

Received: 21 January 2026 • Accepted: 11 May 2026 • Published: 24 August 2026

Topic editor: Magalie Castelin • Section editor: Nesrine Akkari • Desk editor: Pepe Fernández

Research article

urn:lsid:zoobank.org:pub:AD71F5EA-D907-4413-B873-F4E055D73CA0

A mountain of millipedes XIII: New species and records of *Eviulisoma* Silvestri, 1910 from the Udzungwa Mountains, Tanzania, and notes on gnathochilarial trichomes (Diplopoda, Polydesmida, Paradoxosomatidae)

Henrik ENGHOFF^{1,*}  , Alain Senghor K. NGUTE²   & Andrew R. MARSHALL³  

¹Natural History Museum of Denmark (att. Zoological Museum), Øster Farimagsgade 2D, DK-1353 Copenhagen K, Denmark.

^{2,3}Forest Research Institute, University of the Sunshine Coast, Sippy Downs, Queensland, Australia.

*Corresponding author: henghoff@snm.ku.dk

²Email: kamdoum.senghor@gmail.com

³Email: amarshal@usc.edu.au

Abstract. Three new species of *Eviulisoma* from the Udzungwa Mountains, Tanzania, are described, viz., *E. zmuci* Enghoff sp. nov., *E. intricatum* Enghoff sp. nov. and *E. brachyasps* Enghoff sp. nov. New material of seven previously described species from the Udzungwa Mountains is described. The trichomes on the male gnathochilarium of the studied species are described, and trichome morphology from a further three species of *Eviulisoma*, as well as from the related *Suohelisoma ulugurens* Hoffman, 1964, is described.

Keywords. Taxonomy, new species, Eastern Arc Mountains, trichomes.

Enghoff H., Ngute A.S.K. & Marshall A.R. 2026. A mountain of millipedes XIII: New species and records of *Eviulisoma* Silvestri, 1910 from the Udzungwa Mountains, Tanzania, and notes on gnathochilarial trichomes (Diplopoda, Polydesmida, Paradoxosomatidae). *European Journal of Taxonomy* 1087: 1–28.
<https://doi.org/10.5852/ejt.2026.1087.3318>

Introduction

This is the thirteenth paper in a series devoted to the millipede fauna of the Udzungwa Mountains in Tanzania. It is the third in the series which is partly based on material collected in connection with the FoRCE project. A list of previous papers in the series is available in Enghoff (2022), supplemented by Enghoff *et al.* (2024, 2025). General information on the Udzungwa Mountains is provided by Enghoff (2014) and Scharff *et al.* (2015).

The present contribution is a supplement to the treatment of the genus *Eviulisoma* Silvestri, 1910 of the large family Paradoxosomatidae Daday, 1889 by Enghoff (2018) and includes descriptions of three

new species as well as new records of seven species recorded/described by Enghoff (2018). Species of *Eviulisoma* are characterized by being virtually cylindrical due to the extreme reduction of paranota; they are sometimes of rather uniform colouration, sometimes transversely banded (Fig. 1, see also Enghoff 2018: figs 1, 3). Since the treatment by Enghoff (2018), two important contributions to *Eviulisoma* have been published, based on material from countries from which the genus was previously unknown: Nzoko Fiemapong *et al.* (2018) described three new species of *Eviulisoma* from Cameroon, and VandenSpiegel & Ntashavu (2022) recorded four species of *Eviulisoma*, including two new species, from Burundi. VandenSpiegel & Ntashavu (2022) described a peculiar modification of the male gnathochilarium of the species of *Eviulisoma* they studied: the stipites and lamellae linguales in males (but not in females, see Fig. 6) are covered by “a field of short and often modified setae”. These structures in their external morphology resemble sensilla basiconica; here, the term ‘trichomes’ will be applied to them, see Discussion. In order to examine the generality of this character, heads of the species treated here, as well as of four related species, were examined with the scanning electron microscope.

Material and methods

The studied specimens are deposited in the zoological collections of the Natural History Museum of Denmark, University of Copenhagen (NHMD, formerly ZMUC). The specimens were mostly collected by the UniSC FoRCE (Forest Restoration & Climate Experiment) project (<http://force-experiment.com>), see Enghoff *et al.* (2025). More information on the FoRCE project can be found in the following publications: Marshall *et al.* (2020); Ngute *et al.* (2024a, 2024b). In addition to FoRCE material, some specimens collected by staff and students of NHMD were included.

Specimens were stored and examined in 70% ethanol 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

