootic fungi are recorded from *Eviulisoma* spp., and an enigmatic amorphous mass, which may be a kind of plugging substance, is recorded from the gonopod tips and excavated sixth sternum of several species.

**Keywords.** Taxonomy, new species, epizoootic fungi, copulatory plug.


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Introduction
This is the seventh in a series of articles dealing with the millipede fauna of the Udzungwa Mts. For general information on the Udzungwa Mts, see Enghoff (2014) and Scharff et al. (2015).
The previous six articles in the series (Enghoff 2014, 2016a, 2016b, 2016c, 2018; Enghoff & Frederiksen 2015) all deal with the family Odontopygidae, but the present contribution concerns the genus *Eviulisoma* Silvestri, 1910, of the very large family Paradoxosomatidae, which is distributed over all zoogeographical regions, except the Nearctic (Enghoff et al. 2015).

The large genus *Eviulisoma*, as understood by recent workers (Jeekel 2003; Nguyen & Sierwald 2013; VandenSpiegel & Golovatch 2014), is endemic to the African continent. *Eviulisoma* belongs to the ‘ecarinate’ paradoxomatids in which the paranota are very strongly or even completely reduced, resulting in a virtually cylindrical body (cf. the name which alludes to the ‘julid’ appearance of these millipedes). The original description (Silvestri 1910), although possibly based on a misidentified type species (Jeekel 2003), mentions several important characters and is accompanied by quite a nice gonopod drawing.

So far, only four species of *Eviulisoma* have been described from the Eastern Arc Mts, viz., *E. dabagaense* Kraus, 1958, and *E. kwabuniense* Kraus, 1958, from the Udzungwa Mts, and *E. taita* VandenSpiegel & Golovatch, 2014, and *E. taitaorum* VandenSpiegel & Golovatch, 2014, from the northernmost part of the Eastern Arcs, the Taita Hills in southern Kenya.

Twenty new species of *Eviulisoma* from the Udzungwa Mts are described here, as are two additional species, obviously closely related to Udzungwan species, but coming from other Eastern Arc mountain blocks (Rubeho Mts and Kanga Mts). For the sake of simplicity these two species are included wherever “Udzungwan species of *Eviulisoma*” are referred to. When only species from the Udzungwa Mts themselves are meant, the term “Udzungwan s. str. species” is used. Figure 1 shows one of the more strikingly coloured new species described here.

![Fig. 1. *Eviulisoma zebra* sp. nov., one of the strikingly marked species from the Udzungwa Mts. Photograph by Martin Nielsen.](image)
Material and methods

The vast majority of material comes from the zoological collections of the Natural History Museum of Denmark, University of Copenhagen (ZMUC). Much of the material was collected during several field trips to the Udzungwa Mts by ZMUC staff and students, but a very substantial part of it was collected by the NGO Frontier Tanzania (https://frontiergap.com/About-Us/Background-Mission.aspx) and was subsequently deposited in ZMUC. Additional material derives from the collections of the Virginia Museum of Natural History (VMNH), where the very large collection of Tanzanian millipedes accumulated by Richard L. Hoffman (1927–2012) is housed.

Marshall et al. (2001a) described how the material from West Kilombero FR was collected: “Ground-dwelling millipedes were primarily sampled by timed searching of 3 m × 3 m quadrats. [...] The leaf litter and topsoil within quadrats was searched thoroughly by hand for a total of eight person hours per quadrat at all trapsites. In addition, the general proximity of all trapsites was searched for two person hours. During such searches, particular attention was paid to rotting logs, the underside of rocks and other such microhabitats, which may have been missed by the quadrat samples.” The collecting procedure in New Dabaga/Ulangambi FR was the same (Marshall et al. 2001b). Andrew R. Marshall (pers. comm.) further informs that during these campaigns the collectors had to dig down to around 15 cm to find millipedes after initially fruitless searches in the topsoil alone.

Figure 2 shows the areas from where the specimens derive. All studied specimens are from Tanzania, Udzungwa (sometimes spelled Uzungwa) Mts.

A total of 155 male specimens were examined. All samples are kept in 70% alcohol.

Specimens were examined in alcohol under a stereo microscope. Specimens for scanning electron microscopy (SEM) were cleaned with ultrasound, transferred to 96% ethanol, then to acetone, air dried, mounted on aluminium stubs or on triangles of flexible aluminium tape in turn mounted on stubs, coated with platinum/palladium and studied in a JEOL JSM-6335F scanning electron microscope.

Quite often, more than one species was present and represented by males in a sample. Under ‘Distribution and habitat’ for each species such co-occurrences are summarized in statements starting with “Collected together with …”

Descriptions

In light of the large amount of material at hand, and the modest (males) to very small/virtually non-existent (females) number of non-gonopodal differences between the studied species, only adult males are considered. In those cases where females could with some confidence be referred to a particular species, they are listed, but no separate description is given for them. Females are generally larger, especially thicker, than males.

Previous recent descriptions of species of Eviulisoma vary from extremely detailed (Jeekel 2003) to much briefer (VandenSpiegel & Golovatch 2014). I have chosen to follow the lead of the latter authors, and even to make the species description shorter still, because many of the characters specified for each species by VandenSpiegel & Golovatch (2014) hardly vary between the species from the Udzungwa Mts. Instead, these characters are treated under the generic heading.
Characters treated at species level include:

- Body length
- Midbody width
- Colour
- Length of antennae
- Paranota
- Stricture
- Pilosity of body rings
- Length of legs, relative lengths of podomeres from prefemur to tarsus
- Scopulae
- Hyoproct
- Modification of sternum 5
- Modification of sternum 6
- Gonopods

For the relative lengths of podomeres, notations such as the following are used: femur > prefemur ≈ tarsus > tibia (> postfemur. This means that femur is clearly longer than prefemur, prefemur is approximately as long as tarsus, tarsus is clearly longer than tibia, tibia is slightly longer than postfemur.

**Fig. 2.** Map of the Udzungwa Mountains, showing the location of the forest reserves (green ovals), the Udzungwa Mountains National park (red oval) and some individual mountains (yellow arrows) where specimens of *Eviulisoma* have been collected. Inset: the Eastern Arc Mountains, showing the location of the Udzungwa (blue oval), Rubeho (brown ring) and Kanga (pink ring) Mountains. Based on Marshall *et al.* (2010: fig. 1); inset by permission of the Eastern Arc Mountains Conservation Endowment Fund.
Abbreviations for morphological terms used in descriptions and illustrations

\( am \) = amorphous mass sometimes seen in excavation of sternum 6 and/or on tip of process \( map \)
\( bap \) = basal acropodital process
\( cxl \) = coxal lobe
\( exp \) = coxal process
\( dr \) = dentate ridge
\( ep \) = epiproct
\( fe \) = femur
\( fet \) = ‘femorite’
\( hy \) = hypoproct
\( iap \) = intermediate acropodital process
\( lt \) = lateral tubercle
\( map \) = mesal acropodital process
\( oz \) = ozopore
\( pk \) = pleural keel
\( pn \) = paranotum
\( pof \) = postfemur
\( pp \) = paraproct
\( prf \) = prefemur/prefemoral part of gonopod
\( ra \) = ridged area of solenophore
\( sb \) = subapical branch of \( map \)
\( sc \) = sternal cone
\( slm \) = solenomere
\( sp \) = spinneret
\( sph \) = solenophore
\( sph-d \) = dorsal lobe of \( sph \)
\( sph-i \) = intermediate lobe of \( sph \)
\( sph-p \) = slender process from \( sph \)
\( sph-v \) = ventral lobe of \( sph \)
\( sr \) = serrated ridge
\( str \) = stricture between pro- and metazonite
\( ta \) = tarsus
\( ti \) = tibia
\( tn \) = apical tines of \( map \)
\( tr \) = transverse ridges
\( tt \) = terminal tubercle

Other abbreviations used in the text

a.s.l. = above sea level
FR = Forest Reserve
NHMW = Naturhistorisches Museum, Vienna, Austria
VMNH = Virginia Museum of Natural History, VA, USA
ZMUC = Natural History Museum of Denmark (Zoological Museum), Copenhagen, Denmark
ZSM = Zoologische Staatssammlung München, Munich, Germany
**Taxonomy**

Class Diplopoda de Blainville in Gervais, 1844  
Order Polydesmida Leach, 1815  
Family Paradoxosomatidae Daday, 1889  
Subfamily Paradoxosomatinae Daday, 1889  

Tribe *Eviulisomatini* Brölemann, 1916

**Diagnosis**

Paradoxosomatidae in which paranota are very strongly reduced or virtually absent, and the ‘femorite’ of the gonopod is strongly reduced, such that solenomere, solenophore and up to two acropodital processes seem to originate directly from the end of the prefemoral part.

*Eviulisoma* is classified in the tribe *Eviulisomatini* which, according to Nguyen & Sierwald (2013) and Reboleira & Enghoff (2013), also contains *Boreviulisoma* Brolemann, 1928 (SW Palaeartic: NW Africa, SW Europe), *Eoseviulisoma* Brolemann, 1920 (Afrotropical), *Onchiurosoma* Silvestri, 1932 (Neotropical), *Scolodesmus* Cook, 1896 (Afrotropical), *Suohelisoma* Hoffman, 1964 (Afrotropical) and *Wubidesmus* Chamberlin, 1927 (Afrotropical). To these should be added *Jeekelosoma* Mauriès, 1985, raised to full generic status from subgenus under *Eviulisoma* by Enghoff & Reboleira (in prep.), and possibly *Stirosoma* Attems, 1953 (Afrotropical). See below concerning *Eoseviulisoma* and *Suohelisoma*.

In the key to Central African eviulisomatinine genera by Hoffman (1971), *Eviulisoma* keys out together with *Suohelisoma* in couplet 1 because of the ‘dorsal’ (actually cranio-distal) lobe on the mesal side of the gonopod coxa. These two nominal genera also share the strongly excavated sternum 6 (absent in a few species of *Eviulisoma*, however), a character also present in *Wubidesmus*. Variously excavated sterna 6 have been described for certain other paradoxosomatids, e.g., *Luzonomorpha pallidula* Jeekel, 2000, and *Montesecaria golovatchi* Jeekel, 2002 (Jeekel 2000, 2002), but as far as can be deduced from the descriptions, these excavations are quite different from those seen in *Eviulisoma* spp. Most eviulisomatinine genera share a strongly reduced body ring setation: two rows of very thin setae on the collum and only one row on each of the following body rings. The majority of paradoxosomatid genera have two or three rows of setae on postcollar body rings, and this character state is shared by the eviulisomatinine genera *Boreviulisoma* (Reboleira & Enghoff 2013) and *Jeekelosoma* (Mauriès 1985; Enghoff & Reboleira in prep.).

Table 1 summarizes some important characters across the eviulisomatinine genera.

**Genus *Eviulisoma* Silvestri, 1910**

*Eviulisoma* Silvestri, 1910: 463 (type species: *Iulidesmus cavallii* Silvestri, 1907: 3, by original designation).  
*Eoseviulisoma* Brolemann, 1920: 163 (as subgenus of *Eviulisoma*, elevated to full genus by Hoffman (1953); type species: *Strongylomorpha iulinum* Attems, 1909: 10, by original designation).  
*Strandiellus* Attems, 1927: 54 (synonymized by Attems (1929); type species: *Strandiellus cervicornis* Attems, 1927: 54, by original designation).  
*Himatiopus* Verhoeff, 1941: 241 (synonymized by Jeekel (1968); type species: *Himatiopus iuloideus* Verhoeff, 1941: 243, by monotypy).

**Included species**

See Table 2.
### Table 1. Comparison of eviulisominine genera.

| Boreviulisoma | Eviulisoma incl. Eoseviulisoma | Jeekelosoma | Onciurosoma | Scolodesmus | Suohelisoma | Wubidesmus |
|--------------|-------------------------------|-------------|-------------|-------------|-------------|------------|
| Paranota     | present                       | absent¹     | present     | absent or tiny | absent | absent |
| Metazonal setae | 2–3 rows             | 1 row       | 2 rows      | 1 row      | 1 row      | 1 row      |
| Process on sternum of ring 5 | no                             | present in most species | no | present | present, bilobed | a pair of tiny knobs | present |
| Sternum of ring 6 | not excavated                  | deeply excavated in most species | not excavated | not excavated | deeply excavated | deeply excavated |
| Some male femora with tubercles | yes (only some spp.)           | no          | slightly inflated | no | no | no |
| Scopulae     | no                            | yes         | no          | no         | yes         | no |
| Gonopod aperture medially divided by lamella | no                             | no          | yes         | ?          | no          | no |
| Meso-anterior lobe on gonopod coxa | yes ([*B. barrocalense*])     | yes (small) | no          | no         | yes         | no |
| Solenomere   | quite stout, distally forming a loop | flagelliform | flagelliform | flagelliform | flagelliform | flagelliform |
| Acropodital 'postfemoral' process | absent                        | one or two  | one         | not distinct from solenophore | not distinct from solenophore | absent(?) | not distinct from solenophore |
| Distribution | SW Palaearctic                | Afrotropical | Morocco      | Neotropical (S America) | Afrotropical (W Africa) | Afrotropical (E Africa) | Afrotropical (C Africa) |
| Reference(s) | Brolemann 1928; Reboleira & Enghoff 2013 | Jeekel 2003; pers. obs. | Mauriès 1985; Enghoff & Reboleira in prep. | Jeekel 1963; Golovatch 1992 | Hoffman 1953; pers. obs.⁴ | Hoffman 1964; pers. obs.⁵ | Hoffman 1971 |

¹ except for tiny keel on ring 2
² but peritremata present on poriferous rings
³ Hoffman (1953) was in doubt about the existence of a separate solenomere; dissection of the gonopod of a ♂ of *S. ventriconus* (Attems, 1931) from Ghana revealed a short, thin, flagelliform solenomere hidden inside the folds of the solenophore
⁴ 1 ♂ of *S. ventriconus* from Ghana, Cape Three Points, burnt forest, 1961, V. Schiøtz leg. and det. (ZMUC); 1 ♂ of *S. scutigenoides* (Porat, 1894) from Nigeria (East), Osomba, 56 miles from Calabar, 1963, V. Schiøtz leg. and det (ZMUC)
⁵ 1 ♂ of *S. uluguruense* Hoffman, 1964, from Tanzania, Uluguru Mts, M. Stoltze and N. Scharff leg. (ZMUC); 1 ♂, Lukwungwe West, 2100 m a.s.l., 22 Jul. 1981; 1 ♂, Lurangwe West, 1900 m a.s.l., 1 Jul. 1981
Table 2. Species of *Eviulisoma* Silvestri, 1910. (continued next page)

| Species                                      | Distribution | Source                                           |
|----------------------------------------------|--------------|--------------------------------------------------|
| *E. abnorme* (Attems, 1937) comb. nov.       | Congo        | present study                                    |
| *E. acaciae* sp. nov.                       | Tanzania     | present study                                    |
| *E. aequilobatum* sp. nov.                   | Tanzania     | present study                                    |
| *E. akkariae* sp. nov.                       | Tanzania     | present study                                    |
| *E. alluaudi* Brolemann, 1920                | Kenya        | Vandenspiegel & Golovatch 2014                   |
| *E. angulatum* sp. nov.                      | Tanzania     | present study                                    |
| *E. articulatum* sp. nov.                    | Tanzania     | present study                                    |
| *E. biquintum* sp. nov.                      | Tanzania     | present study                                    |
| *E. boranicum* Manfredi, 1939                | Ethiopia     | Nguyen & Sierwald 2013                           |
| *E. breviscutilum* sp. nov.                  | Tanzania     | present study                                    |
| *E. castaneum* Attems, 1953                  | D.R. Congo   | Nguyen & Sierwald 2013                           |
| *E. cavalli* (Silvestri, 1907)               | Uganda       | Nguyen & Sierwald 2013                           |
| *E. cervicorne* (Attems, 1927)               | “Africa”     | Nguyen & Sierwald 2013                           |
| *E. cetafi* sp. nov.                         | Tanzania     | present study                                    |
| *E. chitense* sp. nov.                       | Tanzania     | present study                                    |
| *E. commelina* sp. nov.                      | Tanzania     | present study                                    |
| *E. congicolens* (Chamberlin, 1927)          | Congo        | Nguyen & Sierwald 2013                           |
| *E. coxale* sp. nov.                         | Tanzania     | present study                                    |
| *E. culter* sp. nov.                         | Tanzania     | present study                                    |
| *E. cylindricum* Attems, 1953                | D.R. Congo   | Nguyen & Sierwald 2013                           |
| *E. cylindricum simile* Attems, 1953         | D.R. Congo   | Nguyen & Sierwald 2013                           |
| *E. dabagaense* Kraus, 1958                  | Tanzania     | Nguyen & Sierwald 2013                           |
| *E. debile* Attems, 1938                     | D.R. Congo   | Nguyen & Sierwald 2013                           |
| *E. egregium* Attems, 1938                   | D.R. Congo   | Nguyen & Sierwald 2013                           |
| *E. ejti* sp. nov.                           | Tanzania     | present study                                    |
| *E. fossiger* (Carl, 1909)                   | Tanzania     | Nguyen & Sierwald 2013                           |
| *E. graueri* Attems, 1944                    | Tanzania     | Nguyen & Sierwald 2013                           |
| *E. grumslingslak* sp. nov.                  | Tanzania     | present study                                    |
| *E. insulare* Brölemann, 1920               | Congo        | Nguyen & Sierwald 2013                           |
| *E. iugans* (Chamberlin, 1927)               | Congo        | Nguyen & Sierwald 2013                           |
| *E. itolideum* (Verhoeff, 1941)              | Tanzania     | Nguyen & Sierwald 2013                           |
| *E. jeanneli* Brölemann, 1920                | Kenya        | Nguyen & Sierwald 2013                           |
| *E. julinum* (Attems, 1909)                  | Tanzania     | present study                                    |
| *E. kalimbasiensi* sp. nov.                  | Tanzania     | present study                                    |
| *E. kangaense* sp. nov.                      | Tanzania     | present study                                    |
| *E. kirimeri* Vandenspiegel & Golovatch, 2014| Kenya        | Vandenspiegel & Golovatch 2014                   |
| *E. kakamega* Vandenspiegel & Golovatch, 2014| Kenya        | Vandenspiegel & Golovatch 2014                   |
| *E. kwabuniense* Kraus, 1958                 | Tanzania     | Nguyen & Sierwald 2013                           |
| *E. lanceolatum* Attems, 1953                | D.R. Congo   | Nguyen & Sierwald 2013                           |
| *E. muturanum* Attems, 1937                  | D.R. Congo   | Nguyen & Sierwald 2013                           |
| *E. navuncus* sp. nov.                       | Tanzania     | present study                                    |
Mauriès (1985) described a subgenus of *Eviulisoma*, based on a species from Morocco. However, a study by Enghoff & Reboleira (in prep.) shows that *Jeekelosoma Mauriès, 1985*, should be upgraded to full generic status, and by this action *Eviulisoma* will again become an endemic Afrotropical genus.