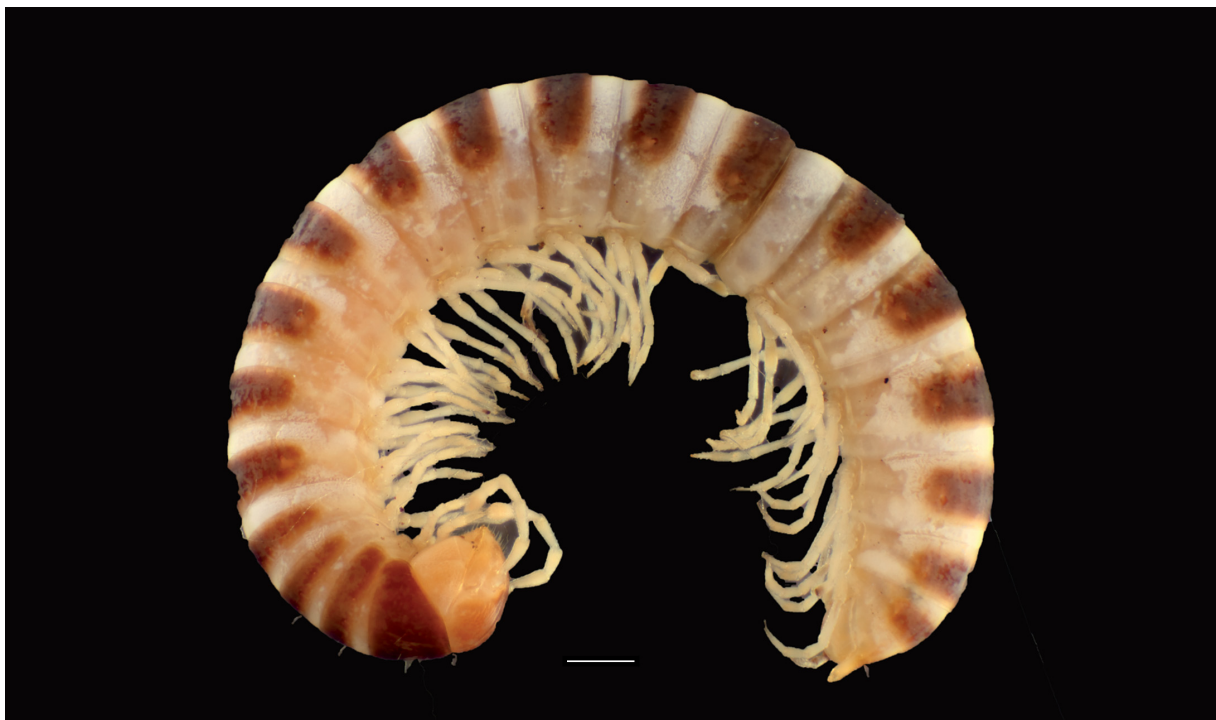


Fig. 1. A representative species of *Eviulisoma* Silvestri, 1910: *E. dabagaense* Kraus, 1958, ♀ from Kipanga (NHMD 1164606). Scale bar = 1 mm. Photo: S.G. Selvantharan.

on stubs, coated with platinum-palladium and studied in a Zeiss Gemini 360VP scanning electron microscope in NHMD.

Images were processed with Adobe Photoshop (ver. 2026), in some cases involving the stacking of multiple images, and plates were composed with Microsoft Publisher (ver. 2026).

For coordinates, decimal degrees were converted to degrees, minutes and seconds using the services at <https://www.fcc.gov/media/radio/dms-decimal> and <https://latlongdata.com/lat-long-converter/>.

See Enghoff (2018) for a general description of the genus *Eviulisoma*. For orientation of the gonopod, each gonopod is understood as emerging perpendicularly from the gonopod aperture and then making a 90° antieriad bend, resulting in the gonopod telopodite pointing antieriad.

The descriptions are based on males. Females are generally a bit larger than conspecific males and have relatively shorter appendages. In characters not mentioned, the new species agree with the general description of Udzungwan *Eviulisoma* in Enghoff (2018: 11–17).

Abbreviations for body parts in text and in figure captions

<i>ca</i>	=	cannula
<i>cx</i>	=	coxa
<i>cxl</i>	=	coxal lobe
<i>gu</i>	=	gula
<i>iap</i>	=	intermediate acropodital process
<i>la</i>	=	solenomere-conducting lamella
<i>ll</i>	=	lamella lingualis
<i>map</i>	=	mesal acropodital process
<i>map-sb</i>	=	side-branch of mesal acropodital process
<i>me</i>	=	mentum
<i>prf</i>	=	prefemur / prefemoral part of gonopod
<i>ra</i>	=	ridged area of solenophore
<i>slm</i>	=	solenomere
<i>sph</i>	=	solenophore
<i>sph-d</i>	=	dorsal lobe of <i>sph</i>
<i>sph-i</i>	=	intermediate lobe of <i>sph</i>
<i>sph-p</i>	=	slender process from <i>sph</i>
<i>sph-v</i>	=	ventral lobe of <i>sph</i>
<i>st5</i>	=	sternum 5
<i>st6</i>	=	sternum 6
<i>sti</i>	=	stipes

Other abbreviations

a.s.l.	=	above sea level
ForCE	=	Forest Restoration and Climate Experiment
NHMD	=	Natural History Museum of Denmark, University of Copenhagen
ZMUC	=	Zoological Museum, Copenhagen, Denmark, now part of NHMD

Results

Taxonomy

Class Diplopoda de Blainville in Gervais, 1844
Order Polydesmida Leach, 1815
Family Paradoxosomatidae Daday, 1889
Subfamily Paradoxosomatinae Daday, 1889
Tribe Eviulisomatini Brölemann, 1916

Genus *Eviulisoma* Silvestri, 1910

Diagnosis

Modified from Enghoff (2018), Nzoko Fiemapong *et al.* (2018) and VandenSpiegel & Ntashavu (2022). Differs from other genera of Paradoxosomatidae by the combination of the following characters: paranota missing or at most present as tiny keels on ring 2 only; stipites and lamellae linguales of male gnathochilarium usually with strongly modified, peglike or clublike trichomes; a process usually present between coxae of fourth male legs; sternum of male body ring 6 usually deeply excavated; collum with two transverse rows of thin setae; postcollar body rings with only one such row; gonopod coxa (*cx*) usually with a more or less conspicuous meso-anterior lobe (*cxl*); gonopod prefemoral part (*prf*) shorter than acropodite, usually less than half as long; acropodite consisting of at least three branches which seem to originate directly from the prefemur; a flagelliform solenomere (*slm*); a mesal acropodital process (*map*) which is often the longest of the acropodital branches; sometimes an intermediate acropodital process (*iap*) originating between the mesal acropodital process and the solenomere; a lateral solenophore (*sph*) which serves to protect the solenomere.

See Enghoff (2018) for further information.

Descriptions of new species

Eviulisoma zmuci Enghoff sp. nov.
urn:lsid:zoobank.org:act:58CC6CB5-415A-4A47-B0E9-B3C95EA5FE61

Fig. 2

Diagnosis

A species of the *kwabuniense* group (group characters: strongly excavated sternum 6, presence of an intermediate acropodital process, *iap*). Differs from other species in the group, except *E. akkariae* Enghoff, 2018, by the combination of slender rod-shaped mesal (*map*) and intermediate acropodital (*iap*) processes and a large, broad dorsal lobe of the solenophore (*sph*) ending in a hook. Differs from *E. akkariae* by the smaller size (male maximal width 1.2–1.7 mm, vs 2.2–3.3 mm in *E. akkariae*), by being uniformly pale in colour (vs with more or less contrasting dark and pale bands in *E. akkariae*), by having the gnathochilarial trichomes spherical and extremely densely set (vs cylindrical and less densely set in *E. akkariae*), and by having the solenophore (*sph*) clearly shorter than the mesal (*map*) and intermediate (*iap*) acropodital processes (vs as long as these processes in *E. akkariae*).

Etymology

The name (noun in genitive) honours the obsolete acronym ZMUC (for the Zoological Museum, University of Copenhagen, now subsumed in the Natural History Museum of Denmark, University of Copenhagen).

Material studied (total: 3 ♂♂, 2 ♀♀, 4 juvs)

Holotype

TANZANIA • ♂; Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve, Kipanga; 8°24'49.86" S, 39°55'17.9394" E; 1685 m a.s.l., 12 Jan 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo, A. Mpoto and A. Marshall leg.; open canopy, plot 100, COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184629.