### Diagnosis

A succinct diagnosis of *Eviulisoma* was provided by Hoffman (1953). Supplemented with information from Hoffman (1964, 1971), Jeekel (2003), Vandenspiegel & Golovatch (2014) and the present study, and with an updated terminology (see below), *Eviulisoma* may be diagnosed as follows:

A genus of Paradoxosomatidae in which:

- paranota are missing, or at most present as tiny keels on ring 2 only
- there is (usually) a process between the coxae of the fourth male legs
- the sternum of body ring 6 is usually deeply excavated
- the collum bears two transverse rows of thin setae, postcollar body rings bear only one such row
- the gonopod coxa usually has a conspicuous meso-anterior lobe
- the gonopod prefemur is shorter than the acropodite, usually less than half as long
- the acropodite consists of at least three branches which seem to originate directly from the prefemur:
  - the flagelliform solenomere
  - a mesal acropodial process which is often the longest of the acropodial branches
  - sometimes an intermediate acropodial process originating between the mesal acropodial process and the solenomere
  - a lateral solenophore which serves as protection of the solenomere

### Table 2. Species of *Eviulisoma* Silvestri, 1910. (continued)

| Species                  | Distribution | Source                        |
|--------------------------|--------------|-------------------------------|
| *E. nessiteras* sp. nov. | Tanzania     | present study                 |
| *E. ngaia* Vandenspiegel & Golovatch, 2014 | Kenya | Vandenspiegel & Golovatch 2014 |
| *E. ngaiaorum* Vandensp. & Golovatch, 2014 | Kenya | Vandenspiegel & Golovatch 2014 |
| *E. obscurum* Attems, 1937 | D.R. Congo  | Nguyen & Sierwald 2013       |
| *E. ottokrausi* sp. nov. | Tanzania     | present study                 |
| *E. pallidum* Attems, 1939 | Uganda, Kenya | Nguyen & Sierwald 2013       |
| *E. paradisiacum* sp. nov. | Tanzania     | present study                 |
| *E. rugegeanum* Attems, 1953 | Rwanda | Sierwald 2017                 |
| *E. schoutedeni* Attems, 1929 | D.R. Congo  | Nguyen & Sierwald 2013       |
| *E. silvaticum* Attems, 1953 | D.R. Congo  | Nguyen & Sierwald 2013       |
| *E. silvestre* (Carl, 1909) | Tanzania     | Nguyen & Sierwald 2013       |
| *E. somaliense* Ceuca, 1971 | Somalia     | Nguyen & Sierwald 2013       |
| *E. sternale* sp. nov. | Tanzania     | present study                 |
| *E. taita* Vandenspiegel & Golovatch, 2014 | Kenya | Vandenspiegel & Golovatch 2014 |
| *E. taitaorum* Vandensp. & Golovatch, 2014 | Kenya | Vandenspiegel & Golovatch 2014 |
| *E. tertalinus* Manfredi, 1941 | Ethiopia  | Nguyen & Sierwald 2013       |
| *E. tritonium* Attems, 1937 | D.R. Congo  | Nguyen & Sierwald 2013       |
| *E. ussuwiense* (Carl, 1909) | Tanzania     | Nguyen & Sierwald 2013       |
| *E. zebra* sp. nov. | Tanzania     | present study                 |
Gonopod terminology

Jeekel (2003) gave detailed redescriptions of many species of *Eviulisoma*, as well as general comments on the gonopods. In Jeekel’s terminology, the gonopod in *Eviulisoma* consists of a basal coxa, followed by a prefemur and a terminal acropodite. The ‘femorite’ which usually forms a distinct basal ‘shaft’ of the acropodite is extremely reduced in *Eviulisoma*, and “Moreover, it has made a torsion of 180° which is shown by the course of the spermal channel along the anterior side towards the lateral side. The result is that the solenomere arises from the lateral side of the femorite” (Jeekel 2003: 48).

On the acropodite Jeekel (2003) distinguished three elements: the “solenomerite”, the “tibiotarsus” and a mesal process which he called the “postfemoral process”. There has been a long tradition of attempting to homologise parts of millipede gonopods with podomeres of ordinary walking legs, from which the gonopods have evolved. In the colobognathan orders, where the gonopods retain an obviously leglike structure, this is no problem, but in the eugnathan groups (Nematophora, Merocheta and Juliformia) the homologisation is not straightforward. Eugnathan gonopods often show some more or less obvious articulations, sutures, or constrictions which might correspond to articulations between podomeres, but apart from the articulation between coxa and telopodite, these subdivisions of the gonopod probably have nothing to do with the original leg segmentation. Thus, developmental studies on polydesmid millipedes indicated that the entire telopodite corresponds to the prefemur of a walking leg (Petit 1976). It therefore makes sense to minimize use of a gonopod terminology suggesting homology with walking leg podomeres. VandenSpiegel & Golovatch (2014) already took such a step for *Eviulisoma*, using the functional term “solenophore” for what Jeekel (2003) called “tibiotarsus”. I suggest a further step in the same direction and herewith propose the terms “mesal acropodital process” and “intermediate acropodital process” for what Jeekel (2003) and VandenSpiegel & Golovatch (2014) referred to as postfemoral processes.

General description of Udzungwan *Eviulisoma*

In order to minimize redundancy in the species descriptions, the following general description is presented. It is based on the Udzungwan species studied here, but when appropriate, additional literature-based information from other species is added [in square brackets]. The description applies to adult males.

- 18 podous + 1 apodous body rings + telson, i.e., ‘20 segments’. ‘Ring’ is used as short for ‘body ring’ in descriptions.
- Body length [13]14–34 mm; width [1]1.3–3.4 mm.
- Colour highly variable. Some species are uniform pale whitish (this seems not always to be a result of preservation), some are more or less uniform brownish or even black (*E. biquintum* sp. nov., partly), many are more or less strikingly ringed, with metazonites or a part thereof being brown or black, contrasting with pale prozonites (e.g., *E. zebra* sp. nov., Fig. 1; *E. akkariae* sp. nov., Fig. 3A), one colour form of *E. coxale* sp. nov. has large brownish dots at the ozopore level, contrasting with a pale background (Fig. 3B), and one colour form of *E. biquintum* sp. nov. is pitch black with contrasting white legs (Fig. 3C).
- Lower part of head capsule ‘clypeo-labral region’ with numerous setae up to between antennal sockets; upper part (‘vertigial region’) with at most a few scattered setae, sometimes arranged in one or more pairs close to midline (Fig. 4).
- Antennae (Fig. 4) reaching back to ring [2]3–5 when folded along the side of the body. Antennomeres 2–6 of roughly same length, 1 and 7 much shorter.
- Collum (Fig. 4) unmodified, with two transverse rows of thin setae, one row near anterior margin, one ca in the middle, laterally somewhat wrinkled.
- **Body rings:**
  - Paranota completely absent or present as inconspicuous, simple ridges on ring 2 only (Fig. 4). In some species, such ridges are seen in some specimens, not in others.
  - Pleurosternal keels (Fig. 5) simple, not prominent, not drawn out as posterior denticles, best developed on rings 2–5(7), decreasing in size backwards, but in some species recognizable as far back as ring 17.
  - Surface smooth, sometimes with visible cellular structure, metazonites more or less longitudinally wrinkled, especially ventro-laterally.
  - Stricture between pro- and metazonite sometimes smooth, sometimes more or less conspicuously striolate (Fig. 5).

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**Fig. 3.** *Eviulisoma* spp., examples of colour patterns. **A.** *E. akkariae* sp. nov., paratype, showing a banded pattern (pale prozonites, dark metazonites) similar to that shown in Fig. 1. **B.** *E. coxale* sp. nov., tentatively referred female from type locality, showing dark lateral spots on a pale background. **C.** *E. biquintum* sp. nov., paratype from Mito Mitatu, showing a black body contrasting with white legs. Not to scale. Photographs by F. Vad and A. Illum.
- Ozopores opening flush with metazonital surface at ca ⅔ of metazonital length behind stricture (Fig. 5).
- A single transverse row of two (1+1) or four (2+2) thin setae often present on metazonites, sometimes only seen on ring 2, sometimes apparently missing (probably abraded in many cases).
- Sternites sometimes with small cones at base of legs (Fig. 5), at least on ring 8.

**Fig. 4. Eviulisoma spp. A–B. E. paradisiacum sp. nov., ♂. A. Head and rings 1–8, lateral view. B. Head and collum, frontal view. C. E. zebra sp. nov., ♂, head and rings 1–3, lateral view. Abbreviation: pn = paranotum. Scale bars: 0.2 mm.**
- Telson (Fig. 5):
  - Preanal ring with a long triangular epiproct; lateral setiferous tubercles usually poorly differentiated, sometimes virtually absent; apical tubercles also usually not prominent.
  - Anal valves (paraprocts) with margin raised as narrow lips.
  - Subanal scale (hypoproct) variable, sometimes semicircular, sometimes trapezoid, sometimes with three more or less conspicuous tubercles at distal margin.
  - Legs 0.8–1.5 × as long as body diameter. Relative lengths of podomeres variable; femur the longest in most cases, but in some short-legged species, prefemur is as long as femur, and in a few long-legged ones, tarsus is as long as or longer than femur.
- Non-gonopodal sexual characters:
  - Sternum 5 usually with a tongue-shaped/subtriangular/subrectangular process (Fig. 6) between anterior legs (pair 4). One species (E. breviscutum sp. nov.) without a process (Fig. 36) and one

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**Fig. 5. Eviulisoma paradisiacum sp. nov., ♂.** A. Two midbody rings, lateral view, showing pleurosternal keel and striolate stricture. B. Two midbody rings, ventral view, showing sternal cones. C–E. Telson. C. Ventral view. D. Dorsal view. E. Posterior view. Abbreviations: ep = epiproct; hy = hypoproct; lt = lateral tubercle; oz = ozopore; pk = pleural keel; pp = paraproct; sc = sternal cone; sp = spinneret; str = stricture; tt = terminal tubercle. Scale bars: 0.1 mm.
(E. biquintum sp. nov.) with a small tubercle between the 4th leg pair and a similar one between the 5th (Fig. 35).

- Sternum 6 usually deeply excavated (Fig. 6), anterior margin of excavation curved, with a row of long setae. Fig. 6 shows a sternum 6 excavation as it appears in most species; deviating morphologies occur in certain species (Figs 26, 28, 30, 34). E. breviscutum sp. nov. and E. biquintum sp. nov. have no excavation.

Fig. 6. Eviulisoma spp., male sternum 5 with lobe between 4th legs and sternum 6 with excavation. A–B. E. ejti sp. nov., paratype, sternum 5 and 6. A. Ventral view. B. Sub-posterior view. C. E. acaciae sp. nov., paratype, sternum 6, ventral view. D–F. Sternum 5 lobe, posterior view. D. E. chitense sp. nov., paratype. E. E. dabagaense Kraus, 1958, specimen from Udzungwa Scarp FR, above Chita Village. F. E. coxale sp. nov., specimen from Mito Mitatu. Abbreviation: am = amorphous mass. Scale bars: A–C = 0.2 mm; D = 0.05 mm; E–F = 0.1 mm.
Fig. 7. *Eviulisoma* spp., scopulae on postfemur (pof), femur (fe), tibia (ti) and tarsus (ta) of male legs. A. *E. paradisiacum* sp. nov., paratype. B, D. *E. cetai* sp. nov., paratype. C. *E. ejti* sp. nov., paratype. E–F. *E. coxale* sp. nov., paratype from Mito Mitatu. Scale bars: A, C, E = 0.05 mm; B, F = 0.01 mm; D = 0.1 mm.
- Scopulae (dense coverings of modified setae) usually present on the ventral side of femur, postfemur, tibia and tarsus on anterior legs (Fig. 7), decreasing in size from anterior to posterior, often disappearing from (femur and) postfemur on posteriormost legs (scopulae only on tibia and tarsus in some non-Udzungwan species). _E. kangense_ sp. nov. and _E. sternale_ sp. nov. furthermore with the ventral surfaces of prefemora and femora flattened and hairless on some leg pairs. No podomeres with swellings or processes.

- Gonopods (Fig. 8):
  - Coxa (cx) with a rounded distomedial lobe of variable size.
  - Telopodite forming right angles with coxa.
  - Prefemoral part (prf) densely hirsute, usually much shorter than acropodite.
  - Acropodite consisting of a highly reduced basal part from which solenomere, solenophore, mesal acropodital and sometimes intermediate acropodital process arise at ca same level.
  - Solenomere (slm) originating near lateral side of gonopod, simple, whip-like, usually largely concealed within folded solenophore (Fig. 8A–B).
  - Solenophore (sph) originating on lateral side of gonopod, very variable in shape, sometimes a simple rolled sheet, sometimes with a distinct ‘conductor’ process guiding the solenomere; in species with an ‘open’ solenophore, an area with parallel ridges (e.g., Figs 12–13, 18 ) is sometimes seen – whether similar ridges are present in rolled-up solenophores is unknown.
  - Mesal acropodital process (map) originating on mesal side of gonopod, mostly but not always the longest part of the acropodite, variable in shape. In species with an intermediate acropodital process (iap), map is basally closely contiguous with the solenomere and map might be interpreted as a solenomeral process (?)parasolenomere). In species without iap, the solenomere articulates with the highly reduced femorite, close to the basis of map.
  - Intermediate acropodital process (iap) only present in some species, originating between map and slm, long, slender, often spinose.

Females are generally larger than males. Although females have not been considered in the present species descriptions, it is worth noting that the ventral part of the third body ring (‘epigyne’) and the basal part of the second pair of legs show considerable variation among species (Brolemann 1920). Also within the Udzungwan species of _Eviulisoma_, several distinct types of ‘epigyne’ and second legs exist, but often it was not possible to correlate a particular female morphotype with a particular species as defined by male characters.

**Species groups**

Four species groups can be recognized among the _Eviulisoma_ species treated here (Table 3). All groups include species with an excavated male sternum 6 and a ventral process/lobe on sternum 5. One group is characterized by the presence of an intermediate acropodital process (iap), one by having the margins of the sternum 6 excavation lobed, one by having a laterally compressed mesal acropodital process (map) and one by having neither of these characteristics, but a large, sheet-like, unrolled solenophore (sph) and, notably, a separate basal part (‘femorite’) of the acropodite. Three species are left ungrouped, being not particularly similar to any other new or previously described species. Two of the ungrouped species lack the sternum 6 excavation and the sternum 5 lobe.

**The kwabuniense group**

**Diagnosis**

Species of _Eviulisoma_ in which male sternum 6 is deeply excavated with unlobed margins, there is an intermediate acropodital process and the solenophore is a relatively open sheet with mostly three, more rarely two apical lobes.
Fig. 8. Gonopods in Eviulisoma spp. A. E. akkariae sp. nov., paratype, right gonopod, colour-coded: light green = coxa; dark green = cannula; light blue = prefemoral part; purplish blue = mesal acropodital process; pink = intermediate acropodital process; orange = solenophore; yellow = solenomere. B. E. culter sp. nov., paratype, right gonopod, solenomere entering solenophore. C. E. ottokrausi sp. nov., paratype, left gonopod, solenomere dislodged from solenophore. Scale bars: A = 0.1 mm; B–C = 0.05 mm.
Table 3. Species groups of *Eviulisoma* Silvestri, 1910, their constituent species and main morphological characters. Note that with the exception of *E. alluaudi* Brolemann, 1920, *E. jeanneli* Brolemann, 1920 and *E. silvaticum* Attems, 1953, which are tentatively assigned to the *kwabuniense* group, the table only includes species from the Udzungwa, Rubeho and Kanga Mts.

| Group name       | Included species                                                                 | CHARACTERS                                                                 |
|------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|                  |                                                                                   | sternum 6 excavation and lobe between coxae 4 | margins of sternum 6 excavation | acropodite with a separate basal ‘femorate’ | intermediate acropodital process | mesal acropodital process | solenophore |
| kwabuniense group| *E. kwabuniense* *E. acaciae* sp. nov. *E. aequilobatum* sp. nov. *E. akkariae* sp. nov. *E. oetafi* sp. nov. *E. chitense* sp. nov. *E. commelina* sp. nov. *E. ejti* sp. nov. *E. kalimbasiense* sp. nov. *E. navuncus* sp. nov. *E. nessiteras* sp. nov. *E. ottokrausi* sp. nov. *E. paradisiacum* sp. nov. *E. alluaudi* *E. jeanneli* *E. silvaticum* | + & + | not lobed | no | + | not compressed | large, not rolled, with (two-)three apical lobes |
| dabagaense group | *E. dabagaense* *E. grumslingslak* sp. nov. *E. coxale* sp. nov. *E. culter* sp. nov. | + & + | not lobed | no | – | strongly laterally compressed | tubular, ‘rolled sheet’ |
| sternale group   | *E. sternale* sp. nov. *E. zebra* sp. nov. *E. kangaense* sp. nov. | + & + | lobed | no | – | not compressed | tubular, ‘rolled sheet’ |
| iuloideum group  | *E. iuloideum* *E. articulatum* sp. nov.                                        | + & + | not lobed | yes | – | not compressed | large, not rolled, no apical lobes |
| Ungrouped        | *E. angulatum* sp. nov.                                                         | + & + | angled | no | – | not compressed | large, not rolled, two apical lobes |
|                   | *E. breviscutum* sp. nov.                                                       | - & - | *NA* | no | – | not compressed | large, not rolled, two apical lobes |
|                   | *E. biquintum* sp. nov.                                                        | - & - | *NA* | no | – | not compressed | large, rolled |
The included species furthermore share a hypoproct with three prominent marginal tubercles. Most of the species are apparently pallid (although fading of colour cannot be excluded), only *E. akkariae* sp. nov., which is also larger than the others, having a distinct ringed colour pattern.

Included species:

*E. kwabuniense* Kraus, 1958
*E. acaciae* sp. nov.
*E. aequilobatum* sp. nov.
*E. akkariae* sp. nov.
*E. cetafi* sp. nov.
*E. chitense* sp. nov.
*E. commelina* sp. nov.
*E. ejti* sp. nov.
*E. kalimbasiense* sp. nov.
*E. navuncus* sp. nov.
*E. nessiteras* sp. nov.
*E. ottokrausi* sp. nov.
*E. paradisiacum* sp. nov.

*E. alluaudi* Brolemann, 1920, *E. jeanneli* Brolemann, 1920, and *E. silvaticum* Attems, 1953, may also be tentatively included in this group, based on published descriptions (Attems 1953; Brolemann 1920; Jeekel 2003; VandenSpiegel & Golovatch 2014).

**Eviulisoma kwabuniense** Kraus, 1958

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**Diagnosis**

Differs from all other species of *Eviulisoma* by the presence of a basal acropodital process. Further differs from other Udzungwan members of the *E. kwabuniense* group by the combination of largely identical, smooth map and iap, and a relatively short solenophore with three lobes of approximately equal length.

**Material studied** (total: 1 ♂)

TANZANIA: 1 ♂, Iringa Region, Iringa District, New Dabaga/Ulangambi FR, 08°05′34.5″ S, 35°55′31.3″ E, montane, 1800–1900 m a.s.l., Plot 16, 15–16 Nov. 2000, Frontier Tanzania leg. (ZMUC).