Paratypes

TANZANIA – Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve • 1 ♂; same data as for holotype; NHMD 1184610 • 1 ♂; Luaha; 8°25'3.0714" S, 35°56'7.9794" E; 1697 m a.s.l.; 14 Jan 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo and A. Mpoto leg.; open canopy, plot 101; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184599.

Referred specimens (not types)

TANZANIA • 1 ♀; same data as for holotype; NHMD 1184610 • 1 ♀, 4 juvs; same data as for paratype from Luaha; NHMD 1184599.

Description (males)

SIZE. Length ca 15–17 mm, max. width of specimens from Kipanga 1.2–1.4 mm, 1.7 mm in specimen from Luaha.

COLOUR. After 3 years in alcohol uniform yellowish white.

GNATHOCHILARIUM (Fig. 2A–D): Mentum (*me*) with a dense field of rather stout setalike trichomes; stipites (*sti*) and lamellae linguales (*ll*) with a very dense cover of clublike, regularly fluted trichomes, except in a narrow marginal zone; distance between clublike trichomes in general equal to or less than their length. In ‘perpendicular’ view, these trichomes look spherical; in oblique view they resemble stout, curved clubs.

ANTENNAE. Reaching back to ring 3.

BODY RINGS. No traces of paranota. Stricture simple. A transverse row of 2 setae.

HYPOPROCT. Trapezoid, with three prominent marginal tubercles.

LEGS. Length $1.1 \times$ body width. Relative length of podomeres: femur > prefemur > tarsus > postfemur = tibia. Scopulae on tibia and tarsus from leg-pair 3, strongly developed on femur, postfemur, tibia and tarsus on midbody legs, decreasing on following legs and completely absent from four last pairs,

STERNUM 5. With a broad semicircular process between legs 4.

STERNUM 6. Deeply excavated, rim of excavation simple.

GONOPODS (Fig. 2E–H). Coxal lobe (*cxl*) large. Length of prefemoral part (*prf*) ca $0.35 \times$ length of acropodite. Mesal acropodital process (*map*) long, slender, smooth, simple. Intermediate acropodital process (*iap*) almost as long as *map*, slender, simple, with several long spines on ventral surface. Solenophore (*sph*) large, ca $0.8 \times$ as long as *map*, three-lobed; dorsal lobe (*sph-d*) longest, broad, apically narrowing and ending in hook; ventral lobe (*sph-v*) little more than half as long as *sph-d*, spatula-shaped; intermediate lobe (*sph-i*) very small, pointed-triangular.

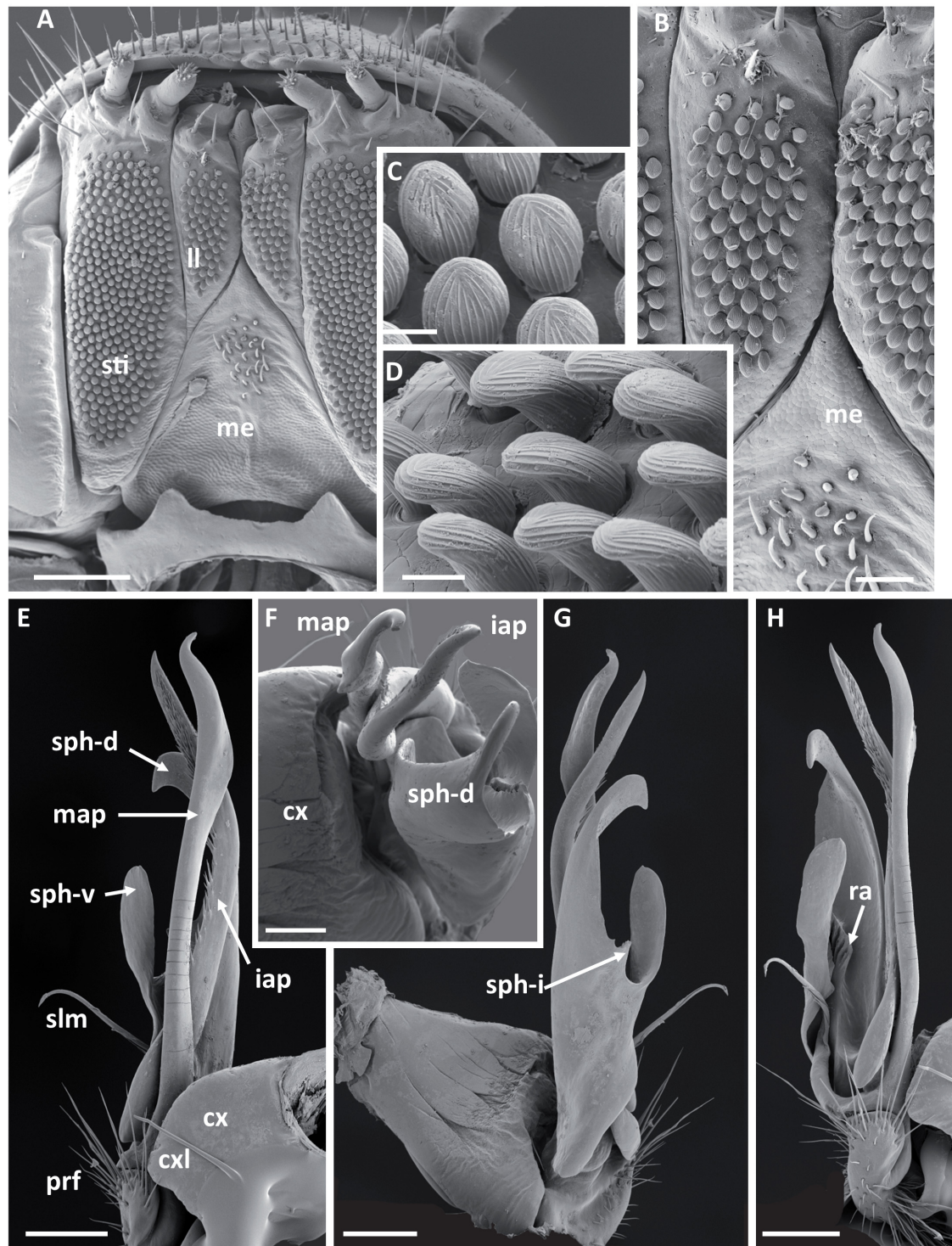


Fig. 2. *Eviulisoma zmuci* Enghoff sp. nov., paratype, ♂ (NHMD 1184599). **A–B.** Gnathochilarium. **C–D.** Clublike trichomes on gnathochilarium. **C.** Perpendicular view. **D.** Oblique view. **E–H.** Right gonopod. **E.** Mesal view. **F.** Anterior (apical) view. **G.** Lateral view. **H.** Meso-ventral view. Abbreviations: *cx* = coxa; *cxl* = coxal lobe; *iap* = intermediate acropodital process; *ll* = lamella lingualis; *map* = mesal acropodital process; *me* = mentum; *prf* = prefemoral part; *ra* = ridged area of solenophore; *slm* = solenomere; *sph-d*, *sph-i*, *sph-v* = dorsal, intermediate and ventral lobes of solenophore; *sti* = stipes. Scale bars: A, E, G–H = 0.2 mm; E = 0.1 mm; B = 0.05 mm; C–D = 0.01 mm.

Distribution and habitat

Only known from two sites in Udzungwa Scarp Nature Reserve, 1685–1697 m a.s.l., open canopy.

Remarks

In the key to Udzungwan *Eviulisoma* species in Enghoff (2018), *E. zmuci* sp. nov. runs to couplet 4, where the choice is between “Dorsal lobe of solenophore (*sph-d*) in the shape of a very large hook” vs “Dorsal lobe of solenophore different”. In *E. zmuci*, *sph-d* does end in a substantial hook (Fig. 2E–H) which is, however, considerably smaller than the hook in *E. cetafi* Enghoff, 2018 (Enghoff 2018: fig. 13).

Eviulisoma intricatum Enghoff sp. nov.

urn:lsid:zoobank.org:act:3264AB97-CC89-4CC5-BC20-B0C4A7BC8F4E

Figs 3–4

Diagnosis

A species of the *kwabuniense* group (group characters: strongly excavated sternum 6, presence of an intermediate acropodital process, *iap*). Differs from other species in the group by the shape and configuration of the acropodital processes, especially the relatively short, simple intermediate acropodital process (*iap*) and the very large, peculiarly shaped solenophore (*sph*).

Etymology

This species is named after its particularly intricate solenophore. Adjective.

Material studied (total: 3 ♂♂)

Holotype

TANZANIA • ♂; Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Luala; 7°46'00.372" S, 36°29'33.2154" E; 1903 m a.s.l.; 26 Oct. 2021; A. Ngute, R. Malanda, W. Mhagawale, A. Mpoto and A. Marshall leg.; closed canopy, FoRCE plot 70; COLL. NHMD - ACC.NO. 2022-EN-003; NHMD 1184604.

Paratypes

TANZANIA – **Iringa Region, Kilolo District, Kilombero Nature Reserve** • 1 ♂ (head and rings 1–6 missing); Uhafiwa; 8°31'58.404" S, 35°51'28.368" E; 1375 m a.s.l.; 25 Jan. 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo, A. Mpoto and A. Marshall leg.; open canopy, FoRCE plot 106 COLL. NHMD - ACC.NO. 2022-EN-003; NHMD 1184605. – **Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve** • 1 ♂; Chita Juu; 8°33'14.1444" S, 35°51'38.7354" E; 1411 m a.s.l.; 28 Jan. 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo, A. Mpoto and A. Marshall leg.; open canopy, FoRCE plot 110; COLL. NHMD - ACC.NO. 2022-EN-003; NHMD 1184603.

Description (males)

SIZE. Length 23–25 mm, max. width 2.0–2.2 mm.

COLOUR. After four years in alcohol uniform pale yellowish white; specimen from Chita Juu with metaterga medium brown.

GNATHOCHILARIUM (Fig. 3A–C). Mentum (*me*) with a dense field of setalike trichomes; stipites (*sti*) and lamellae linguales (*ll*) with a very dense cover of modified, regularly fluted, curved clublike trichomes, except in a narrow marginal zone; distance between clublike trichomes in general equal to or less than their length.