**Descriptive notes** (male)

Information on the holotype, from Kraus (1958), in square brackets when different.

**Size.** Length 15 mm, max. width 1.8 mm [1.6 mm].

**Colour.** Completely pallid after 17 years in alcohol, possibly not due to fading, cf. remarks under *E. ottokrausi* sp. nov. [very pale, just weakly horn brown mainly on collum and metazonites].

**Antennae.** Reaching back to end of ring 3.

**Body rings.** Paranota completely missing. Stricture between pro- and metazonite clearly striolate. No setae seen on post-collar body rings.
ENGHOFF H., *Eviulisoma* millipedes from the Udzungwa Mountains

Fig. 9. *Eviulisoma kwabuniense* Kraus, 1958, ♂, non-type, from New Dabaga-Ulangambi FR, right gonopod. A. Dorso-lateral view. B. Dorso-mesal view. C. Close-up of basal acropodital process. D. Ventral view. E. Lateral view. Abbreviations: bap = basal acropodital process; iap = intermediate acropodital process; map = mesal acropodital process; prf = prefemoral part; slm = solenomere; sph-d, sph-i, sph-v = dorsal, intermediate and ventral lobes of solenophore. Scale bars: A–B, D–E = 0.1 mm; C = 0.01 mm.
**HYPOPROC.** Trapezoid, with three prominent apical tubercles.

**LEGS.** Short, stout, length 0.9 × body width. Relative lengths of podomeres: prefemur = femur > tarsus > postfemur = tibia. Scopulae strongly developed on femur, postfemur, tibia and tarsus, continuing until last legs, except on femur.

**STERNUM 5.** A tongue-shaped process between legs 4.

**STERNUM 6.** Deeply excavated. Rim of excavation simple.

**GONOPODS** (Fig. 9). Coxal lobe (cxl) large (not seen in Fig. 9). Prefemoral part (prf) ca half as long as acropodite. Acropodite with a small basal, finger-shaped process (bap); surface of bap with honeycomblike microsculpture (Fig. 9C). Mesal and intermediate acropodital processes (map and iap) largely identical, slender, smooth, pointed rods (iap diastally hooked). Solenophore (sph) large, ca ⅔ as long as acropodital processes, folded around solenomere (slm), three-lobed, dorsal lobe (sph-d) large, semicircular, ventral lobe (sph-v) pointed-triangular, intermediate lobe (sph-i) smaller, triangular.

**Distribution and habitat**

Known only from the New Dabaga/Ulamgambi FR. Altitudinal range 1800–2100 m a.s.l. (upper limit according to Kraus 1958). Habitat: montane forest (studied specimen) and semi-rainforest, under leaf litter (Kraus 1958). Collected together with *E. ottokrausi* sp. nov.

**Remarks**

The studied specimen, which is a near-topotype, agrees completely with the original description (Kraus 1958); a side-by-side comparison with the holotype was therefore deemed unnecessary.

**Eviulisoma acaciae** sp. nov.

urn:lsid:zoobank.org:act:B769088A-0401-43BD-82F9-09537DA86B49

Figs 6C, 10

**Diagnosis**

Differs from other species of the *E. kwabuniense* group by the combination of a map ending in two equal, parallel prongs, a spinose iap and a two-lobed solenophore with a dorsal lobe reaching tip of acropodital processes.

**Etymology**

This species is named after the dominant tree at the type locality.

**Material studied** (total: 5 ♂♂)

**Holotype**

TANZANIA: ♂, Iringa Region, Iringa District, West Kilombero Scarp FR, 07°45′34.2″ S, 36°26′37.4″ E, (open) woodland, 1510 m a.s.l., Plot Acacia, 5 Dec. 2000, Frontier Tanzania leg. (ZMUC).

**Paratypes**

TANZANIA: 4 ♂♂, same collection data as for holotype, except 7 Dec. 2000 (ZMUC).

**Description** (male)

**Size.** Length unmeasurable, all specimens broken, max. width 2.0 mm.

**Colour.** After 17 years in alcohol whitish to pale yellowish, dorsal half of metazonites very faintly light brown in some specimens.
**Antennae.** Reaching back to end of ring 3.

**Body rings.** Paranota represented by very faintly developed keels on body ring 2 (as in Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite not striolate. A transverse row of setae on all body rings, but many setae abraded.

**Hypoproct.** Trapezoid, almost rectangular, with three strong marginal tubercles.

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Fig. 10. *Eviulisoma acaciae* sp. nov., paratype, left gonopod. A. Mesal view. B. Ventral view. C. Lateral view. D. Acropodite, apical (anterior) view. E. Tip of solenophore, dorso-apical view. Abbreviations: cxl = coxal lobe; iap = intermediate acropodital process; map = mesal acropodital process; prf = prefemoral part; slm = solenomere; sph-d, sph-v = dorsal and ventral lobes of solenophore. Scale bars: A–C = 0.1 mm; D–E = 0.05 mm.
LEGS. Length 1.1 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > tibia > postfemur. Scopulae on femur, prefemur, tibia and tarsus, diminishing towards posterior and present on tibia and tarsus only on posteriormost legs.

STERNUM 5. A tongue-shaped process between legs 4.

STERNUM 6 (Fig. 6C). Deeply excavated. Rim of excavation simple.

GONOPODS (Fig. 10). Coxal lobe (cxl) large. Prefemoral part (prf) ca. ⅓ as long as acropodite. Mesal acropodital process (map) a rather stout rod, apically expanded and ending in two equal, stout, pointed tines. Intermediate acropodital process (iap) a slender straight rod, as long as map, densely covered in spines on mesal and ventral surfaces, except basally and apically. Solenophore (sph) large, deeply divided into two broad lobes, dorsal lobe (sph-d) as long as map, apically with a few minute teeth, ventral lobe (sph-v) much shorter, broadly rounded, curved around solenomere (slm).

Distribution and habitat
Known only from West Kilombero Scarp FR, (open) woodland, 1510 m a.s.l. As implied by the plot name on the label (“Plot Acacia”) the vegetation is open Acacia woodland (cf. Doody et al. 2001: 27, 174). Collected together with E. grumslinglak sp. nov. Eviulisoma aequilobatum sp. nov.

**Evialisoma aequilobatum** sp. nov.

urn:lsid:zoobank.org:act:2CDA3FA8-41C9-4A3E-8349-344D4EB38358

Fig. 11

**Diagnosis**

Differs from other species of the *E. kwabuniense* group by having the solenophore almost as long as map and iap, which are both smooth, in combination with the equal length of the three apical lobes of the solenophore.

**Etymology**

The name is an adjective referring to the equally long apical lobes of the solenophore.

**Material studied** (total: 1 ♂)

*Holotype*

TANZANIA: ♂, Iringa Region, Iringa District, New Dabaga/Ulangambi FR, 08°04′05.6″ S, 35°54′20.41″ E, montane, 1930 m a.s.l., Plot 6, 29 Oct. 2000, Frontier Tanzania leg. (ZMUC).

**Description** (male)

**Size.** Length not measurable, hind end of unique specimen missing; max. width 1.7 mm.

**Colour.** Completely pallid after 17 years in alcohol, possibly not due to fading, cf. remarks under *E. ottokrausi* sp. nov.

**Antennae.** Reaching back to end of ring 4.

**Body rings.** Paranota completely absent. Stricture between pro- and metazonite not strioliate. A pair of dorsal setae on body ring 2, other rings apparently naked.

**Telson.** Missing from specimen.
Fig. 11. *Eviulisoma aequilobatum* sp. nov., holotype, right gonopod. **A.** Mesal view. **B.** Lateral view. **C.** Ventral view. **D.** Tip of solenophore, sublateral view. **E.** Dorsal view. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; *map* = mesal acropodital process; *prf* = prefemoral part; *slm* = solenomere; *sph-d, sph-i, sph-v* = dorsal, intermediate and ventral lobes of solenophore. Scale bars: A–C, E = 0.1 mm; D = 0.05 mm.
LEGS. Length 1.2 × body width. Relative lengths of podomeres: femur > prefemur = tarsus > tibia > postfemur. Scopulae on femur, prefemur, tibia and tarsus, hardly diminished on body ring 11 (last ring present on specimen).

STERNUM 5. A trapezoid process between legs 4.

STERNUM 6. Deeply excavated. Rim or margin simple.

GONOPODS (Fig. 11). Coxal lobe (cxl) large. Prefemoral part (prf) ca half as long as acropodite. Mesal acropodal process (map) long, slender, slightly arched, apically expanded, somewhat axe-shaped. Intermediate acropodal process (iap) as long as map, basally stouter than map but apically tapering to pointed tip, smooth except for slight rugosities on distal part. Solenophore (sph) large, almost as long as map, folded around solenomere (slm), three-lobed, all lobes of equal length, but dorsal and ventral lobes (sph-d and sph-v) stouter, finger-shaped, intermediate lobe (sph-i) tapering to long pointed tip.

Distribution and habitat
Known only from the type locality, New Dabaga/Ulangambi FR, 1930 m a.s.l.

Eviulisoma akkariae sp. nov.
urn:lsid:zoobank.org:act:F8D49FFD-E331-467C-A1BF-06750D070007
Figs 3A, 8A, 12

Diagnosis
Differs from other species of the E. kwabuniense group by being larger (width 2.6–3.3 mm vs 1.5–2.1 mm in other species), in having contrasting dark and pale transverse bands, and in the combination of a smooth intermediate acropodal process (iap) and a large, two-lobed solenophore with a dorsal lobe (sph-d) as long as acropodal processes and ending in a hook.

Etymology
This species is named after Nesrine Akkari, one of the very few myriapodologists from the African continent, author of several important papers on myriapods, now curator of the important myriapod collection in the Naturhistorisches Museum Wien, Austria, and always a dear friend.

Material studied (total: 7 ♂♂)

Holotype
TANZANIA: ♂, Morogoro Region, Udzungwa Mts National Park, Mito Mitatu, Plot MM1, Trap #3, 07°50'14.3″ S, 36°50'46.8″ E, 1207 m a.s.l., 7 Jan. 2014, pitfall trapping, T. Pape and N. Scharff leg. (ZMUC).

Paratypes
TANZANIA: 1 ♂, same collection data as for holotype, except Trap #4; 5 ♂♂, Morogoro Region, Udzungwa Mts National Park, Sanje Kati Camp and Plot, 850 m a.s.l., 07°45'47.6″ S, 36°53'10.4″ E, pitfall trap, Plots 2, 6, 8, 17 and 24, 7 Feb. 2014, J. Malumbres-Olarte leg. (ZMUC, NHMW).

Description (male)
SIZE. Length 26–28 mm, max. width 2.6–3.3 mm.

COLOUR (Fig. 3A). After 3 years in alcohol: overall impression contrasting dark and pale transverse bands. Head light to medium brown. Antennomeres 1–5 light brown; antennomeres 6–7 pale yellow. Collum brown. Postcollar body rings: prozonites pale yellow; metazonites dorsally brown, gradually
lighter brown ventrally. Legs brownish yellow. Dorsal anterior half of preanal ring brown, rest of telson yellowish.

**Antennae.** Reaching back to end of ring 4.

**Body rings.** Paranota represented by a tiny keel on ring 2 (as Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite not striolate. A transverse row of setae on all body rings.

**Hypoproct.** Rounded-trapezoid, with three prominent marginal tubercles.

**Legs.** Length 1.2 × body width. Relative lengths of podomeres: femur > prefemur (>) tarsus > postfemur = tibia. Scopulae on anterior legs on femur, postfemur, tibia and tarsus; those on femur and postfemur missing from posterior legs.

**Sternum 5.** A small, low, rectangular process between legs 4.

**Sternum 6.** Deeply excavated, rim simple.

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**Fig. 12.** *Eviulisoma akkariae* sp. nov., paratypes from Udzungwa Mts National Park, Sanje Kati camp and plot (A, C) and Udzungwa Mts National Park, Milo Mitatu (B, D), right gonopods. **A.** Mesal view. **B.** Ridged area on inner surface of solenophore. **C.** Ventral view. **D.** Lateral view. Abbreviations: cxl = coxal lobe; iap = intermediate acropodital process; map = mesal acropodital process; prf = prefemur; ra = ridged area of solenophore; slm = solenomere; sph = solenophore; sph-d, sph-i, sph-v = dorsal, intermediate and ventral lobes of solenophore; sr = serrated ridge; tr = transverse ridges. Scales: A, C–D = 0.1 mm; B = 0.05 mm.
GONOPODS (Figs 8A, 12). Coxal lobe (\textit{cxl}) well-developed, semicircular. Prefemoral part (\textit{prf}) ca \(\frac{1}{4}\) as long as acropodite; mesal acropodital process (\textit{map}) long, slender, straight, apically pointed, with a prominent subterminal pointed-triangular side branch; intermediate acropodital process (\textit{iap}) a little shorter than \textit{map}, slender, smooth, acuminate; solenophore very large, as long as \textit{map}, folded around solenomere, with two large lobes; dorsal lobe (\textit{sph-d}) ending in hook-shaped process; ventral lobe (\textit{sph-v}) much shorter than \textit{sph-d}, apically broadly rounded; a tiny intermediate lobe (\textit{sph-i}) between \textit{sph-d} and \textit{sph-v}; inner surface of \textit{sph} with two parallel, longitudinal serrated ridges (\textit{sr}) followed by an area of parallel transverse ridges (\textit{tr}).

Distribution and habitat
Known from two sites in the Udzungwa Mts National Park. Altitudinal range 850–1207 m a.s.l.

\textit{Eviulisoma cetafi} sp. nov.
\textit{urn:lsid:zoobank.org:act:2754E233-F5D6-493B-B410-1067FF17A521}
Figs 7B, D, 13

Diagnosis
Differs from other species of the \textit{E. kwabuniense} group by having the solenophore two-lobed, its dorsal lobe developed as a very strong hook, hook much larger than those seen in certain other species (\textit{E. ejti} sp. nov., \textit{E.akkariae} sp. nov., \textit{E. nessiteras} sp. nov.).

Etymology
The species name honours CETAF, Consortium of European Taxonomic Facilities, www.cetaf.org, in recognition of the immense importance of CETAF for natural history collections in Europe and for collections-based research.

Material studied (total: 12 ♂♂)

Holotype
TANZANIA: ♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1300–1400 m a.s.l., 26 Oct.–14 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC).

Paratypes
TANZANIA: 2 ♂♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1450 m a.s.l., 4–9 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC); 4 ♂♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1500 m a.s.l., 2–13 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC); 2 ♂♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1500–1550 m a.s.l., 2–13 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC); 1 ♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1300 m a.s.l., 2–6 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC); 2 ♂♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1400 m a.s.l., 4–5 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC).

Description (male)
SIZE. Length 20 mm, max. width 1.9–2.1 mm.

COLOUR. After 33 years in alcohol all whitish.

ANTENNAE. Reaching back to middle of ring 3.

BODY RINGS. Paranota indicated by very faint ridges on body ring 2 (as in Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite not striolate. A transverse row of setae on all body rings, but the majority of setae abraded in most specimens.
Fig. 13. *Eviulisoma cetafi* sp. nov., paratype, right gonopod. A. Mesal view. B. Meso-dorsal view. C. Latero-ventral view. D. Ventral view. E. Spiny tip of *iap*. F. Ridged area of solenophore with tip of solenomere sticking out. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; *map* = mesal acropodital process; *prf* = prefemoral part; *ra* = ridged area of solenomere; *slm* = solenomere; *sph-d, sph-i, sph-v* = dorsal, intermediate and ventral lobes of solenophore. Scale bars: A–D = 0.1 mm; E = 0.01 mm; F = 0.02 mm.
HYPOPROCT. Large, trapezoid, with three prominent apical tubercles, middle tubercle larger.

LEGS. Length 1.2 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > tibia > postfemur. Scopulae (Fig. 7B, D) on femur, postfemur, tibia and tarsus until ca midbody, thereafter gradually disappearing.

STERNUM 5. A small trapezoid process between legs 4.

STERNUM 6. Deeply excavated. Rim of excavation simple.

GONOPODS (Fig. 13). Coxal lobe (cxl) moderate. Prefemoral part (prf) ca half as long as acropodite. Mesal acropodital process (map) a long, smooth, almost straight rod, apically pointed, subapically with small triangular side branch. Intermediate acropodital process (iap) a very slender, straight rod, densely covered in long spines on part of its surface, especially on apical part (Fig. E). Solenophore (sph) deeply split into two long lobes; dorsal lobe (sph-d) a very large, strong hook, almost reaching to tip of acropodital processes; ventral lobe (sph-v) much shorter, lanceolate; no intermediate process between sph-d and sph-v; internal surface of sph with a ridged area (ra, Fig. 13D, F).

Distribution and habitat
Known only from the Udzungwa Scarp FR. Altitudinal range 1300–1550 m a.s.l. Habitat: montane rain forest. Collected together with E. chitense sp. nov.

Eviulisoma chitense sp. nov.
urn:lsid:zoobank.org:act:13931F2B-13C9-4987-A3AA-B9F42BB5796D
Figs 6D, 14

Diagnosis
Differs from other species of the E. kwabuniense group by the combination of a map with a short subapical laterad side branch, a partly spinose iap, and a clearly three-lobed solenophore that is much shorter than map and iap, dorsal lobe of solenophore much longer than the others.

Etymology
The name is an adjective referring to the type locality.

Material studied (total: 5 ♂♂)

Holotype
TANZANIA: ♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1400 m a.s.l., 4–5 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC).

Paratypes
TANZANIA: 4 ♂♂, same locality as for holotype but 1050 m a.s.l., 26–29 Oct. 1984, pitfall traps in intermediate rain forest, N. Scharff leg. (ZMUC).

Description (male)
SIZE. Length 20 mm, max. width 1.6–1.9 mm.

COLOUR. After 33 years in alcohol whitish to very light brown, a little darker dorsally.

ANTENNAE. Reaching back to middle of ring 4.
Fig. 14. *Eviulisoma chitense* sp. nov. paratype. A, C–F. Left gonopod. A. Lateral view. C. Mesal view. D. Ventral view. E. Dorsal view. F. Isolated solenophore, lateral view. B. Lobe between legs 4. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; *map* = mesal acropodital process; *prf* = prefemoral part; *slm* = solenomere; *sph-d, sph-i, sph-v* = dorsal, intermediate and ventral lobes of solenophore. Scale bars: A–E = 0.1 mm; F = 0.05 mm.
Body rings. Paranota indicated by very faint ridges on body ring 2 (as Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite smooth. A transverse row of setae on all body rings.

Hypoproct. Trapezoid, almost rectangular with three large apical tubercles.

Legs. Length 1.1 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > tibia > postfemur. Scopulae on femur, postfemur, tibia and tarsus until midbody, gradually disappearing on more posterior legs.

Sternum 5. A small subrectangular lobe between legs 4 (Fig. 6D).

Sternum 6. Deeply excavated. Rim of excavation simple.

Gonopods (Fig. 14). Coxal lobe (cxl) distally right-angled. Prefemoral part (prf) ca half as long as acropodite. Mesal acropodal process (map) a straight, smooth rod with a subapical curved side branch. Intermediate acropodal process (iap) a curved pointed rod, covered in long spines along mesal side. Solenophore (sph) much shorter than acropodal processes, curving around solenomere (slm), apically with three slender lobes/processes, dorsal lobe (sph-d) longer, intermediate process (sph-i) thinner than the others.