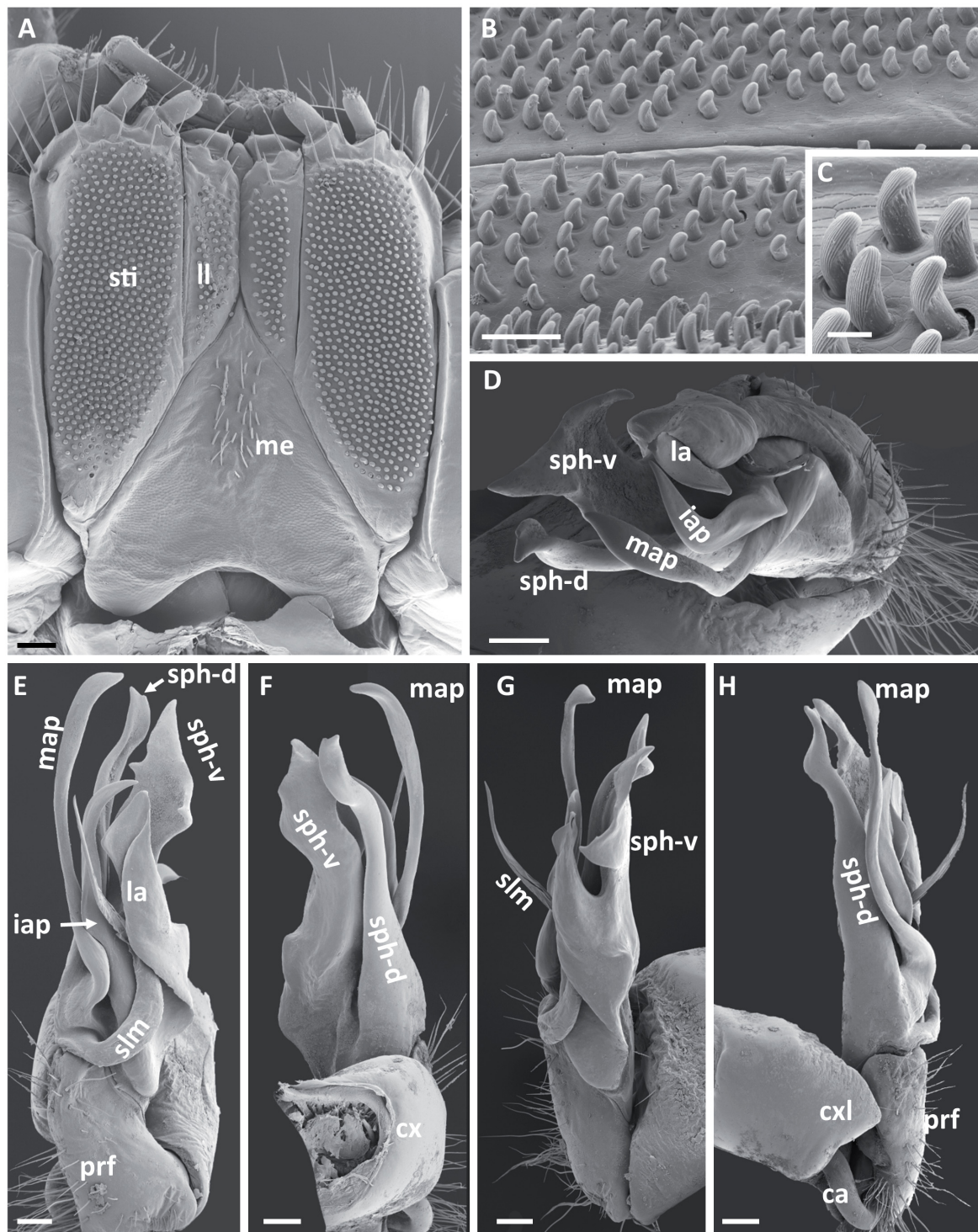


Fig. 3. *Eviulisoma intricatum* Enghoff sp. nov., holotype, ♂ (NHMD 1184604). **A–C.** Gnathochilarium. **A.** Overview. **B–C.** Close-ups of peglike trichomes on stipes and lamella lingualis. **D–H.** Left gonopod. **D.** Apical (anterior) view. **E.** Ventral view. **F.** Dorsal view. **G.** Lateral view. **H.** Mesal view. Abbreviations: *ca* = cannula; *cx* = coxa; *cxl* = coxal lobe; *iap* = intermediate acropodital process; *la* = solenomere-conducting lamella; *ll* = lamella lingualis; *map* = mesal acropodital process; *me* = mentum; *prf* = prefemoral part; *slm* = solenomere; *sph-d*, *sph-v* = dorsal and ventral lobe of solenophore; *sti* = stipes. Scale bars: A, D–H = 0.1 mm; B = 0.05 mm; C = 0.01 mm.

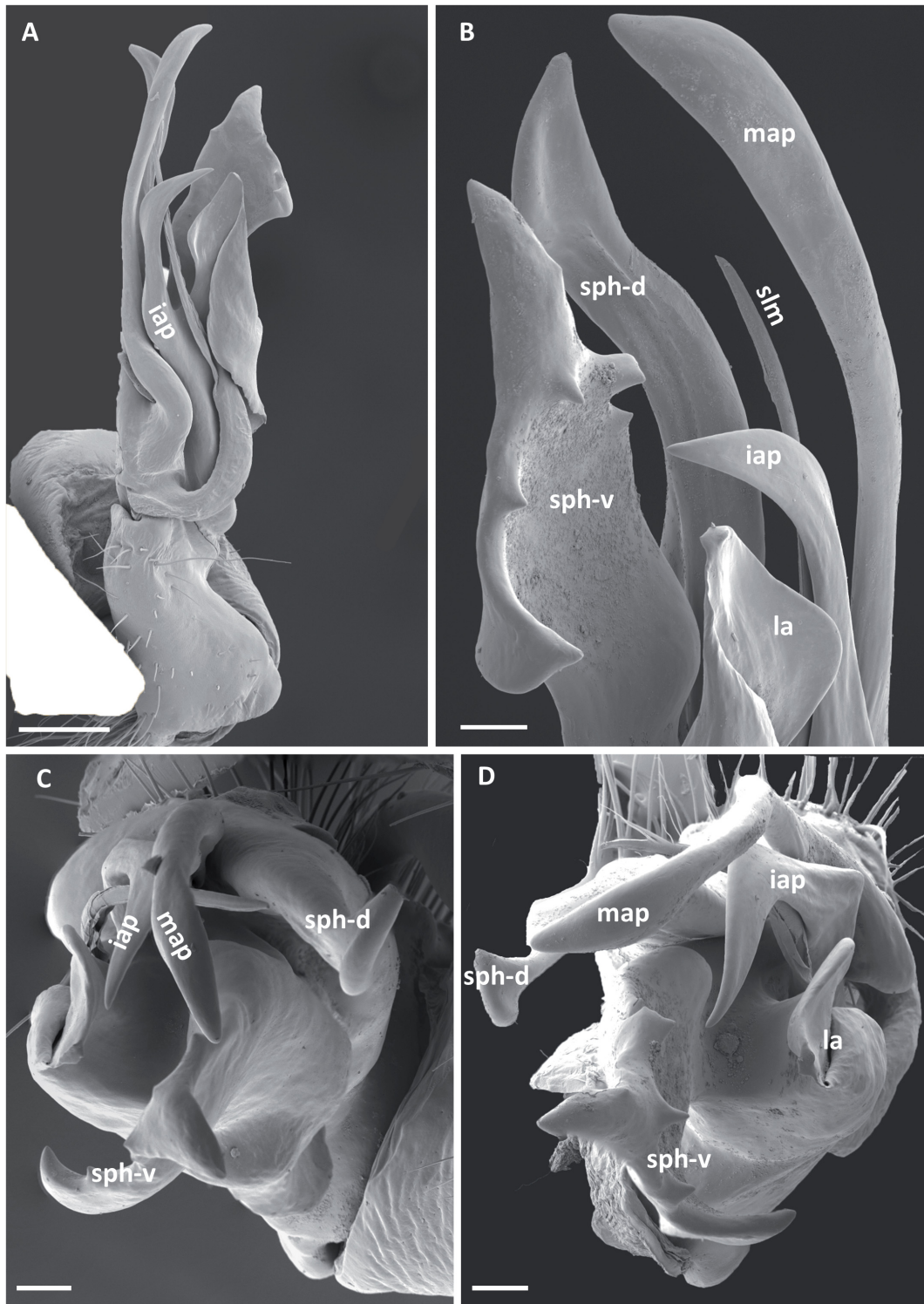


Fig. 4. *Eviulisoma intricatum* Enghoff sp. nov., paratypes, ♂♂. **A, D.** Paratype from Uhafiwa (NHMD 1184605), left gonopod. **B–C.** Paratype from Chita Juu (NHMD 1184603), right gonopod. **A.** Ventral view (white area obscured by mounting tape). **B.** Distal part of telopodite, meso-ventral view. **C–D.** Apical (anterior view). Abbreviations: *iap* = intermediate acropodital process; *la* = solenomere-conducting lamella; *map* = mesal acropodital process; *slm* = solenomere; *sph-d*, *sph-v* = dorsal and ventral lobe of solenophore. Scale bars: A = 0.2 mm; B–D = 0.05 mm.

ANTENNAE. Reaching back to ring 3.

BODY RINGS. No traces of paranota. Stricture simple. A transverse row of 4 setae.

HYPOPROCT. Trapezoidal.

LEGS. Length $1.3 \times$ body width. Relative length of podomeres: femur > tarsus > prefemur > tibia (>) postfemur. Scopulae on postfemur, tibia and tarsus of midbody legs, decreasing backwards and absent from last few pairs of legs; legs 6–8 also with scopulae on femur.

STERNUM 5. With a trapezoidal process between legs 4.

STERNUM 6. Deeply excavated, rim of excavation simple.

GONOPODS (Figs 3D–H, 4). Coxal lobe (*cxl*) large. Prefemoral part (*prf*) ca half as long as acropodite. Mesal acropodital process (*map*) longer than other processes, smooth, simple, slightly bent in distal part. Intermediate acropodital process (*iap*) much shorter than *map*, slender, smooth, simple, strongly bent in distal part. Solenophore (*sph*) very large, complex, deeply divided into two lobes. Dorsal lobe (*sph-d*) almost as long as *map*, slender, smooth, slightly sigmoid, apically expanded. Ventral lobe (*sph-v*) broad, irregularly shaped, apically with several teeth, ventro-laterally with large lamella (*la*) branching off from basis and forming a ‘conductor’ for the solenomere (*slm*).

Distribution and habitat

Known from two widely separated areas in the Udzungwa Mts: Kilombero Nature Reserve at 1903 m a.s.l. under closed canopy and Udzungwa Scarp Nature Reserve at 1375–1415 m a.s.l. under open canopy.

Remarks

In the key to Udzungwan *Eviulisoma* species in Enghoff (2018), *E. intricatum* sp. nov. runs to couplet 8 where the choice is between “Intermediate acropodital process (*iap*) much shorter than mesal acropodital process (*map*); dorsal lobe of solenophore (*sph-d*) bifid” and “Intermediate acropodital process (*iap*) as long or almost as long as than mesal acropodital process; dorsal lobe of solenophore different”. In *E. intricatum*, *iap* is considerably shorter than *map*, but *sph-d* is not bifid.

Eviulisoma brachyaspis Enghoff sp. nov.

urn:lsid:zoobank.org:act:EDE46B5F-B3C5-4D27-86A8-C4AC58EF25C1

Fig. 5

Diagnosis

Much smaller than other species of *Eviulisoma*; max. width of males 0.8 mm, vs at least 1 mm in other species, and at least 1.3 mm in other Udzungwan species. Differs further from other Udzungwan species, except *E. breviscutum* Enghoff, 2018, and *E. biquintum* Enghoff, 2018, in not having sternum 6 of males deeply excavated, and from all Udzungwan species, except *E. breviscutum*, by having the mesal acropodital process (*map*) of the gonopods only about half as long as the solenophore (*sph*). Differs from *E. breviscutum* (max. width 1.5–1.6 mm) in smaller size, in having setalike trichomes on the gnathochilarium (vs thickened trichomes on stipites and lamellae linguales in *E. breviscutum*), in having male sternum 6 very shallowly excavated (vs not excavated at all), by having a process between male coxae 4 (vs no process in *E. breviscutum*) and by having the ventral lobe of the solenophore (*sph*) undivided (vs divided into two branches in *E. breviscutum*).

Etymology

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

Material examined (total 2 ♂♂, 6 ♀♀)

Holotype

TANZANIA • ♂; Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Chawemba; 7°44' 49.956" S, 36°27'54.864" E; 2300 m a.s.l.; 10 Nov. 2021; A. Ngute, R. Malanda, W. Mhagawale, A. Mpoto and A. Marshall leg.; FoRCE Plot 80, closed canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184600.

Paratype

TANZANIA • 1 ♂; same data as for holotype; NHMD 1184609.

Referred specimens (not types)

TANZANIA • 6 ♀♀; same data as for holotype; NHMD 1184609.

Description (males)

SIZE. Length 11 mm, max. width 0.8 mm.

COLOUR. After 4 years in alcohol uniform pale whitish; posterior part of metazonites faintly brownish.

GNATHOCHILARIUM (Fig. 5A). Mentum (*me*) without trichomes; stipites (*sti*) and lamellae linguales (*ll*) with setalike trichomes.

ANTENNAE. Reaching back to ring 3.

BODY RINGS. No traces of paranota. Stricture smooth. One transverse row of setae on all postcollar rings.

HYPOPROCT. Rounded-triangular.

LEGS. Length $1.1 \times$ body width. Relative lengths of podomeres: femur > prefemur > tibia = tarsus > postfemur. Scopula present on tibia and tarsus, also (faintly developed) on postfemora of pregonopodal legs.

STERNUM 5 (*st5*, Fig. 5B). With a broad, blunt process between legs 4; distal margin of process slightly indented.

STERNUM 6 (*st6*, Fig. 5B). With a very shallow excavation between the four coxae.

GONOPODS (Fig. 5C–G). Coxal lobe (*cxl*) not evident. Prefemoral part (*prf*) slightly more than half as long as acropodite. Mesal acropodital process (*map*) short, shieldlike. Solenophore (*sph*) about 50% longer than *map*, apically divided into a finger-shaped dorsal lobe (*sph-d*) and a flattened ventral lobe (*sph-v*) the ventral margin of which is folded over, protecting the solenomere (*slm*).

Distribution and habitat

Known only from a single forested site in Kilombero Nature Reserve, 2300 m a.s.l.