Distribution and habitat
Known only from the Udzungwa Scarp FR, above Chita Village. Altitudinal range 1050–1400 m a.s.l. Habitat: intermediate and montane rain forest. Collected together with E. cetafi sp. nov. Eviulisoma commelina sp. nov.

Diagnosis
Differs from other species of the E. kwabuniense group by having the solenophore somewhat shorter than the smooth map and iap, in combination with the small size of the intermediate apical lobe of the solenophore, compared with the very long, slender dorsal and ventral lobes.

Etymology
The name is a noun in apposition, referring to the one short and two long apical lobes of the solenophore. Commelina L. is a genus of plants (‘dayflowers’) with flowers characterized by one small and two large petals. Linnaeus (1737: 79) dedicated this genus to three members of the family Commelijn, two of whom were well-known botanists, while the third accomplished nothing (at least not in botany); see also Wijnand (1983: 11).

Material studied (total: 1 ♂)

Holotype
TANZANIA: ♂, Iringa Region, Iringa District, New Dabaga/Ulangambi FR, 08°05′34.5″ S, 35°51′31.3″ E, montane, 1800–1900 m a.s.l., Plot 16, 15–16 Nov. 2000, Frontier Tanzania leg. (ZMUC).

Description (male)
Size. Length 14 mm, max. width 1.5 mm.

Colour. Completely pallid after 17 years in alcohol, possibly not due to fading, cf. remarks under E. ottokrausi sp. nov.
Fig. 15. *Eviulisoma commelina* sp. nov., holotype, right gonopod. A. Lateral view. B. Mesal view. C. Ventral view. D. Solenophore, dorso-lateral view. E. Dorso-lateral view. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; *map* = mesal acropodital process; *prf* = prefemoral part; *slm* = solenomere; *sph-d*, *sph-i*, *sph-v* = dorsal, intermediate and ventral lobes of solenophore. Scale bars: 0.1 mm.
**Antennae.** Reaching back to end of ring 3.

**Body rings.** Paranota completely absent. Stricture between pro- and metazonite striolate. A transverse row of setae on pre-gonopodal rings, a few scattered setae seen on post-gonopodal rings.

**Hypoproct.** Trapeziform with three apical tubercles.

**Legs.** Stout, short, length 0.9 × body width. Relative lengths of podomeres: femur = prefemur > tarsus > postfemur = tibia. Scopulae on femur, postfemur, tibia and tarsus, continuing until last legs, except on femur.

**Sternum 5.** A rounded-rectangular process between legs 4.

**Sternum 6.** Deeply excavated. Rim of excavation simple.

**Gonopods (Fig. 15).** Coxal lobe \((cxl)\) large. Prefemoral part \((prf)\) ca half as long as acropodite. Mesal and intermediate acropodital processes \((map\) and \(iap\)\) largely identical, slender, smooth, pointed rods. Solenophore \((sph)\) large, ca 0.8 × as long as acropodital processes, folded around solenomere \((slm)\), three-lobed, dorsal and ventral lobes \((sph-d\) and \(sph-v)\) finger-shaped, much longer than pointed-triangular intermediate lobe \((sph-i)\).

**Distribution and habitat**
Known only from the New Dabaga/Ulangambi FR. Altitude 1800–1900 m a.s.l.

**Eviulisoma ejti** sp. nov.  
urn:lsid:zoobank.org:act:8DAFBA5D-17C5-49A6-A290-D0D540D1295F  
Figs 6A–B, 7C, 16

**Diagnosis**
Differs from other species of the *E. kwabuniense* group by \(map\) being apically shaped like a narrow, slightly hooked spoon and at ca ¾ of its length having a side branch, in combination with a spinose \(iap\) and a solenophore with a large, hooked dorsal lobe.

**Etymology**
The species name honours the *European Journal of Taxonomy (EJT)*, in recognition of its immense importance for the dissemination of taxonomic research in Europe, and beyond.

**Material studied** (total: 5 ♂♂)

**Holotype**
TANZANIA: ♂, Iringa District, Udzungwa Scarp FR, 11 km SE of Masisiwe Village, Kihanga Stream, 1800 m a.s.l., 08°22'05.7" S, 35°58'41.6" E, 17–27 May 1997, ZMUC and SI Exp. leg. (ZMUC).

**Paratypes**
TANZANIA: 4 ♂♂, same collection data as for holotype (ZMUC).

**Referred non-type material**
TANZANIA: 1 ♀, tentatively referred to this species, same collection data as for holotype (ZMUC).

**Description (male)**
Size. Length 15 mm, max. width 1.5 mm.
Fig. 16. *Eviulisoma ejti* sp. nov., paratype, left gonopod. A. Mesal view. B. Lateral view. C. Ventral view. D. Dorsal view. Aluminium tape used for mounting visible in lower left corner of A and D. Abbreviations: cxl = coxal lobe; iap = intermediate acropodital process; map = mesal acropodital process; prf = prefemoral part; slm = solenomere; sph-d, sph-i, sph-v = dorsal, intermediate and ventral lobes of solenophore. Scale bars: 0.1 mm.
**Colour.** After 20 years in alcohol uniformly light yellowish brown, a little darker dorsally.

**Antennae.** Reaching back to middle of ring 3.

**Body rings.** Paranota completely absent. Stricture between pro- and metazonite clearly striolate. A transverse row of setae on all body rings, but many setae abraded.

**Hyoproct.** Large, trapezoid, almost rectangular, with three prominent marginal tubercles.

**Legs.** Length $\approx$ body width. Relative lengths of podomeres: prefemur = femur $>$ tarsus $>$ tibia $>$ postfemur. Scopulae (Fig. 7C) on femur, postfemur, tibia and tarsus, present until last pair of legs, although less dense posteriorly.

**Sternum 5.** A trapezoid process, slanting anteriad, between legs 4 (Fig. 6A–B).

**Sternum 6.** Deeply excavated. Rim of excavation simple (Fig. 6A–B).

**Gonopods** (Fig. 16). Coxal lobe (cxl) prominent. Prefemoral part (prf) ca 0.4 $\times$ as long as acropodite. Mesal acropodital process (map) stout, straight, apically divided into long, narrowly spoon-shaped, slightly hooked branch and short, rounded-triangular side branch. Intermediate acropodital process (iap) almost as long as map, very slender, straight, densely spinose. Solenophore (sph) very large, ca 0.8 $\times$ as long as map, deeply divided into relatively broad, mesally concave, apically hooked dorsal process (sph-d) and much shorter, long, lamellloid ventral process (sph-v), a very short lamellloid process between sph-d and sph-v.

**Distribution and habitat**

Known only from the Udzungwa Scarp FR, 11 km SE of Masisiwe Village, Kihanga Stream, 1800 m a.s.l.

*Eviulisoma kalimbasiense* sp. nov.

**Diagnosis**

Differs from other species of the *E. kwabuniense* group by having a smooth iap much shorter than map and by having the large dorsal lobe of the solenomere bifid.

**Etymology**

Named after the type locality, Mt Kalimbasi (Kalimbazi).

**Material studied** (total: 4 ♂♂)

- **Holotype**
  TANZANIA: ♂, Iringa Region, Iringa District, Kalimbasi Mountain, 2000–2100 m a.s.l., 10 km S of Mazombe (forest floor), Jan. 1984, J. Kielland leg. (VMNH).

- **Paratypes**
  TANZANIA: 3 ♂♂, same collection data as for holotype (VMNH, ZMUC).

**Description** (male)

**Size.** Length 19 mm, max. width 1.6 mm.
Fig. 17. Eviulisoma kalimbasiense sp. nov., paratype, right gonopod. A. Mesal view. B. Lateral view. C. Ventral view. D. Dorsal view. Abbreviations: cxl = coxal lobe; iap = intermediate acropodital process; map = mesal acropodital process; prf = prefemoral part; slm = solenomere; sph-d, sph-i, sph-v = dorsal, intermediate and ventral lobes of solenophore. Scale bars: 0.1 mm.
COLOUR. After 34 years in alcohol completely whitish.

ANTENNAE. Reaching back to end of ring 4.

BODY RINGS. Paranota completely absent. Stricture between pro- and metazonite smooth. A transverse row of setae on all body rings.

HYPROPROC. Trapezoid, almost reactangular, with three strong marginal tubercles.

LEGS. Length ≈ body width. Relative lengths of podomeres: femur > prefemur (>) tarsus > tibia (>) postfemur. Scopulae well-developed on postfemur, tibia and tarsus all the way to last leg pairs, also weakly on femora of anterior legs.

STERNUM 5. A tongue-shaped process between legs 4.

STERNUM 6. Deeply excavated. Rim of excavation simple.

GONOPODS (Fig. 17). Coxal lobe (cxl) moderate. Prefemoral part (prf) ca half as long as acropodite. Mesal acropodital process (map) a straight pointed rod with a small lateral bump ca at ⅔ of its length. Intermediate acropodital process (iap) much shorter than map, slender, straight, pointed, smooth. Solenophore (sph) very large, ca as long as map, apically divided into a bifid dorsal lobe (sph-d), a slender, pointed intermediate lobe (sph-i) and a broader, apically linearly obtuse ventral lobe (sph-v).

Distribution and habitat
Known only from Kalimbasi Mountain, S of Mazombe town, 2000–2100 m a.s.l. The site is located in the Kisinga-Rugaro FR.

Eviulisoma navuncus sp. nov.
urn:lsid:zoobank.org:act:91A53055-C236-4F4E-A32A-172D2289DE25
Fig. 18

Diagnosis
Differs from other species of the E. kwabuniense group by having a long, curved side branch from map fitting over the semicircular dorsal lobe of the solenophore, in combination with an extremely slender, spinose iap.

Etymology
The name is a noun in apposition, from the Latin navis (‘boat’) and uncus (‘hook’), referring to the boat-hook shape of the mesal acropodital process.

Material studied (total: 7 ♂♂)
Holotype
TANZANIA: ♂, Kitungulu FR, 1500 m a.s.l., 08°09′ S, 36°05′ E, forest, Jan.1996, M. Andersen, P. Gravlund and A. Jakobsen leg. (ZMUC).

Paratypes
TANZANIA: 6 ♂♂, “Bomalambinga, Uzungwa FR, Muhange Village, Uzungwa Mountains”, 36.03/8.12 [must be longtitude/latitude, but format unknown], 19 Jun. 1979, W.A. Rodgers leg. (VMNH).

Referred non-type material
TANZANIA: 6 ♀♀, tentatively referred to this species, same collection data as for paratypes (VMNH).
Fig. 18. *Eviulisoma navuncus* sp. nov., holotype, right gonopod. A. Mesal view. B. Lateral view. C. Ventro-lateral view. D. Ventral view. Aluminium tape used for mounting visible in lower left corner of B. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; *map* = mesal acropodital process; *prf* = prefemoral part; *ra* = ridged area of solenophore; *slm* = solenomere; *sph-d, sph-i, sph-v* = dorsal, intermediate and ventral lobes of solenophore. Scale bars: 0.1 mm.
Description (male)

Size. Length 22 mm, max. width 2.0 mm.

Colour. After 21 years in alcohol uniform whitish yellow, only vertigial region of head and hind edge of body rings very light brown.

Antennae. Reaching back to middle of ring 3.

Body rings. Paranota indicated by very faint keels on body rings 2 (as in Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite striolate. A transverse row of setae on all body rings.

Hypoproct. Trapezoid, with three apical tubercles.

Legs. Length 0.9 × body width. Relative lengths of podomeres: prefemur = femur > tarsus > post-femur = tibia. Scopulae on femur, postfemur, tibia and tarsus, disappearing towards hind end.

Sternum 5. A broadly rounded-rectangular process between legs 4.

Sternum 6. Deeply excavated. Rim of excavation simple.

Gonopods (Fig. 18). Coxal lobe (cxl) large. Prefemoral part (prf) ca half as long as acropodite. Mesal acropodial process (map) a long, slightly sinuous rod, with pointed tip and a large, pointed lateral hook subapically; hook curving over dorsal lobe (sph-d) of solenophore. Intermediate acropodial process (iap) very thin, straight, covered in long spines along dorsal side. Solenophore (sph) large, with dorsal lobe (sph-d) largest, broadly rounded, fitting under lateral hook of map, intermediate lobe (sph-i) very small, ventral lobe (sph-v) broadly rounded; internal surface of sph with a coarsely ridged area (ra).

Distribution and habitat

Known from two sites, one in Kitungulu/Kiranzi FR, the other in Udzungwa Scarp FR. Altitudinal range includes 1500 m. Collected together with E. dabagaense Kraus, 1958 and E. nessiteras sp. nov. in Kitungulu/Kiranzi FR.

Remarks

Interpreting the locality name “Bomalamzinga” caused a lot of problems until Andy Marshall (pers. comm.) informed me that it refers to a place at the northern end of the Udzungwa Scarp FR.

Eviulisoma nessiteras sp. nov.
urn:lsid:zoobank.org:act:7442C1C4-8C4F-4CCB-BD53-64347CB6185A
Fig. 19

Diagnosis

Differs from other species of the E. kwabuniense group by having map and the spinose iap extremely slender, in combination with a solenophore with very to extremely slender dorsal and ventral processes, such that the acropodite seems to consist of four very slender branches (in addition to the solenomere).

Etymology

The specific epithet is a noun in apposition. Nessiteras is the genus name given to the famous Loch Ness Monster, and the dorsal lobe of the solenophore of E. nessiteras sp. nov. resembles the most famous photograph of the alleged monster sticking its long neck out from the lake surface.
Fig. 19. *Eviulisoma nessiteras* sp. nov., paratypes from Udzungwa Scarp Catchment FR, right gonopod. 
A. Mesal view. B. Lateral view. C. Ventral view. D. Dorsal view. E. Solenophore, latero-ventral view. 
F. Spiny surface of *iap*. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; 
*map* = mesal acropodital process; *prf* = prefemoral part; *ra* = ridged area of solenophore; 
*slm* = solenomere; *sph-d, sph-i, sph-v* = dorsal, intermediate and ventral lobes of solenophore. Scale 
bars: A–E = 0.1 mm; F = 0.005 mm.
Material studied (total: 7 ♂♂)

Holotype
TANZANIA: ♂, Kitungulu FR, 1500 m a.s.l., 08°09’ S, 36°05’ E, forest, Jan. 1996, M. Andersen, P. Gravlund and A. Jakobsen leg. (ZMUC).

Paratypes
TANZANIA: 3 ♂♂, same collection data as for holotype (ZMUC); 3 ♂♂, Morogoro Region, Udzungwa Scarp Catchment FR, Chita, Plot 18, 2 Nov. 2014. 08°29’19.5” S, 35°54’27.3” E, 1531 m a.s.l., pitfall trap, J. Malumbres-Olarte leg., sample codes 18 PT1 and 18 PT6 (ZMUC).

Referred non-type material
TANZANIA: 1 ♀, tentatively referred to this species, Morogoro Region, Udzungwa Scarp Catchment FR, Chita, Plot 18, 2 Nov. 2014. 08°29’19.5” S, 35°54’27.3” E, 1531 m a.s.l., pitfall trap, J. Malumbres-Olarte leg., sample code 18 PT6 (ZMUC).

Description (male)
Size. Length 18 mm, max. width 1.9 mm.

Colour. After three years in alcohol all whitish, only vertigial region of head very light brownish.

Antennae. Reaching back to end of ring 3.

Body rings. Paranota at most indicated by faint ridge on body ring 2 (as Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite striolate. A transverse row of setae on all body rings.

Hypoproct. Large, trapezoid to almost rectangular, with three apical tubercles.

Legs. Length 1.2 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > tibia > postfemur. Scopulae prominent on femur, postfemur, tibia and tarsus, only missing from posteriormost legs.

Sternum 5. A small subpentagonal process between legs 4.

Sternum 6. Deeply excavated. Rim of excavation simple.

Gonopods (Fig. 19). Coxal lobe (cxl) large. Prefemoral part (prf) ca 0.3 × as long as acropodite. Mesal acropodital process (map) a very slender, smooth, slightly arched rod with a short triangular subapical side branch. Intermediate acropodital process (iap) as slender and ca as long as map, slightly arched, densely covered in long spines along dorsal side (Fig. 19F). Solenophore (sph) deeply split into two long lobes; dorsal lobe (sph-d) almost as long as acropodital processes, stouter than these, apically bent at right angles and ending in two triangular lobes; ventral lobe (sph-v) ca as long and stout as sph-d, somewhat sinuous (in Fig. 19C the sph-v looks strongly twisted, but this is due to distortion during preparation of the SEM mount), apically pointed; a tiny intermediate lobe (sph-i) between sph-d and sph-v; internal surface of sph with a ridged area (ra).

Distribution and habitat
Known from Udzungwa Scarp FR and Kitungulu/Kiranza FR. Altitudinal range 1500–1531 m a.s.l. Collected together with E. dabagaense and E. navuncus sp. nov. in Kitungulu/Kiranza FR.
Eviulisoma ottokrausi sp. nov.
urn:lsid:zoobank.org:act:4AC6017F-F868-4073-9A60-61FB1922F8E1
Figs 8C, 20

Diagnosis
Differs from other species of the *E. kwabuniense* group by having a short subterminal side branch on the *map*, in combination with having spines on the basal part of the long, slender *iap* and having the dorsal lobe of the solenophore much longer than the ventral and intermediate lobes.

Etymology
The name honours Otto Kraus (1930–2017) who described the first species of *Eviulisoma* from the Udzungwa Mountains and authored numerous other papers on myriapod (and arachnid) taxonomy.

Material studied (total: 13 ♂♂)

**Holotype**
TANZANIA: ♂, Iringa Region, Iringa District, New Dabaga/Ulangambi FR, 08°05’34.5” S, 35°55’31.3” E, montane, 1800–1900 m a.s.l., Plot 16, 15–16 Nov. 2000, Frontier Tanzania leg. (ZMUC).

**Paratypes**
TANZANIA (all from Iringa Region, Iringa District, New Dabaga/Ulangambi FR, Frontier Tanzania leg.): 1 ♂, 08°00’26.6” S, 35°56’06.1” E, scrub/thicket/bush, 1915 m a.s.l., Plot Kinyonga, 18 Oct. 2000; 1 ♂, 08°03’39.9” S, 35°54’41.91” E, montane, 1955 m a.s.l., Plot 24, 2 Nov. 2000; 1 ♂, 08°03’39.9” S, 35°54’41.91” E, montane, 1962 m a.s.l., Plot 24, 27 Oct. 2000; 1 ♂, 08°04’05.6” S, 35°54’13.8” E, montane, 1940 m a.s.l., Plot 1, 18 Oct. 2000; 2 ♂♂, 08°00’26.6” S, 35°56’06.1” E, montane forest, 1910 m a.s.l., Plot Kinyonga, 24 Oct. 2000; 1 ♂, 08°05’34.5” S, 35°55’31.3” E, montane, 1800 m a.s.l., Plot 16, 15 Nov. 2000; 5 ♂♂, 08°04’05.6” S, 35°54’20.41” E, montane, 1930 m a.s.l., Plot 6, 27 Oct. 2000 (all in ZMUC).