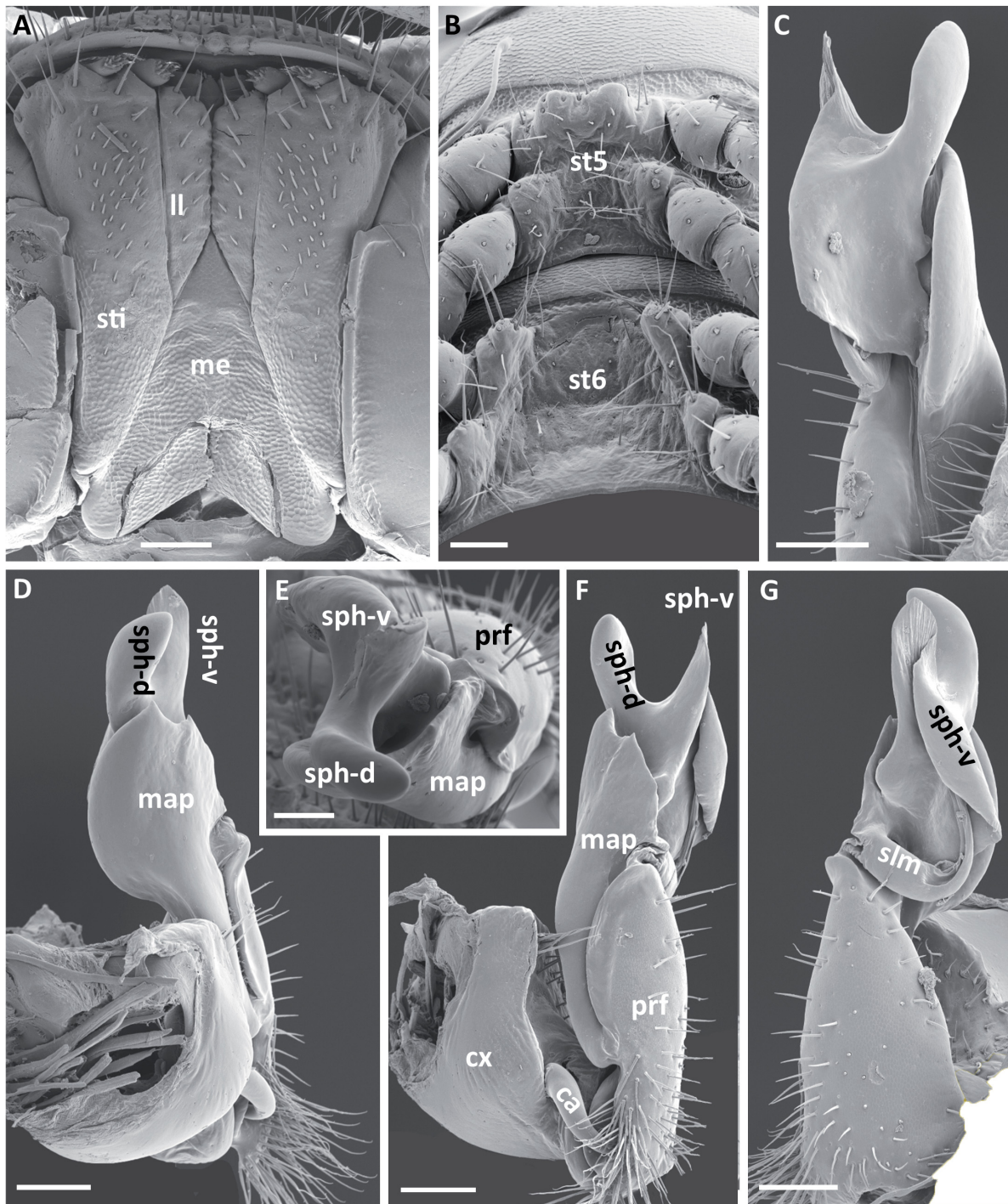


Fig. 5. *Eviulisoma brachyaspis* Enghoff sp. nov., holotype, ♂ (NHMD 1184600). **A.** Gnathochilarium. **B.** Body rings 5 and 6, ventral view. **C–G.** Left gonopod. **C.** Lateral view. **D.** Dorsal view. **E.** Apical (anterior) view. **F.** Mesal view. **G.** Ventral view (white area obscured by mounting tape). Abbreviations: *ca* = cannula; *cx* = coxa; *ll* = lamella lingualis; *map* = mesal acropodital process; *me* = mentum; *prf* = prefemoral part; *slm* = solenomere; *sph-d*, *sph-v* = dorsal and ventral lobe of solenophore; *st5*, *st6* = sternum 5, sternum 6; *sti* = stipes. Scale bars: A–D, F–G = 0.1 mm; E = 0.05 mm.

Remarks

In couplet 1 of the key to Udzungwan *Eviulisoma* species in Enghoff (2018), *E. brachyaspis* sp. nov. fits neither alternative because sternum 6 has a shallow, not a deep excavation. If the second alternative “Sternum 6 not excavated” is chosen, the new species runs to couplet 21 where again no alternative fits, because *E. brachyaspis* has a process on sternum 5 but none on sternum 6.

New records of known species***Eviulisoma akkariae* Enghoff, 2018**

Fig. 6

Eviulisoma akkariae Enghoff, 2018: 26.

Material studied (total >50 ♂♂, ♀♀, juvs)

TANZANIA – Morogoro Region, Kilombero District, Udzungwa Mountains National Park • 3 ♂♂, 3 ♀♀; 7°49'13.2198" S, 36°53'33.4608" E; 334 m a.s.l.; 25 Feb. 2020; A. Ngute and A.R. Marshall leg.; Micro-FoRCE plot 17, open forest, COLL. NHMD. ACC.NO. 2020-EN-002; NHMD 1184612 • 2 ♀♀; same collection data as for preceding; 7°50'56.4102" S, 36°53'0.4086" E, 325 m a.s.l.; 2 Mar. 2020; Micro-FoRCE plot 26; NHMD 1184613 • 1 ♂, 1 ♀; same collection data as for preceding; 7°47'1.1394" S, 36°54'13.8594" E; 381 m a.s.l.; 15 Feb. 2020; A. Ngute and A.R. Marshall leg.; Micro-FoRCE plot 30, closed forest; NHMD 1184614 • 2 ♂♂; Mwanihana, Niokamoni; 7°50'33.1434" S, 36°52'54.912" E; 357 m a.s.l.; 22 Dec. 2021; A. Ngute, R. Malanda, W. Mhagawale and A. Marshall leg.; FoRCE plot 12; open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184615 • numerous (>25) ♂♂, ♀♀ and juvs, mostly strongly fragmented and poorly preserved; Mwanihana, Sonjo; 7°48'22.608" S, 36°52'17.04" E; 579 m a.s.l.; 14 Dec. 2021; A. Ngute, R. Malanda, H. Mnendendo, W. Mpoto and A. Marshall leg.; FoRCE plot 13, closed canopy; Plot COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184616 • 1 ♂; same collection data as for preceding; 7°48'22.2834" S, 36°52'32.196" E; 595 m a.s.l.; 17 Dec. 2021; A. Ngute, R. Malanda, H. Mnendendo, W. Mhagawale, A. Mpoto and A. Marshall leg.; FoRCE plot 15, open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184617 • 1 ♂, 3 ♀♀, 1 juv.; Mwanihana, Sanje; 7°46'52.14" S, 36°54'11.7714" E; 421 m a.s.l.; 20 Feb. 2022; A. Ngute, E. Kivambe, R. Malanda, W. Mhagawale, H. Mnendendo and A. Marshall leg.; FoRCE Plot 92, open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184597 • 5 ♂♂, 4 ♀♀, 4 juvs; same collection data as for preceding; 7°47'2.9754" S, 36°54'5.76" E; 410 m a.s.l.; 17 Feb. 2022; A. Ngute, E. Kivambe, W. Mhagawale, H. Mnendendo, M. Mpoto and A. Marshall leg.; FoRCE Plot 93, open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184598.