Description (male)

**SIZE.** Length 18 mm, max. width 2.0 mm.

**COLOUR.** Completely pallid after 17 years in alcohol (probably not due to fading because whereas all adult specimens are pallid, the samples also contain some juveniles, possibly of another species, in which the metazonites have retained a brownish colouration similar to that seen in *E. dabagaense*).

**ANTENNAE.** Reaching back to middle of ring 4.

**BODY RINGS.** Paronota seen as extremely inconspicuous ridges on ring 2 in one specimen (as Fig. 4C), completely absent in others. Stricture between pro- and metazonite striolate. A transverse row of setae on all body rings back to ring 9 in one specimen, only on ring 2 in another.

**HYPOPROCT.** Trapezoid, with three very prominent marginal tubercles.

**LEGS.** Length 0.8 × body width. Relative lengths of podomeres: femur (>) prefemur > tarsus > tibia (>), postfemur. Scopulae strongly developed on femur, postfemur, tibia and tarsus; those on femur missing from posterior legs.

**STERNUM 5.** A tongue-shaped process between legs 4.

**STERNUM 6.** Deeply excavated, rim of excavation simple.
Fig. 20. *Eviulisoma ottokrausi* sp. nov, paratype, left gonopod. A. Mesal view. B. Lateral view. C. Ventral view. D. Acropodite, latero-ventro-apical view. E. Dorsal view. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; *map* = mesal acropodital process; *prf* = prefemoral part; *slm* = solenomere; *sph-d, sph-i, sph-v* = dorsal, intermediate and ventral lobes of solenophore. Scale bars: A–D = 0.1 mm.
ENGHOFF H., *Eviulisoma* millipedes from the Udzungwa Mountains

**GONOPODS** (Figs 8C, 20). Coxal lobe (*cxl*) large. Prefemoral part (*prf*) slightly more than half as long as acropodite; mesal acropodital process (*map*) long, slender, straight, apically bifurcate; intermediate acropodital process (*iap*) as long as *map*, slender, with several long spines on basal half, apically pointed; solenophore (*sph*) large, ca 0.8 × as long as *map*, folded around solenomere (*slm*), three-lobed, dorsal lobe (*sph-d*) longest, subrectangular, ventral lobe (*sph-v*) large, apically broadly rounded; a small intermediate lobe (*sph-i*) between *sph-d* and *sph-v*.

**Distribution and habitat**

Known only from the New Dabaga/Ulangambi FR. Altitudinal range 1800–1962 m a.s.l. Habitats include montane forest and scrub/thicket/bush. Collected together with *E. kwabuniense* Kraus, 1958.

**Remarks**

One male infested with nematodes, one worm sticking out from each gonopore.

*Eviulisoma paradisiacum* sp. nov.

_urn:lsid:zoobank.org:act:EF53C636-FF60-4E60-93AB-911BAACD56E0_  
Figs 4A–B, 5, 7A, 21

**Diagnosis**

Differs from other species of the *E. kwabuniense* group by having a strong hook emerging from the concave side of the solenophore and, together with the ventral lobe of the solenophore, delimiting a narrow slit.

**Etymology**

The name is an adjective referring to the name Frontier Tanzania gave to the montane forest plot where the species was found.

**Material studied** (total: 29 ♂♂)

**Holotype**

TANZANIA: ♂, Iringa Region, Iringa District, West Kilombero Scarp FR, 07°50′38.4″ S, 36°22′17.6″ E, montane woodland, 1400 m a.s.l., Plot Paradiso, 16 Nov. 2000, Frontier Tanzania leg. (ZMUC).

**Paratypes**

TANZANIA (all from Iringa Region, Iringa District, West Kilombero Scarp FR, Frontier Tanzania leg.): 8 ♂♂, same collection data as for holotype; 2 ♂♂, same collection data as for holotype, except montane forest, 1390 m a.s.l., 12 Nov. 2000; 18 ♂♂, same collection data as for holotype, except 1390–1410 m a.s.l., 18 Nov. 2000 (all in ZMUC).

**Description** (male)

**Size.** Length 16 mm, max. width 1.7 mm.

**Colour.** After 17 years in alcohol whitish to pale yellowish, anterior part of dorsum very light brownish in some specimens.

**Antennae.** Reaching back to end of ring 3.

**Body rings.** Paranota completely absent. Stricture between pro- and metazonite clearly striolate (Fig. 7A). A transverse row (1 + 1) of setae on all body rings.

**Hypoproct.** Large, trapezoid, with three marginal tubercles.
Fig. 21. *Eviulisoma paradisiacum* sp. nov. A–D. Paratype, left gonopod, solenomere dislodged from solenophore. A. Lateral view. B. Ventral view. C. Mesal view. D. Dorsal view. E. Another paratype, gonopod acropodite, apical (anterior) view, solenomere sticking out from solenophore slit. Abbreviations: *cxl* = coxal lobe; *iap* = intermediate acropodital process; *map* = mesal acropodital process; *prf* = prefemoral part; *slm* = solenomere; *sph-d*, *sph-i*, *sph-v* = dorsal, intermediate and ventral lobes of solenophore; *sph-h* = solenophore hook. Scale bars: A–C = 0.1 mm; D–E = 0.05 mm.
ENGHOFF H., *Eviulisoma* millipedes from the Udzungwa Mountains

**LEGS.** Length 0.9 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > postfemur = tibia. Scopulae (Fig. 7A) on femur, prefemur, tibia and tarsus, diminishing towards posterior, especially on femur.

**STERNUM 5.** A bell-shaped process between legs 4.

**STERNUM 6.** Deeply excavated. Rim of excavation simple.

**GONOPODS** (Fig. 21). Coxal lobe (*cxl*) moderately large. Prefemoral part (*prf*) ca \( \frac{2}{3} \) as long as acropodite. Mesal acropodital process (*map*) a long, straight, stout, pointed rod with a subapical lateral flange. Intermediate acropodital process (*iap*) a more slender, straight, non-spinose pointed rod, as long as *map*. Solenophore (*sph*) a massive sheet, almost as long as *map*, with a large, hook-shaped process (*sph-h*) on the hollow side, basal part of *sph-h* separated from small ventral, 'solenomere-conducting' lobe (*sph-v*) by narrow slit, dorso-lateral part of *sph* apically with a finger-shaped dorsal lobe (*sph-d*) separated by U-shaped incision from multi-cusped intermediate lobe (*sph-i*).

**Distribution and habitat**

Known only from the West Kilombero Scarp FR, Plot Paradiso. Altitudinal range: 1390–1410 m a.s.l. Habitat: montane forest. According to Frontier Tanzania (2001: 27, 174), ‘Plot Paradiso’ is dominated by *Millettia usaramensis* Taub.

**The dabagaense group**

**Diagnosis**

Species of *Eviulisoma* in which sternum 6 is deeply excavated, with unlobed margins, there is no intermediate acropodital process, the solenophore is a tightly rolled-up sheet of a tube-like appearance (with a few small processes) and the mesal acropodital process is strongly laterally compressed.

Included species:

*E. dabagaense* Kraus, 1958  
*E. coxale* sp. nov.  
*E. culter* sp. nov.  
*E. grumslingslak* sp. nov.

No further species can be assigned to this group based on the existing literature.

*Eviulisoma dabagaense* Kraus, 1958  
Figs 6E, 22

*Eviulisoma dabagaense* Kraus, 1958: 2 (holotype (not studied) in the Überseemuseum Bremen).

**Diagnosis**

Differs from other species of the *E. dabagaense* group by the combination of a gonopod coxa without a distolateral process and a parallel-margined *map* with two strong apical denticles and several smaller ones on the dorsal margin.

**Material studied** (total: 5 ♂♂)

TANZANIA: 1 ♂, Iringa Region, Iringa District, New Dabaga/Ulangambi FR, 08°06'47.4" S, 38°56'50.4" E, montane, 1800 m a.s.l., Plot MS–Plot A, 9 Nov. 2000, Frontier Tanzania leg. (near
topotype) (ZMUC); 3 ♂♂, Iringa Region, Udzungwa Scarp FR, above Chita Village, 1600–1650 m a.s.l., 8–13 Nov. 1984, pitfall traps in montane rain forest, N. Scharff leg. (ZMUC); 1 ♂, Kitungulu FR, 1500 m a.s.l., 08°09′ S, 36°05′ E, forest, Jan.1996, M. Andersen, P. Gravlund and A. Jakobsen leg. (ZMUC); 3 ♀♀, tentatively referred to this species, same collection data as preceding (ZMUC).

**Descriptive notes** (male)

**Size.** Length 17–18 mm, max. width 1.8–2.1 mm.

**Colour.** After 17–33 years in alcohol overall colour of body, antennae and legs whitish. Occipital region of head, as well as collum, light brown. Dorsal half of posterior ¾ of metazonites also light brown, making entire animal transversely striped.

**Antennae.** Reaching back to middle of ring 4.

**Body rings.** Paranota represented by a tiny keel on ring 2 (as Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite smooth or indistinctly striolate. A transverse row of setae on all body rings.

**Hypoproct.** Rounded trapezoidal, without distinct tubercles.

**Legs.** Length 1.3–1.5 × body width. Relative lengths of podomeres: femur > prefemur ≈ tarsus > tibia > postfemur. Scopulae on anterior legs on femur, postfemur, tibia and tarsus, disappearing from femur and postfemur on posterior legs.

**Sternum 5.** A trapezoidal process between legs 4 (Fig. 6E).

**Sternum 6.** Deeply excavated, rim simple.

**Gonopods** (Fig. 22). Coxa without a lateral process; coxal lobe (cxl) small. Prefemoral part (prf) ca 0.25 × as long as acropodite; mesal acropodital process (map) large, lamelloid, straight, with parallel margins, tip of process with two strong denticles, a few smaller denticles distally on dorsal margin; solenophore (sph) a rolled sheet, less than ⅔ as long as map, forming a tube with two small apical denticles and a slender process (sph-p) ca at mid-length.

**Distribution and habitat**

Known from three forest reserves in the western Udzungwas (New Dabaga/Ulamgambi FR, Kiranzi/Kitungulu FR, Udzungwa Scarp FR). Altitudinal range 1500–2100 m a.s.l. (upper limit according to Kraus 1958). Habitat: montane rain forest (studied specimens) and semi-rainforest (Kraus 1958). Collected together with *E. navuncus* sp. nov. and *E. nessiteras* sp. nov. in Kitungulu/Kiranzi FR.

**Remarks**

The studied near-topotype agrees completely with the original description (Kraus 1958); a side-by-side comparison with the holotype was therefore deemed unnecessary. Several juveniles with a colour pattern like that of *E. dabagaense* were found in samples from New Dabaga-Ulangambi FR containing no males of *E. dabagaense*, but one or several males of the entirely pallid *E. ottokrausi* sp. nov. Although a safe identification of these juveniles cannot be made, they probably belong to *E. dabagaense*. 

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Fig. 22. *Eviulisoma dabagaense* Kraus, 1958. **A–C.** Topotype, ♂, left gonopod. A. Mesal view. B. Lateral view. C. Ventral view. **D–F.** ♂ from Udzungwa Scarp FR, above Chita Village, right gonopod. D. Ventrolateral view. E. Sternal lobe between legs 4. F. Subdorsal view, emphasizing solenophore. Abbreviations: *cxl* = coxal lobe; *map* = mesal acropodital process; *prf* = prefemur; *slm* = solenomere; *sph* = solenophore; *sph-p* = slender process from *sph*. Scale bars: A–E: 0.1 mm; F = 0.05 mm.
**Eviulisoma coxale** sp. nov.

urn:lsid:zoobank.org:act:10D5E316-6E8F-4A38-8D58-197DDA963339
Figs 3B, 6F, 7E–F, 23

**Diagnosis**
Diffs from other species of the *E. dabagaense* group, except *E. culter* sp. nov., by having a distolateral process on the gonopod coxa. Differs from *E. culter* sp. nov. by having map with two strong apical denticles and several small denticles along the dorsal margin.

**Etymology**
The name, an adjective, refers to the peculiar modification of the gonopod coxa.

**Material studied** (total: 7 ♂♂)

**Holotype**
TANZANIA: ♂, Iringa Region, Mahenge District, West Kilombero Scarp FR, Nyambanitu Mts, S of Udekwa Village, 07°48′ S, 36°21′ E, 1500 m a.s.l., Dec. 1993, J.O. Svendsen leg. (ZMUC).

**Referred non-type material**
TANZANIA: 2 ♀♀, tentatively referred to this species, same collection data as for holotype (ZMUC); 1 ♂, Morogoro Region, Mwanihana FR, 1800–1850 m a.s.l., 28–29 Sep. 1984, litter in montane forest, N. Scharff leg. (ZMUC); 1 ♂, same collection data as preceding, but 1650 m a.s.l., 25–29 Sep. 1984, pitfall trap in montane rain forest (ZMUC); 1 ♂, same collection data as preceding, but 1400–1650 m a.s.l., montane rain forest (ZMUC); 1 ♂, Mwanihana Forest above Sanje, 1650 m a.s.l., 18 Aug. 1982, litter, M. Stoltze and N. Scharff leg. (ZMUC); 1 ♀ (tentatively assigned), 2 ♂♂, Morogoro Region, Udzungwa Mts National Park, Mito Mitatu, Plot 15, 07°49′39.8″ S, 36°50′26.0″ E, 1552 m a.s.l., 27 Nov. 2014, pitfall trapping, J. Malumbres-Olarte leg., sample codes 15 PT6 and 15 PT8 (ZMUC).

**Description** (holotype, male)

**Size.** Length 22 mm, max. width 2.0 – 2.5 mm.

**Colour** (Fig. 3B). Specimen from Nyambanitu Mts after 24 years in alcohol pallid, except collum and large lateral spots on body rings brownish, on poriferous rings the spots cover the ozopore. Specimens from Mito Mitatu and Mwanihana FR almost all pallid.

**Antennae.** Reaching back to middle of ring 4.

**Body rings.** Paranota absent, except for barely discernible keels on ring 2 (as in Fig. 4C). Stricture between pro- and metazonite indistinctly striolate. A transverse row of setae on most body rings (probably abraded where absent).

**Hypoproct.** Rounded-trapezoidal, without distinct tubercles.

**Legs.** Length 1.3 × body width. Relative lengths of podomeres: femur > prefemur ≈ tarsus > tibia > postfemur. Scopulae (Fig. 7E–F) on anterior legs on femur, postfemur, tibia and tarsus, diminishing and eventually disappearing on more posterior legs, especially on femur.

**Sternum 5.** A rounded-trapezoidal process between legs 4 (Fig. 6F).

**Sternum 6.** Deeply excavated, rim simple.
Gonopods (Fig. 23). Coxa with a long, digitiform distolateral process (cxp). Other gonopodal characters as in E. dabagaense: coxal lobe (cxl) moderate; prefemoral part (prf) ca 0.25 × as long as acropodite; mesal acropodital process (map) lamelloid, straight, with parallel margins, tip of process with two strong denticles, a row of smaller denticles along apical part of dorsal margin; solenophore (sph) a rolled sheet, separated from map by a distinct gap, less than \( \frac{2}{3} \times \) as long as map, forming a tube with two small apical denticles and a slender process ca at mid-length.

Specimens from Udzungwa Mts National Park

Similar to type specimens, except as follows:

Size. Length 25 mm, max. width 2.5 mm.

Fig. 23. Eviulisoma coxale sp. nov. A–D. Holotype, right gonopod. A. Mesal view. B. Ventral view. C. Dorsal view. D. Lateral view. E. Paratype from Mito Mitatu, right gonopod, showing lump of amorphous mass on tip of process map. Abbreviations: am = amorphous mass; cxl = coxal lobe; cxp = coxal process; map = mesal acropodital process; prf = prefemur; sph = solenophore. Scale bars: 0.1 mm.
**COLOUR.** Overall pallid after 3 years in alcohol; only head and collum slightly ochre-yellow; a small brown patch between antennae.

**ANTENNAE.** Reaching back to middle of ring 4. Antennomeres 2–6 subequal.

**Distribution and habitat**

Known from two sites in the Udzungwa Mts National Park. Altitudinal range 1400–1850 m a.s.l. Habitat: montane rain forest. Collected in litter and pitfall traps, together with *E. breviscutum* sp. nov. in Mwanihana Forest.

**Remarks**

This species is very similar to *E. dabagaense*, but differs in the presence of a distolateral finger-formed process on the gonopod coxa, the latter character being shared with *E. culter* sp. nov. There are several females and juveniles in the same sample as the holotype, in addition to the listed females. They agree with the holotype in all non-sexual characters except that they are uniformly pale. Whether this is due to fading of the large lateral spots seen in the holotype, or to the possibility that they represent a different species, is difficult to say. Several specimens from Udzungwa Mountains National Park carry large lumps of an amorphous mass (see Discussion) on the tip of process *map* (Fig. 23E). These specimens are slightly larger than the holotype and they do not have large lateral spots on the body rings, but these differences hardly warrant the recognition of a separate species.

**Eviulisoma culter** sp. nov.

urn:lsid:zoobank.org:act:AB9254B1-5D83-4B68-A56C-6ED62B509286

Figs 8B, 24

**Diagnosis**

Differs from other species of the *E. dabagaense* group by lacking denticles on the dorsal and ventral margins of *map*.

**Etymology**

The name is a noun in apposition, meaning ‘knife’ in Latin and referring to the shape of the mesal acropodital process (*map*).

**Material studied** (total: 5 ♂♂)

**Holotype**

TANZANIA: ♂, Dodoma Region, Mpwapwa District, Rubeho Mts (48 km W of Kilosa), Mangalisa Peak, 2100 m a.s.l., 26 Feb.1984, J. Kielland leg. (VMNH).

**Paratypes**

TANZANIA: 4 ♂♂, same collection data as for holotype (VMNH, ZMUC).

**Description** (male)

**SIZE.** Length up to 27 mm (smallers specimens incomplete), max. width 2.2–2.4 mm.

**COLOUR.** After 33 years in alcohol uniformly yellowish, probably faded.

**ANTENNAE.** Reaching back to middle of ring 4.

**BODY RINGS.** Paranota absent, except for barely distinguishable keels on ring 2 (as in Fig. 4C). Stricture between pro- and metazonite smooth. A transverse row of setae on all rings.
HYPOPROC. Rounded-triangular, without distinct tubercles.

LEGS. Length 1.2 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > tibia > postfemur. Scoopulae on anterior legs on femur, postfemur, tibia and tarsus; those on femur missing from posterior legs, those on postfemur, tibia and tarsus present almost until end of body.

STERNUM 5. An almost semicircular process between legs 4.

STERNUM 6. Deeply excavated, rim simple.

GONOPADS (Figs 8B, 24). Coxa with a short, triangular distolateral process (cxp); coxal lobe (cxl) small; prefemoral part (prf) ca 0.2 × as long as acropodite; mesal acropodital process (map) large, simple, lamelloid, knife-like, gently curved, with basally parallel and apically converging margins, tip of process simple, sharp, dorsal and ventral margins of process without denticles; solenophore (sph) a rolled sheet, less than ⅔ × as long as map, forming a tube with three apical processes (Fig. 24C).

Distribution and habitat
Known only from Mangalisa Peak in the Rubeho Mts, 2100 m a.s.l.

Fig. 24. Eviulisoma culter sp. nov., paratype, right gonopod. A. Mesal view. B. Ventral view. C. Tip of solenophore, lateral view. D. Lateral view. Abbreviations: cxl = coxal lobe; cxp = coxal process; map = mesal acropodital process; prf = prefemur; slm = solenomere; sph = solenophore. Scale bars: A–B, D = 0.2 mm; C = 0.05 mm.
Eviulisoma grumslingslak sp. nov.
urn:lsid:zoobank.org:act:07C12948-4168-49D7-B074-95DC69716565

Fig. 25

Diagnosis

Differs from other species of the *E. dabagaense* group by its larger size (width 2.5–3.4 mm vs 1.8–2.4 mm in other species) and by having the ventral margin of *map* strongly convex.

Etymology

The name, here to be regarded as a noun in apposition, means ‘pregnant’ in the now extinct Danish cryptolec ‘rotvælsk’ and refers to the shape of the gonopodal postfemoral process which (somewhat) resembles the profile of a pregnant woman’s torso.

Material studied

(total: 9 ♂♂)

**Holotype**

TANZANIA: ♂, Morogoro Region, Udzungwa Mts National Park, Kidatu, Plot 6, 07°40’42.1″ S, 36°55’06.8″ E, 1482 m a.s.l., 21 Oct. 2014, pitfall trapping, J. Malumbres-Olarte leg. (ZMUC).

**Paratype**

TANZANIA: ♂, same collection data as for holotype (ZMUC).

**Referred non-type material**

TANZANIA: 1 ♂, 3 ♀♀, Iringa Region, Udzungwa Mts, Ndundulu Forest, 07°46’46″ S, 36°29’32″ E, Waller’s Camp, tropical semi-evergreen forest, 1550 m a.s.l., 1–12 Jan. 2007. L.A. Hansen and local assistants leg. (ZMUC); 1 ♂, 5 ♀♀, 1 juv., same collection data as preceding, but Dec. 2006 (ZMUC); 1 ♂, Iringa Region, Udzungwa Mts, Ndundulu Forest, 07°46’ S, 36°29’ E, Luwasia Camp, semi-evergreen tropical, montane virgin forest, 1880 m a.s.l., 19 Feb.– 10 Mar. 2007, L.A. Hansen and local assistants leg. (ZMUC); 1 ♂, Iringa Region, Iringa District, West Kilombero Scarp FR, 07°45’34.2″ S, 36°26’37.4″ E, (open) woodland, 1510 m a.s.l., Plot Acacia, 7 Dec. 2000, Frontier Tanzania leg. (ZMUC); 3 ♂♂, same collection data as preceding, but 5 Dec. 2000, Frontier Tanzania leg. (ZMUC).

Description (male)

**Holo- and paratype**

**Size.** Length 34 mm, max. width 3.4 mm.

**Colour.** After 3 years in alcohol, overall impression: contrasting dark and pale transverse bands. Head light brown, vertigial region darker. Antennae pale yellow, or antennomeres 1–5 light brown, antennomeres 6–7 pale yellow. Collum brownish black. Postcollar body rings pale yellow; posterior dorsal quarter of metazonites brownish black; these dark transverse bands expanded in areas around ozopores. Legs pale yellow. Dorsal middle ⅕ of preanal ring brownish black.

**Antennae.** Reaching back to middle of ring 4.

**Body rings.** Paranota represented by a tiny keel on ring 2 (as in Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite indistinctly striolate. A transverse row of setae on all rings.

**Hypoproct.** Rounded-triangular, with a large median and a pair of smaller lateral tubercles.
Fig. 25. *Eviulisoma grumslingslak* sp. nov., paratype, right gonopod. A. Mesal view. B. Lateral view. C. Ventral view. D. Lateral view, detail, showing coxal lobe and entrance of solenomere into solenophore. Abbreviations: *cxl* = coxal lobe; *map* = mesal acropodital process; *prf* = prefemur; *slm* = solenomere; *sph* = solenophore. Scale bars: A–B = 0.2 mm; C–D = 0.1 mm.
LEGS. Length 1.5 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > postfemur = tibia. Scopulae on anterior legs on femur, prefemur, tibia and tarsus; those on femur and postfemur missing from posterior legs.

STERNUM 5. A small semicircular process between legs 4.

STERNUM 6. Deeply excavated, rim simple.

GONOPODS (Fig. 25). Coxa without a lateral process; coxal lobe (cxl) not very prominent. Prefemoral part (prf) ca 0.3 × as long as acropodite; mesal acropodital process (map) large, lamelloid, ventral margin strongly convex, dorsal margin concave, in profile the process vaguely resembles the torso of a pregnant woman (sway-backed, big belly), tip of process with two strong denticles, a few smaller denticles along apical part of ventral and especially dorsal margin; solenophore (sph) a simple rolled sheet, less than \( \frac{2}{3} \) × as long as map, forming a tube with two small apical denticles.

Specimens from West Kilombero Scarp FR, including Ndundulu Forest:
Similar to type specimens, except as follows:

SIZE. Max. width 2.5–2.9 mm.

COLOUR. After 10 years in alcohol more or less faded, but differs from type specimens in having the collum pale with dark margins.

ANTENNAE. Reaching middle of ring 3.

LEGS. Length 1.4 × body diameter.

GONOPODS. Denticles on ventral and dorsal margin of map in part indistinct/missing.

Distribution and habitat
Known from several sites in the Udzungwa Mts National Park and West Kilombero FR. Altitudinal range 1452–1880 m a.s.l. Habitat: mainly found in tropical semi-evergreen forest, but also in (open) Acacia woodland (cf. Frontier Tanzania 2001: 27, 174). Collected together with E. acaciae sp. nov. in West Kilombero FR, Plot Acacia, and with E. sternale sp. nov. in Ndundulu Forest.

Remarks
The differences between the type specimens and those from West Kilombero FR seem to be constant, but they are not regarded as significant enough to distinguish the two populations taxonomically.

The sternale group

Diagnosis
Species of Eviulisoma in which sternum 6 is deeply excavated, there is no intermediate acropodital process, the solenophore is a tightly rolled-up sheet of a tube-like appearance (with a few small processes), the mesal acropodital process is not particularly compressed, but is apically furcate and longer than the solenophore, and the rim of sternum 6 forms four lobes.

Included species:

E. sternale sp. nov.
E. kangense sp. nov.
E. zebra sp. nov.
No further species can be assigned to this group based on the existing literature. VandenSpiegel & Golovatch (2014: fig. 6e) illustrated the sternum 6 excavation in *E. taita* VandenSpiegel & Golovatch, 2014, and it appears that there are small lobes at the base of legs 6–7. However, in *E. taita* the mesal acropodital has no apical furcation and is shorter than the solenophore.

*Eviulisoma sternale* sp. nov.
urn:lsid:zoobank.org:act:C1C01D8B-4082-4DF2-83F0-FB8F444CF9F7
Figs 26–27

**Diagnosis**

Differs from other species of the *E. sternale* group by its smaller size (width 2.0 mm, vs 3.0–3.2 mm in other species) and by having an apical dentate ridge on map.

**Etymology**

The name is an adjective referring to the modified 6th male sternum.

**Material studied** (total: 1 ♂)

**Holotype**

TANZANIA: ♂, Iringa Region, Udzungwa Mts, West Kilombero Scarp FR, Ndundulu Forest 07°46′ S, 36°29′ E, Waller’s camp, tropical semi-evergreen forest, 1550 m a.s.l., 1–12 Jan. 2007, L.A. Hansen and local assistants leg. (ZMUC).

**Referred non-type material**

TANZANIA: 2 ♀♀, same collection data as for holotype (ZMUC); 1 ♀, 3 juv., same collection data as for holotype, but Dec. 2006 (ZMUC).

**Description** (male)

**Size.** Length 23 mm, max width 2.0 mm.

**Colour.** After 10 years in alcohol, overall impression: contrasting dark and pale transverse bands. Head brown; collum black; prozonites yellowish white; metazonites black; antennae and legs light yellow; telson brown, darker (black) dorsally.

**Antennae.** Reaching back to middle of ring 4.

**Body rings.** Paranota completely absent. Stricture deep, broad, smooth. Setae absent, except for a mid-dorsal pair on ring 2.

**Hyoproct.** Semicircular, no distinct tubercles.

**Legs.** Length 1.5 × body width. Relative lengths of podomeres: femur > tarsus > prefemur > tibia > postfemur. Scopulae present on tibia and tarsus on pre-gonopodal legs (Fig. 26C); also present, but poorly developed, on femur and postfemur. Prefemur and femur of post-gonopodal legs ventrally smooth, almost hairless (Fig. 26B).

**Sternum 5.** A bell-shaped process between coxae 4.

**Sternum 6** (Fig. 26A). Deeply excavated. Lateral rims of excavation produced into two lobes on each side, one lobe at basis of each leg.
**Gonopods** (Fig. 27). Coxal lobe (cxl) moderately developed. Prefemoral part (prf) ca half as long as acropodite. Mesal acropodital process (map) long, straight, stout, with a deep, broad furrow on apical part of mesal surface, apically with three stout, triangular tines (tn1, tn2, tn3) and a transverse, dentate ridge (dr). Solenophore (sph) a simple rolled sheet, considerably shorter than process map, apically with two small processes.

**Distribution and habitat**
Known only from the West Kilombero Scarp FR, Ndundulu Forest, 1550 m a.s.l. Habitat: tropical semi-evergreen forest. Collected together with *E. grumslingslak* sp. nov.

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**Fig. 26. Eviulisoma sternale** sp. nov., holotype. A. Ventral side of 6th body ring with right side legs, showing lobed rim of excavation. B. Post-gonopodal leg, showing smooth prefemur and femur. C. Pre-gonopodal leg, showing scopula. Scale bars: 0.1 mm.
Remarks
The ventrally smooth prefemora and femora is an unusual feature of this species, shared only with *E. kangense* sp. nov. (see Discussion).

Fig. 27. *Eviulisoma sternale* sp. nov., holotype, right gonopod. A. Mesal view. B. Ventral view. C. Tip of mesal acropodital process (*map*), ventral view. D. As C, dorsal view. E. Lateral view. Abbreviations: cxl = coxal lobe; dr = dentate ridge; *map* = mesal acropodital process; prf = prefemoral part; sph = solenophore; tn1, tn2, tn3 = apical tines of process *map*. Scale bars: 0.1 mm.
Eviulisoma kangense sp. nov.
urn:lsid:zoobank.org:act:5BB2A851-08A1-439E-95A5-241DF9AA50DD
Figs 28–29

Diagnosis
Differs from other species of the E. sternale group by having the solenophore almost as long as map. Differs from E. sternale sp. nov. by its larger size (width 3.2 mm vs 2.0 mm) and by having a slenderer map without an apical dentate ridge. Differs from E. zebra sp. nov. by having a flattened, almost hairless area on the ventral side of the prefemora and femora of the legs of a number of post-gonopodal body rings.

Etymology
The name is an adjective referring to the type locality, the Kanga Mts.

Material studied (total: 12 ♂♂)

Holotype
TANZANIA: ♂, Kanga Mts, Morogoro Region, Kanga FR, 400–500 m a.s.l., 22–25 Nov. 1984, lowland rainforest, N. Scharff leg. (ZMUC).

Paratypes
TANZANIA: 11 ♂♂, same collection data as for holotype (ZMUC).

Referred non-type material
TANZANIA: 4 ♀♀, 1 juv., same collection data as for holotype (ZMUC).

Description (male)

SIZE. Length 33 mm, max. width 3.2 mm.

COLOUR. Overall impression ringed. Head, collum, posterior ⅔ of metazonites, epiproct and paraprocts dark brown, rest of body and appendages pale yellowish.

ANTENNAE. Reaching back to middle of ring 4.

BODY RINGS. Paranota sometimes visible as a very faint line/keel on ring 2 (as Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite striolate. A transverse row of setae on all rings, but many setae abraded.

HYPOPROCT. Rounded-trapezoid, without distinct tubercles.

LEGS. Length 1.5 × body width. Relative lengths of podomeres: femur ≈ tarsus > prefemur > tibia > postfemur. Tibiae and tarsi with dense scopulae (Fig. 28B–C); prefemora and femora of legs of rings 8–18 ventrally with a flattened, almost hairless area clearly demarcated against the normal surface (Fig. 28E).

STERNUM 5. A rounded-rectangular process, sometimes slightly bilobed, between legs 4.

STERNUM 6. Deeply excavated. Lateral rims of excavation produced into two lobes on each side, one lobe at basis of each leg (Fig. 28A).
Fig. 28. *Eviulisoma kangenense* sp. nov., paratype. A. Body ring 6, oblique ventral view. B. Post-gonopodal leg. C. Detail of scopula. D. Pre-gonopodal leg (leg from ring 6). E. Femur of post-gonopodal leg, showing smooth, soft ventral surface. Scale bars: A–B, D = 0.2 mm; C = 0.01 mm; E = 0.1 mm.
**Fig. 29.** Eviulisoma kangense sp. nov., paratype, right gonopod. **A.** Lateral view. **B.** Ventral view. **C.** Mesal and slightly dorsal view. **D.** Tip of mesal acropodital process \( (\text{map}) \). **E.** Tip of solenomere. Aluminium tape used for mounting visible in lower right part of C. Abbreviations: cxl = coxal lobe; map = mesal acropodital process; prf = prefemoral part; slm = solenomere; sph = solenophore; \( tn_1, tn_2, tn_3 \) = apical tines of process map. Scale bars: A–C = 0.2 mm; D = 0.1 mm; E = 0.02 mm.
GONOPODS (Fig. 29). Coxal lobe (cxl) prominent. Prefemoral part (prf) ca ⅓ as long as acropodite. Mesal acropodital process (map) long, slender, slightly curved, apically divided into three pointed tines (tn1, tn2, tn3); dorsal tine (tn1) shortest, separated from the two other tines by a V-shaped incision. Solenophore (sph) almost as long as map, a simple ‘rolled sheet’, ending in two small triangular processes.

Distribution and habitat

Known only from the Kanga Mts, Kanga FR, 400–500 m a.s.l. Habitat: lowland rainforest. The Kanga Mts belong to the Nguru massif, one of the smaller blocks of the Eastern Arc Mountains, situated some 150 km N of the Udzungwa Mts.

Remarks

Although females have in general not been considered in this paper, it is worth noting that in this species, female legs are without dense setation on any podomere, and without modified prefemora and femora. See also Discussion.

Eviulisoma zebra sp. nov.

*Eviulisoma zebra* sp. nov. urn:lsid:zoobank.org:act:CDF79D62-E412-4DC3-AE93-6832AAC737A4

Figs 1, 4C, 30–31

Diagnosis

Differs from other species of the *E. sternale* group by the combination of its large size (width 3.0 mm), the lack of an apical dentate ridge on map and the lack of modification of post-gonopodal prefemora and femora.

Etymology

A noun in apposition alluding to the striped appearance of this species.

Material studied (total: 5 ♂♂)

**Holotype**

TANZANIA: ♂, Udzungwa Mts National Park, 07°40.786´ S, 36°55.120´ E, 1450 m a.s.l., 8 Oct. 2014, Martin Nielsen leg. (ZMUC).

**Paratypes**

TANZANIA: 4 ♂♀, same collection data as for holotype (ZMUC).

Description (male)

**Size.** Length 31 mm, max. width 3.0 mm.

**Colour.** Live (Fig. 1) and freshly preserved animals vividly ringed. Head, collum, telson and metazonites except for a narrow anterior zone deep black, contrasting with white prozonites, antennomeres 1–5 and legs; antennomeres 6–7 brown.

**Antennae.** Reaching back to anterior part of ring 5.

**Body rings.** Paranota absent, except for tiny keels on ring 2 (Fig. 4C). Stricture between pro- and metazonite clearly striolate (Fig. 30A). A transverse row of setae on ring 2, ring 3 sometimes with a few tiny setae, following rings without setae.

**Hypoproct.** Rounded-trapezoid, without distinct tubercles.
LEGS. Length 1.3 × body width. Relative lengths of podomeres: femur > prefemur ≈ tarsus > tibia > postfemur. Legs densely hirsute on ventral surface (Fig. 30D), but proper scopulae poorly developed, on postfemur, tibia and tarsus (Fig. 30C); those on tarsus also present on posteriormost legs, however.

STERNUM 5. A rounded-trapezoid process between legs 4.

STERNUM 6 (Fig. 30B). Deeply excavated. Lateral rims of excavation produced into two lobes on each side, one lobe at basis of each leg.

GONOPADS (Fig. 31). Coxal lobe (cxl) prominent. Prefemoral part (prf) ca 0.3 × as long as acropodite. Mesal acropodital process (map) long, slender, slightly curved, apically divided into three pointed tines (tn1, tn2, tn3); ventral tine (tn1) process largest, separated from the two others by a V-shaped incision; lumps of an amorphous mass (am) adhering to tip of map. Solenophore (sph) ca 0.7 × as long as map, a simple rolled sheet, ending in two small processes, one slender, the other broadly triangular.

Distribution and habitat

Known only from the Udzungwa Mts National Park, 1450 m a.s.l.

Fig. 30. Eviulisoma zebra sp. nov., paratype. A. Midbody ring, showing carinulate stricture and ozopore. B. Sternum 6, showing lobate rim of excavation. C–D. Midbody leg. C. Tarsus and part of tibia, showing scopulae. D. Prefemur and femur, showing dense setation. Abbreviations: oz = ozopore; str = stricture. Scale bars: A–B = 0.2 mm; C–D = 0.1 mm.
Fig. 31. *Eviulisoma zebra* sp. nov., paratypes. A. Paratype 1, right gonopod, mesal view. B–C. Paratype 2, gonopods. B. Lateral view. C. Ventral view; notice lumps of secretion between apical tines. D. Paratype 1, right gonopod, (latero-)ventral view. Abbreviations: *am* = amorphous mass; *cxl* = coxal lobe; *map* = mesal acropodital process; *sph* = solenophore; *slm* = solenomere; *tn1, tn2, tn3* = apical tines of process *map*. Scale bars: 0.1 mm.
Remarks

Although this species is very similar to the two other species in the *E. sternale* group, especially to *E. kangense* sp. nov., it differs by lacking the peculiar modifications of the prefemur and femur of at least some post-gonopodal legs.

The *iuloideum* group

Diagnosis

Species of *Eviulisoma* in which sternum 6 is deeply excavated with unlobed margins, the gonopod acropodite has a separate basal ‘femorite’ part, there is no intermediate acropodital process and the solenophore is a large, unrolled sheet without apical lobes.

Included species:

*E. iuloideum* (Verhoeff, 1941)
*E. articulatum* sp. nov.

This group corresponds to the genus *Himatiopus* Verhoeff, 1941. The description of *E. iuloideum* by Verhoeff (1941) is quite good, and the similarity with *E. articulatum* sp. nov. is obvious. An examination of the type material of *Himatiopus iuloideus* confirmed the similarity but also confirmed that the two species are indeed different.

*E. lanceolatum* Attems, 1953 (Congo) also seems to have an articulated acropodite, but the solenophore is quite different (Jeekel 2003); hence, *E. laceolatum* is not regarded as a member of the *iuloideum* group.

*Eviulisoma iuloideum* (Verhoeff, 1941)

Fig. 32

*Himatiopus iuloideus* Verhoeff, 1941: 243.

*Eviulisoma iuloides* – Jeekel 1968: 101.

*Eviulisoma iuloideus* – Mortiz & Fischer 1978: 105.

*Eviulisoma iuloideum* – Jeekel 2003: 69.

Diagnosis

Differs from all other *Eviulisoma* species, except *E. articulatum* sp. nov. and *E. lanceolatum*, by the obviously articulated gonopod acropodite. Very similar to *E. articulatum* sp. nov., with which it shares the very large, subrectangular solenophore, but differs from that species by having a cylindrical mesal acropodite process (*map*) without a subapical side branch (*vs* *map* tapering, with a side branch), as well as by having a triangular hypoproct (*vs* a rounded trapezoid, tritubercuate hypoproct).

Material studied

Syntypes

TANZANIA (all in ZSM): 1 ♂ (only posterior half), 1 ♀, in alcohol, non-original label “*Himatiopus iuloideus* Verhoeff, Tanganjika, Tier mit Originaldet.-Etik. (Typus-Verd.), ehem. Trockenm. Etik. Nr.1277”; slide with gonopod, labelled “A20035148, *Himatiopus juloideus* Verh. Gp. ♂ Tanganjika”; slide with male leg pairs 1–6, labelled “A20035147, *Himatiopus juloideus* Verh. 1.–6. B. ♂ Tanganjika”; 2 ♀, in alcohol, “Tanganykia, Mufindi, Iringa, in tea nursery, xii – 1930, W. V. Harris, from DAO”.

Remarks

As far as can be seen from the available material, *E. iuloideum* shares the general morphology of the Udzungwan *Eviulisoma* species. It is especially similar to *E. articulatum* sp. nov., from which it differs
gonopod-wise as specified in the diagnosis. Figure 32 (from Verhoeff 1941) shows the gonopod telopodite of E. iuloideum; a restudy of the gonopod slide confirmed that Verhoeff’s drawing is accurate. In particular, the mesal acropodital process (map) does not have a subapical side branch. The two species also differ in the shape of the hypoproct, which in E. iuloideum is triangular vs rounded trapezoid, with three tubercles in E. articulatum sp. nov. According to Verhoeff (1941), E. iuloideum, unlike E. articulatum sp. nov., has no setae on the collum and body rings (“spärliche Beborstung nur am Telson”), but considering how delicate and hard to see these setae are, this difference is hardly significant. The type locality of E. iuloideum, “Tanganjikasee bei Mufundi-Iringa”, probably refers to Mufundi SW of Iringa City, some 100 km SW of the type locality of E. articulatum sp. nov., i.e., outside the Udzungwa Mts (and, as is the case with several other localities at the “Tanganjikasee” mentioned by Verhoeff 1941, very far from Lake Tanganjika [did Verhoeff misread “tea nursery”?]).

**Eviulisoma articulatum** sp. nov.

urn:lsid:zoobank.org:act:FD505E16-0A0E-47FB-AB2D-5200D8346CF2

Fig. 33

**Diagnosis**

Differs from all other Eviulisoma species, except E. iuloideum and E. lanceolatum, by the obviously articulated gonopod acropodite. Very similar to E. iuloideum, with which it shares the very large, subrectangular solenophore, but differs from that species by having a pointed, tapering mesal acropodite process (map) with a subapical side branch (vs map cylindrical, not tapering and without a side branch), as well as by having a rounded trapezoid, tritubercuate hypoproct (vs a triangular hypoproct).

**Etymology**

The specific epithet is an adjective referring to the articulated gonopod acropodite.
Fig. 33. *Eviulisoma articulatum* sp. nov., holotype, right gonopod. A. Mesal view. B. Lateral view. C. Ventral view. D. Dorsal view. E. Acropodite, distal (-anterior) view. Abbreviations: cxl = coxal lobe; fet = ‘femorite’; map = mesal acropodital process; ra = ridged area on internal surface of sph; sb = side branch of map; slm = solenomere; sph = solenophore. Scale bars: A–D= 0.1 mm; E = 0.05 mm.
Material studied (total: 1 ♂)

Holotype
TANZANIA: ♂, Iringa Region, Iringa District, Kalimbasi Mountain, 2000–2100 m a.s.l., 10 km S of Mazombe, forest floor, Jan. 1984, J. Kielland leg. (VMNH).

Description (male)
SIZE. Length 18 mm, max. width 1.9 mm.

COLOUR. Completely pallid after 33 years in alcohol.

ANTENNAE. Reaching back to middle of ring 3.

BODY RINGS. Paranota completely absent. Stricture between pro- and metazonite faintly striolate. A transverse row of setae on all body rings.

HYPOPROCT. Rounded trapezoid, with three poorly developed tubercles.

LEGS. Stout, length 0.8 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > postfemur > tibia. Scopulae very well-developed, on femur, postfemur, tibia and tarsus, absent from femur only on posteriormost leg pairs.

STERNUM 5. A rounded-rectangular process, between legs 4.

STERNUM 6. Deeply excavated. Lateral rims of excavation simple.

GONOPODS (Fig. 33). Coxal lobe (cx) moderate. Prefemoral part (prf) ca half as long as acropodite. Acropodite with a separate basal part (‘femorite’, fet) separated from apical part by an arched articulation at ca ⅓ of its length. Mesal acropodial process (map) simple, stout, slightly arched, tapering, apically pointed, with a small laterad subapical side branch (sb). Solenophore (sph) a very large subrectangular sheet, almost as long as map, distal margin in lateral view (Fig. 33B) oblique with a small triangular tooth in middle. Internal surface (Fig. 33E) with a deeply ridged area (ra).

Distribution and habitat
Known only from Kalimbasi Mountain, S of Mazombe town, 2000–2100 m a.s.l. The site is located in the Kisinga-Rugaro FR.

Ungrouped species

Three species have no very similar congeners, neither among the species treated her, nor, as far as can be deduced, among previously described species. Rather than erecting a group for each of these, they are left ungrouped.

Ungrouped species:

E. angulatum sp. nov.
E. biquintum sp. nov.
E. breviscutum sp. nov.
**Evulisoma angulatum** sp. nov.
urn:lsid:zoobank.org:act:B9772330-5C4A-4CFC-A5A0-A8A4DE67AC65

Fig. 34

**Diagnosis**

Differs from all other *Evulisoma* species by the angular rim of the sternum 6 excavation and by the opposing hooks of the mesal acropodital process (*map*) and the solenophore (*sph*).

**Etymology**

The specific epithet is an adjective referring to the angular shape of the rim of the excavation of the male sternum 6.

**Material studied** (total: 7 ♂♂)

**Holotype**

TANZANIA: ♂, Morogoro Region, Udzungwa Mts National Park, Kidatu, Plot 5, 07°40'45.5" S, 36°55'06.9" E, 1448 m a.s.l., 21 Oct. 2014, pitfall trapping, J. Malumbres-Olarte leg. (ZMUC).

**Paratypes**

TANZANIA: 6 ♂♂, same collection data as for holotype (ZMUC).

**Description** (male)

**Size.** Length 14 mm, max. width 1.3 mm.

**Colour.** Overall colour after 3 years in alcohol medium brown, lighter ventrally. Clypeolabral region, mandibular bases, antennae and legs pale yellowish.

**Antennae.** Reaching back to middle of ring 3.

**Body rings.** Paranota completely absent. Stricture between pro- and metazonite indistinctly striolate. No setae on postcollar body rings.

**Hyoproct.** Triangular, tubercles indistinct.

**Legs.** (Fig. 34G). Stout, length ≈ body width. Relative lengths of podomeres: femur > prefemur > tarsus > postfemur = tibia. Scopulae on femur, postfemur, tibia and tarsus on anterior legs, only on tibia and tarsus on posterior legs.

**Sternum 5.** A high, narrow, rectangular hairy process between legs 4.

**Sternum 6.** (Fig. 34F). Deeply excavated. Rim of excavation laterally forming prominent rectangular ‘corners’.

**Gonopods.** (Fig. 34A–E). Coxal lobe (*cxl*) moderate. Prefemoral part (*prf*) almost half as long as acropodite. Mesal acropodital process (*map*) stout, slightly arched, subapically with irregular ridges on mesal surface, ending in pointed tip; a large subapical irregular, dorsad hook (*hmap*), with a small pointed side branch. Solenophore (*sph*) as long as *map*, stout, arched, ending in pointed tip similar to that of *map*; a large subapical ventrad hook (*hsph*) lying parallel to hook (*hmap*) of mesal acropodital process.

**Distribution and habitat**

Known only from the Udzungwa Mts National Park, Kidatu, 1448 m a.s.l.
Fig. 34. Eviulisoma angulatum sp. nov., paratype. A–E. Left gonopod. A. Mesal view. B. Lateral view. C. Ventral view. D. Tips of mesal acropodial process and solenophore, mesal view. E. As D, latero-dorsal view, also showing solenomere. F. Excavation of sternum 6. G. Leg from ring 6. Abbreviations: cxl = coxal lobe; hmap = hook-shaped process of map; hsp = hook-shaped process of sph; prf = prefemoral part; slm = solenomere; sph = solenophore. Scale bars: A–C, F = 0.1 mm; D–E, G = 0.05 mm.
**Diagnosis**

Differs from all other species of *Eviulisoma* by having two knobs on sternum 5, one between coxae 4 and one between coxae 6. Differs from most species of *Eviulisoma* by lacking an excavation of sternum 6.

**Etymology**

The name is composed of the Latin *bi*, meaning ‘two’, and *quintum*, meaning ‘fifth’, and refers to the two knobs on sternum 5.

**Material studied** (total: 3 ♂♂)

**Holotype**

TANZANIA: ♂, Iringa Region, Iringa District, Nyambanike Mts, Udekwa Village, Ukami Forest, 7°42'49" S, 36°25'15" E, Jul.–Nov. 1994, David Moyer leg. (ZMUC).

**Paratypes**

TANZANIA: 1 ♂, Iringa District, Mwanihana FR, Uzungwa Mts, Sanje River valley near Sanje Falls, 3000 ft a.s.l., 23 Nov. 1979, W.A. Rodgers and K.H. Bulstrode leg. (VMNH); 1 ♂, Morogoro Region, Uzungwa Mts National Park, Mito Mitatu, Plot MM1, 07°50'16.3" S, 36°50'44.6" E, 800 m a.s.l., 22 Mar. 2013, hand collected, T. Pape and N. Scharff leg. (ZMUC).

**Description** (male)

**Size.** Length 19–24 mm, max. width 2.0–2.4 mm.

**Colour.** Specimen from Mito Mitatu after 4 years in alcohol with entire body deep black, except for amber-coloured sternal regions and contrastingly white legs (Fig. 3C). Specimen from Udekwa Village (holotype): after 23 years in alcohol head reddish brown; antennae, collum, metazonites and telson dark brown; prozonites and legs yellowish. Specimen from Mwanihana FR overall pallid after 38 years in alcohol, only metazonites dorsally very light brownish.

**Antennae.** Reaching back to ring 4 or 5.

**Body rings.** Paranota represented by very indistinct keels on body ring 2 (as Fig. 4C), otherwise completely absent. Stricture between pro- and metazonite smooth. No setae seen on post-collar metazonites (abraded?).

**Hypoproct.** Semicircular, no marginal tubercles.

**Legs.** Length 1.5 × body width. Relative lengths of podomeres: tarsus (> femur > tibia (> prefemur (> postfemur. Scopulae poorly developed, only on tibia and tarsus, absent from posteriormost leg pairs.

**Sternum 5.** With two small median knobs, one between legs 4, one between legs 5.

**Sternum 6.** Not excavated, coxae more separated than on normal body rings.

**Gonopods** (Fig. 35). Coxal lobe (*cxl*) moderate, irregular, not evenly rounded. Prefemoral part (*prf*) ca 0.4 × as long as acropodite. Mesal acropodal process (*map*) long, narrow, straight sides tapering
Fig. 35. *Eviulisoma biquintum* sp. nov., holotype. A–D. Right gonopod. A. Mesal view. B. Ventral view. C. Lateral view. D. Acropodite, subapical view. E. Sternum 5. Abbreviations: *cxl* = coxal lobe; *map* = mesal acropodital process; *prf* = prefemoral part; *slm* = solenomere; *sph* = solenophore. Scale bars: A–C, E = 0.1 mm; D = 0.05 mm.
towards tip, apically regularly rounded, dorsally concave, forming gutter for solenophore. Solenophore (sph) slender, simple, a little longer than map, apically with two slender processes.

**Distribution and habitat**

Known from two parts of the Udzungwa Mts: Udzungwa Mountains National Park (incl. Mwanihana FR) and Nyambanike Mts in West Kilombero Scarp FR.

**Remarks**

The newly collected specimen from the Udzungwa National Park is strikingly coloured – black body and white legs (Fig. 3C) – whereas the one from Nyambenike seems to be less remarkable in this respect. Fading with age of the specimen may explain the difference, but more specimens from each of these sites would be highly desirable in order to ascertain whether we are really dealing with only one species.

The gonopods resemble those of *E. taitaorum* VandenSpeigel & Golovatch, 2014, and *E. taita* VandenSpeigel & Golovatch, 2014. These two species, however, have an excavated sternum 6, and *E. taitaorum* lacks a lobe on sternum 5. No other species has two processes behind each other on sternum 5, according to available descriptions.

**Eviulisoma breviscutum** sp. nov.  
urn:lsid:zoobank.org:act:D7C4195B-37DF-4B02-BD3B-4447DBCBB23C

**Fig. 36**

**Diagnosis**

Differs from other Udzungwan species of *Eviulisoma* by the combination of unmodified sterna 5 and 6 and a very short map (ca half as long as solenophore).

**Etymology**

The name is a noun in apposition meaning ‘short shield’ and refers to the short, shield-like mesal acropodital process.

**Material** (total: 3 ♂♀♀)

**Holotype**

TANZANIA: ♂, Mwanihana Forest, above Sanje, 1650 m a.s.l., pitfall trap, 18 Aug. 1982, M. Stoltze and N. Scharff leg. (ZMUC).

**Paratypes**

TANZANIA: 1 ♂, Morogoro Region, Kilombero District, Udzungwa Mts National Park, forest below Mwanihana Peak, 7°49′ S, 36°50′ E, 1800 m a.s.l., sifted from leaf litter, 20 Aug. 2017, T. Pape leg. (ZMUC); 1 ♂, Morogoro Region, Udzungwa Mts National Park, Mito Mitatu, above Mang’ula, 07°49′3″ S, 36°52′58″ E, 1487 m a.s.l., 16 Dec. 2016, T. Pape and N. Scharff leg. (ZMUC).

**Description** (male)

**Size.** Length 14–15 mm, max. width 1.5–1.6 mm.

**Colour.** After 3 months in alcohol dorsally dark brown to blackish brown, vertex and metazonites medium brown, rest of head, antennae and legs pale yellowish.

**Antennae.** Reaching back to middle of ring 3.

**Body rings.** Ring 2 with barely perceptible keels representing paranota (as in Fig. 4C). Stricture between pro- and metazonite striolate. No setae seen on body rings.
Fig. 36. *Eviulisoma breviscutum* sp. nov., paratype from forest below Mwanihana Peak. A–D. Right gonopod. A. Mesal view. B. Lateral view. C. Ventral view. D. Dorsal view. E. Body rings 5 and 6, showing unmodified sterna. Abbreviations *cxl* = coxal lobe; *map* = mesal acropodital process; *prf* = prefemoral part; *slm* = solenomere; *sph-d*, *sph-v* = dorsal and ventral lobes of solenophore; *st5*, *st6* = sterna 5 and 6. Scale bars: 0.1 mm.
HYPOPROC. Triangular, with a distinct median tubercle.

LEGS. Length 0.8–0.9 × body width. Relative lengths of podomeres: femur > prefemur > tarsus > tibia ≈ postfemur. Scopulae not prominent, on anterior legs on (postfemur), tibia and tarsus, disappearing on more posterior legs.

STERNUM 5 (Fig. 36E). Unmodified, no process.

STERNUM 6 (Fig. 36E). Not excavated, coxae 6–7 more separated than on normal body rings.

GONOPODS (Fig. 36A–D). Coxal lobe (cxl) small. Prefemoral part (prf) slightly more than half as long as acropodite. Mesal acropodital process (map) short, shield-like, apically smoothly rounded. No intermediate acropodital process. Solenophore (sph) large, ca twice as long as map, apically divided into a finger-shaped dorsal lobe (sph-d) and a more massive ventral lobe (sph-v), ventral lobe in turn divided into a pointed erect branch and a rounded ‘head’ set off from main axis by right angles.

Distribution and habitat
Known from two places in the Udzungwa Mountains National Park forest. Altitudinal range 1487–1800 m a.s.l. Collected together with E. coxale sp. nov. in Mwanihana Forest.

Remarks
The gonopods of this species bear some resemblance to those of E. somaliense Ceuca, 1971, sharing a short, shield-like mesal acropodital process (“ramo laterale” of Ceuca 1971) and an apically bifurcate solenomere (“ramo seminale” of Ceuca 1971). However, E. somaliense also has a large lobe (“placa allungata”) between map and sph, and it has a lobe on sternum 5 as well as an excavated sternum 6. The shapes of map and slm are also reminiscent of those of E. julinum, the type species of Eoseviulisoma, and with this species E. breviscutum sp. nov. also shares the lack of a sternum 6 excavation and a sternum 5 lobe. However, in E. julinum the premoral part of the gonopod is very much larger than in E. breviscutum sp. nov.

Key to Udzungwan s. str. species of Eviulisoma
The key is based on adult males. Identifications should always be checked against the species descriptions and illustrations, as additional species of Eviulisoma are expected to exist in the Udzungwa Mts.

1. Sternum 6 with a deep excavation ..................................................................................................................2
   – Sternum 6 not excavated .............................................................................................................................21

2. Gonopod with an intermediate acropodital process (iap) ...........................................................................3
   – Gonopod without an intermediate acropodital process .............................................................................15

3. Acropodite with a finger-shaped basal process (Fig. 9: bap) ..............E. kwabuniense Kraus, 1958
   – Acropodite without a basal process ...........................................................................................................4

4. Dorsal lobe of solenophore (sph-d) in the shape of a very large hook (Fig. 13) ....E. cetafi sp. nov.
   – Dorsal lobe of solenophore different .........................................................................................................5

5. A strong hook emerging from concave side of solenophore (Fig. 21: sph-h) .................................................E. paradisiacum sp. nov.
   – No strong hook emerging from concave side of solenophore .....................................................................6
6. Large species (width 2.6–3.3 mm) with contrasting dark and pale transverse bands; dorsal lobe of two-lobed solenophore (sph-d) large, as long as acropodital processes and ending in a hook (Figs 8A, 12) ........................................................................................................... E. akkariae sp. nov.
   - Smaller species (width 1.5–2.1 mm), (always?) without contrasting transverse bands; solenophore different .............................................................................................................................................. 7

7. Gonopods with four very to extremely slender processes (Fig. 19: iap, map, sph-d, sph-v) ...........
   - At least some of these processes stouter .................................................................................... 8

8. Intermediate acropodital process (iap) much shorter than mesal acropodital process (map); dorsal lobe of solenophore (sph-d) bifid (Fig. 17) .............................................. E. kalimbasiense sp. nov.
   - Intermediate acropodital process as long or almost as long as mesal acropodital process; dorsal lobe of solenophore different .......................................................................................................... 9

9. Mesal acropodital process (map) with a long, curved side branch fitting over semicircular dorsal lobe of solenophore (sph-d) (Fig. 18) ..................................................... E. navuncus sp. nov.
   - Mesal acropodital process different ............................................................................................. 10

10. Solenophore with three elongate lobes .................................................................................... 11
    - Solenophore with two lobes, sometimes with a rudimentary intermediate lobe as well .......... 14

11. All three lobes of solenophore of equal length, but intermediate lobe (sph-i) thinner than the others (Fig. 11) .............................................................................................................. E. aequilobatum sp. nov.
    - The three lobes of solenophore of unequal length ........................................................................ 12

12. Intermediate lobe of solenophore (sph-i) much shorter than the slender, approximately equally long dorsal and ventral lobes (sph-d and sph-v) (Fig. 15) .................................................. E. commelina sp. nov.
    - Dorsal lobe of solenophore (sph-d) much longer than intermediate and ventral lobes (sph-i and sph-v) ........................................................................................................................................... 13

13. Intermediate and ventral lobes of solenophore (sph-i and sph-v) slender; subapical side branch of mesal acropodital process (map) directed laterad (Fig. 14) .......................... E. chitense sp. nov.
    - Intermediate and ventral lobes of solenophore (sph-i and sph-v) very short and broad; subapical side branch of mesal acropodital process (map) directed obliquely apicad (Fig. 20) ............................................................... E. ottokrausi sp. nov.

14. Solenophore with two broad lobes; mesal acropodital process (map) ending in two subequal points (Fig. 10) ........................................................................................................ E. acaciae sp. nov.
    - Solenophore with a stout dorsal lobe (sph-d), a slender ventral lobe (sph-v) and a rudimentary intermediate lobe (sph-i); mesal acropodital lobe (map) ending in a hooked point and with a small, pointed subapical side branch (Fig. 16) ..................................................................................... E. ejti sp. nov.

15. Sternum 6 excavation with four-lobed or angled rim (Figs 26A, 30A, 34F) ......................... 16
    - Sternum 6 excavation with a simple rim (as Fig. 6A–C) ........................................................... 18

16. Sternum 6 excavation with angled rim (Fig. 34F); mesal acropodital process (map) with large subapical hook opposing corresponding hook on solenophore (Fig. 34A–B, D) ...................................................... E. angulatum sp. nov.
    - Sternum 6 excavation with four-lobed rim (Figs 26A, 30A); gonopods different ............ 17
17. Smaller species (width 2.0 mm); a dentate ridge present on mesal acropodital process (map) (Fig. 27) ................................................................. ...E. sternale sp. nov.
- Larger species (width 3.0–3.2 mm); no dentate ridge on map (Fig. 31) ............E. zebra sp. nov.

18. Gonopod acropodite with a separate basal ‘femorite’; solenophore large, plate-like (Fig. 33) ....
- ...................................................................................................................E. articulatum sp. nov.
- No separate ‘femorite’; solenophore slender, tube-like (‘rolled sheet’) .................................19

19. Larger species (width 2.5–3.4 mm); ventral margin of mesal acropodital process (map) strongly convex (Fig. 25) ..............................................................E. grumslingslak sp. nov.
- Smaller species (width 1.8–2.4 mm); ventral margin of map almost straight ..................20

20. Gonopod coxa with a slender distolateral process (Fig. 23A: cxp) ..................E. coxale sp. nov.
- Gonopod coxa without a distolateral process (Fig. 22) .........................E. dabagaense Kraus, 1958

21. Sterna 5 and 6 each with a knob-like process (Fig. 35) ..............E. biquintum sp. nov.
- Sterna 5 and 6 without processes (Fig. 36) .....................................................E. breviscutum sp. nov.

**Distribution and habitat patterns**

All Udzungwan s. str. species of Eviulisoma are endemic to the Udzungwa Mts. Figure 37 shows the distribution of the 22 species plotted on a diagrammatic map of the areas within the Udzungwa where the species have been collected. Only three species (E. dabagaense, E. navuncus sp. nov. and

![Diagram of species distribution](./image.png)

**Fig. 37.** Distribution of species of Eviulisoma Silvestri, 1910, in the Udzungwa Mts. The positions of the ovals in relation to each other approximately correspond to the relative position of the Udzungwa Mts National Park, Mt Kalimbasi and the three forest reserves, cf. Fig. 2. Species shared between two or three areas are indicated with coloured text and double-headed arrows.
E. nessiteras sp. nov.) have been found in more than one area. The Udzungwa Mts National Park, where the highest number of species (nine) has been found, shares no species with other areas.

Table 4 shows the altitudinal distribution of the Udzungwan s. str. species. Although some species occur as low as 800 m a.s.l., the highest diversity occurs from 1400 m a.s.l. upward. Eviulisoma covers a larger altitudinal spectrum than the Chaleponcus dabagaensis group, which is restricted to 1500–2200 m a.s.l. with a maximum at 1800–2000 m a.s.l. (Enghoff 2014, 2017).

Habitat information is included on the labels of many specimens, and a small amount of habitat information can be extracted from the literature (Kraus 1958, Frontier Tanzania 2001). In by far the most cases, the habitat is indicated as forest, montane rain forest, tropical semi-evergreen forest, etc. Some species have been collected in open Acacia woodland (E. acaciae sp. nov., E. grumslingslak sp. nov.) or ‘scrub/thicket/bush’ (E. ottokrausi sp. nov.), but the two last-mentioned have also been collected in proper forests.

The status of Eoseviulisoma Brolemann, 1920

Eoseviulisoma was proposed as a subgenus of Eviulisoma by Brolemann (1920) on the basis of the following characters:

- No process between the 4th male legs (vs a process present in Eviulisoma s. str.)
- Male sternum 6 with a very shallow excavation (vs a pronounced excavation in Eviulisoma s. str.)
- Gonopodal prefemur (“tronc du télopodite”) longer than the distal processes (“les rameaux”) (vs shorter in Eviulisoma s. str.)
- Transverse suture of body rings striolate (“perlée”) (vs smooth in Eviulisoma s. str.)

The type and only species of Eoseviulisoma was Strongyllosoma julinum Attems, 1909.

Hoffman (1953) elevated Eoseviulisoma to a full genus and transferred Dyseviulisoma abnorme Attems, 1937 to it. In his key to African eviulisomatine genera, Hoffman separated Eoseviulisoma from Eviulisoma in the first couplet in which genera with a large mesapical lobe on the gonopod coxa (Eviulisoma and Suohelisoma) were separated from genera without such a lobe (Scolodesmus, Eoseviulisoma and Wubidesmus) (Hoffman 1971). A third species, Eviulisoma (Eoseviulisoma) ruugegianum Attems, 1953, was regarded as “generic status uncertain” by Jeekel (1968), but judging from the original description it may be included in the present rather broad concept of Eviulisoma.

VandenSpiegel & Golovatch (2014) pointed out some difficulties in distinguishing these two genera. Thus, Eviulisoma ngaia VandenSpiegel & Golovatch, 2014, has a process between the 4th male legs, but no excavation on sternum 6. Eviulisoma taitaorum VandenSpiegel & Golovatch, 2014, has no process between the 4th male legs, but does have an excavated sternum 6 and a smooth suture. They therefore argued that the two genera “may well prove to be synonymous”.

The Udzungwan species studied here offer further examples in favour of this suggestion. Thus, E. biquintum sp. nov. has two processes on sternum 5, one between the 4th legs and one between the 5th, but no excavation on sternum 6. Striolation of the transverse suture seems to be quite variable: in some Udzungwan species the suture is clearly striolate (Fig. 5A), in others the striolation is indistinct, and in still others the suture is virtually smooth. The relative length of the prefemur and acropodite is also variable; however, most species have the prefemur less than half the length of the acropodite.

Existing illustrations of the gonopod of E. julinum (Attems 1909; Brolemann 1920) are not very clear concerning the acropodital part. Thanks to Sara B. Frederiksen, I have been able to examine a male of
Table 4. Altitudinal ranges of Udzungwan s. str. species of *Eviulisoma* Silvestri, 1910. The inferred ranges include all 100 m intervals between the lower and upper limits of the recorded range, although a species may not have been found in all 100 m intervals within the recorded range. Species recorded only from an altitude at exactly x hundred m a.s.l. have been assigned to the higher of the two 100 intervals including this altitude.

| Species         | Altitude (m a.s.l.) | 800–900 | 900–1000 | 1000–1100 | 1100–1200 | 1200–1300 | 1300–1400 | 1400–1500 | 1500–1600 | 1600–1700 | 1700–1800 | 1800–1900 | 1900–2000 | 2000–2100 |
|-----------------|---------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| kwabuniense     | 1800–2100           | x x x   |          |           |           |           |           |           |           |           |           |           |           |           |
| acaciae         | 1510                | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| aequilobatum    | 1930                | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| akkariae        | 850–1207            | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| cetafi          | 1300–1500           | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| chitense        | 1050–1400           | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| commelina       | 1800–1900           | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| ejti            | 1800                | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| kalimbasiense   | 2000–2100           | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| navuncus        | 1500                | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| nessiteras      | 1500–1531           | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| ottokrausi      | 1800–1962           | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| paradisiacum    | 1390–1410           | x x x x x |          |           |           |           |           |           |           |           |           |           |           |           |
| dabagaense      | 1500–2100           | x x x x x | x x x x x |           |           |           |           |           |           |           |           |           |           |           |
| coxale          | 1400–1850           | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |
| grumslingslak   | 1482–1880           | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |
| sternale        | 1550                | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |
| zebra           | 1450                | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |
| articulatum     | 2000                | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |
| angulatum       | 2100                | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |
| biquintum       | 800                 | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |
| breviscutum     | 1487–1800           | x x x x x |           |           |           |           |           |           |           |           |           |           |           |           |

| No. of species  | 2 1 2 2 2 3 6 8 4 4 7 4 5 |
E. julinum from Tanzania, Kilimanjaro Region, Moshi Vijijini (rural) District, Mt Kilimanjaro, lower montane forest plot 4, 1623 m a.s.l., 03°15′27.79″ S, 37°25′12.74″ E, 9 Apr. 2014, S. Frederiksen leg. and det. (ZMUC). Figure 38 shows several images of the right gonopod of the specimen. There is a relatively pronounced ‘Eviulisoma type’ coxal lobe (contra Hoffman 1971; the lobe is also evident in Brolemann 1920: figs 85–86). The prefemoral part is long – as long as or even longer than the acropodital part. The acropodite consists – in addition to the flagelloid solenomere – of a relatively short, simple, lamelloid mesal acropodital process (map) and a large complicated solenophore which is split at ca half its length into a mesal process with a rounded, finger-shaped tip and a triangular expansion ca at mid-length, and a large lateral lamella which is rolled up to form a conductor for the solenomere. The entire gonopod telopodite is quite short and does not reach the unexcavated sternum 6.

There are several other groups of fungi which have at least part of their life cycle associated with millipede cuticle. What little is known about these fungi was summarized by Enghoff & Reboleira (2017), and two of the fungus types mentioned by these authors were found on one specimen of Eviulisoma chitense sp. nov. Figure 40A shows a secondary capilliconidium of the genus Basidiobolus Eidam, a fungus which has been found on several millipede species belonging to different orders and families, including Paradoxosomatidae. Figure 40B shows rows of minute spherules which seemingly come out between the cuticular scales of the millipede. Figure 40C shows similar structures on the ventral side of ring 6 in E. biquintum sp. nov. Enghoff & Reboleira (2017) hypothesized that these structures, which have been encountered on several
Fig. 38. *Eviulisoma julinum* (Attems, 1909), specimen from Mt Kilimanjaro, S. Frederiksen leg., right gonopod. A. Lateral view. B. Mesal view. C. Anteroventral view. D. Dorsal view. Abbreviations: cxl = coxal lobe; map = mesal acropodital process; slm = solenomere; sph = solenophore. Scale bars: A–B = 0.1 mm; C–D = 0.05 mm.
Fig. 39. *Suohelisoma ulugurense* Hoffman, 1964, specimen from Uluguru Mts, Lupanga, M. Stoltze and N. Scharff leg. A–C. Right gonopod. A. Mesal view. B. Ventral view. C. Lateral view. D. Body ring 6 showing excavated sternum, ventral view. E. Anterior leg, showing scopulae. Abbreviations: *cxl* = coxal lobe; *map / fet* = mesal acropodital process / `femorite`; *prf* = prefemoral part; *slm* = solenomere; *sph* = solenophore. Scale bars: 0.1 mm.
different millipedes and have been described as “intercalary cuticular microscutes”, first by Akkari & Enghoff (2011), may also be of fungal nature, although nothing definite can be said about this at present.

**Discussion**

With 22 species now known from the Udzungwa Mts, all apparently endemic, *Eviulisoma* matches the odontopygid genus *Chaleponcus* in terms of Udzungwan species richness. As in the case of *Chaleponcus* (Enghoff 2014) there doubtlessly are additional species of *Eviulisoma* to be found in the Udzungwa Mts,

![Fig. 40. Epizootic fungi on *Eviulisoma* spp. A. Basidiobolus Eidam on *E. chitense* sp. nov. B–C. Fungi? (‘intercalary cuticular microscutes’) B. On *E. chitense* sp. nov. C. On *E. biquintum* sp. nov. Scale bars: 0.005 mm.](image-url)
as indicated, i.a., by the fact that four out of 22 Udzungwan s. str. species are known only from one male (Fig. 41). Some of the species (E. coxale sp. nov., E. grumstingslak sp. nov. and E. biquintum sp. nov.) show geographical variation in colour and size and each may eventually prove to include several species. Whereas the Udzungwan species of Chaleponcus all belong to a morphologically well-defined group endemic to the Udzungwa and Rungwe Mts (Enghoff 2014, 2017), the Udzungwan species of Eviulisoma belong to several different species groups. At least three of the groups also have species outside the Udzungwas (the dabagaense group has E. culter sp. nov. in the Rubeho Mts, the sternale group has E. kangense sp. nov. in the Kanga Mts and the iuloideum group has E. iuloideum from Mufindi). Whether the kwabuniense group also has non-Udzungwan members it not certain, because as noted by Jeekel (2003): “Although the structure of the gonopods is basically simple, it is often quite difficult to identify the various branches.” SEM, as first applied to Eviulisoma by VandenSpiegel & Golovatch (2014), and also in the present contribution, greatly helps, but interpretation of earlier authors’ drawings remains difficult, in some cases bordering on impossible. To quote Jeekel again: “an analysis of the genus based upon the available data in literature seems impossible on account of the [...] inadequacy of the published gonopod illustrations” (Jeekel 1968: 102). In other words, a full revision of Eviulisoma will require the restudy of a large number of type specimens as well as considerable new material of many species. I have seen several further species of Eviulisoma from other Eastern Arc blocks – Usambara Mts, Uluguru Mts, Rubeho Mts – but these belong to different species groups than the Udzungwan species and are not considered here.

In the material studied here I found no examples of polymorphism of sternum 6 and the gonopods, similar to what Carl (1909) observed.

Fig. 41. The number of studied specimens (♂♂) per species of Udzungwan s. str. Eviulisoma Silvestri, 1910.
Excavation of sternum 6

The vast majority of species of *Eviulisoma* are characterized by a strongly excavated sternum 6 (e.g., Fig. 6). The margins of the excavation are sharp and usually carry a fringe of long setae. Carl (1909), in his description of *E. fossiger*, pointed out that this structure is unique among “Polydesmiden”, i.e., polydesmidan millipedes. He suggested that the excavation protects the tip of the gonopods when the animal rolls up for protection. He also noticed that “among many specimens of various origin, a few are found here and there in which the gonopods are somewhat shorter and end more bluntly, and in these animals the mentioned cavity is completely missing or only very faintly indicated” (translated from German) and for this reason argued that there is only a “mechanical correlation” [between excavation and gonopods]. There may, however, be more than that.

A mysterious mass

Quite often, the excavation of sternum 6 is more or less filled up with an amorphous/microgranular mass (a small lump of this mass is seen in Fig. 6A), and just as often, a ‘hood’ of a similar amorphous mass is found attached to the tip of the mesal acropodital processes (Fig. 23E). The nature of the mass is unknown, but the shape of the ‘hood’ often corresponds to the shape of the sternal excavation, so a functional correlation between sternal excavation, gonopods and the amorphous mass is suggested. No spermatozoa could be distinguished in the mass even at high magnification in the scanning electron microscope; since Akkari & Enghoff (2012) were able to see spermatozoa in a similarly amorphous matrix in species of the genus *Ommatoiulus* (Julida, Julidae), this observation speaks against interpreting the amorphous mass in *Eviulisoma* as a spermatophore. Possibly, the mass serves as a ‘copulatory plug’ preventing subsequent matings by the female. ‘Copulatory plugs’ are common in insects, reptiles and certain groups of mammals (Stockley 1997). Amorphous masses more or less similar to those seen in *Eviulisoma* have been described, sometimes as spermatophores, from millipedes of the families Chordeumatidae Koch, 1847 and Tinguidae Loomis, 1966, order Chordeumatida Koch, 1847 (Verhoeff 1926–1932: 195; Schubart 1939; Shear 2010), and have also been seen in the paradoxosomatid genus *Desmoxyes* Chamberlin, 1923 (R. Srisonchai, pers. comm.) the polydesmid genus *Pseudopolydesmus* Attems, 1898 (P. Sierwald, pers. comm.) and the julid genus *Megaphyllum* Verhoeff, 1894 (B. Vagalinski, pers. comm.).

Irrespective of whether the amorphous mass in *Eviulisoma* serves as a spermatophore, a copulatory plug, or both, one would expect to find the mass attached to the female vulvae or their surroundings. Although females were not used for taxonomic purposes in the present study, numerous females were examined, but in no case could a mass similar to that found in males be seen on or near the vulvae. The nature and purpose of the mass remains fully enigmatic.

Modifications of non-gonopodal legs

Almost all species of *Eviulisoma* have scopulae on some or all of the walking legs of males – females have no scopulae. Scopulae (Fig. 7) are dense brushes of flattened, often transversely ribbed setae and almost certainly play a role during copulation. In two of the species described here, *E. sternale* sp. nov. and *E. kangense* sp.nov., there is also another leg modification in males: the prefemur and femur have a ventral smooth, apparently soft area (Figs 26B, 28E), somewhat reminiscent of the ‘soft pads’ seen on the legs of many juliformian millipedes. Whether this modification also exists in any previously described species is not clear.

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