Descriptive notes on the new material (males)

Max. width 2.2–2.5 mm. Colour after 3–5 years in alcohol brownish, prozonites lighter than metazonites, but contrast much less than in type material (cf. Enghoff 2018: fig. 3a).

GNATHOCHILARIUM (Fig. 6). Mentum with a median field of setalike trichomes; Stipites and lamellae linguales (except for a narrow marginal zone) with a dense cover of peg-shaped, fluted trichomes, distance between trichomes equal to or slightly longer than length of trichomes.

Other non-gonopodal as well as gonopodal characters as in type material (cf. Enghoff 2018: figs 8a, 12).

Remarks

The new material, as the holo- and paratypes, was collected in the Udzungwa Mountains National Park. However, whereas the type material was collected at 830–1207 m a.s.l., the new material comes from lower altitudes at 325–595 m a.s.l. The total altitudinal range of *E. akkariae* thus lies under that of

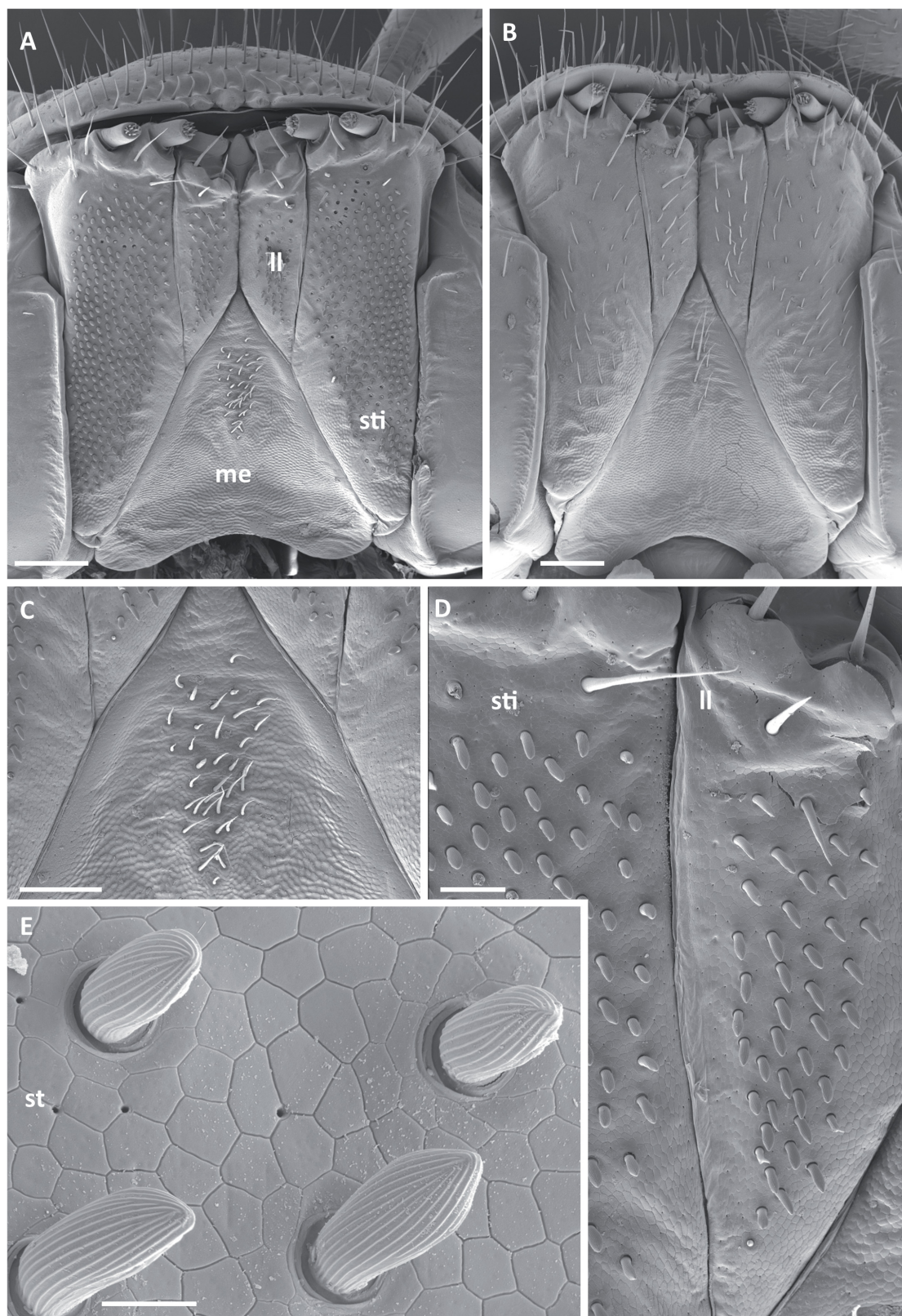


Fig. 6. *Eviulisoma akkariae* Enghoff, 2018, specimens from Mwanihana, Sanje (NHMD 1184598), gnathochilarium. **A, C–E.** ♂. **B.** ♀. Abbreviations: *ll* = lamella lingualis; *me* = mentum; *sti* = stipes. Scale bars: A–B = 0.2 mm; C = 0.1 mm; D = 0.05 mm; E = 0.01 mm.

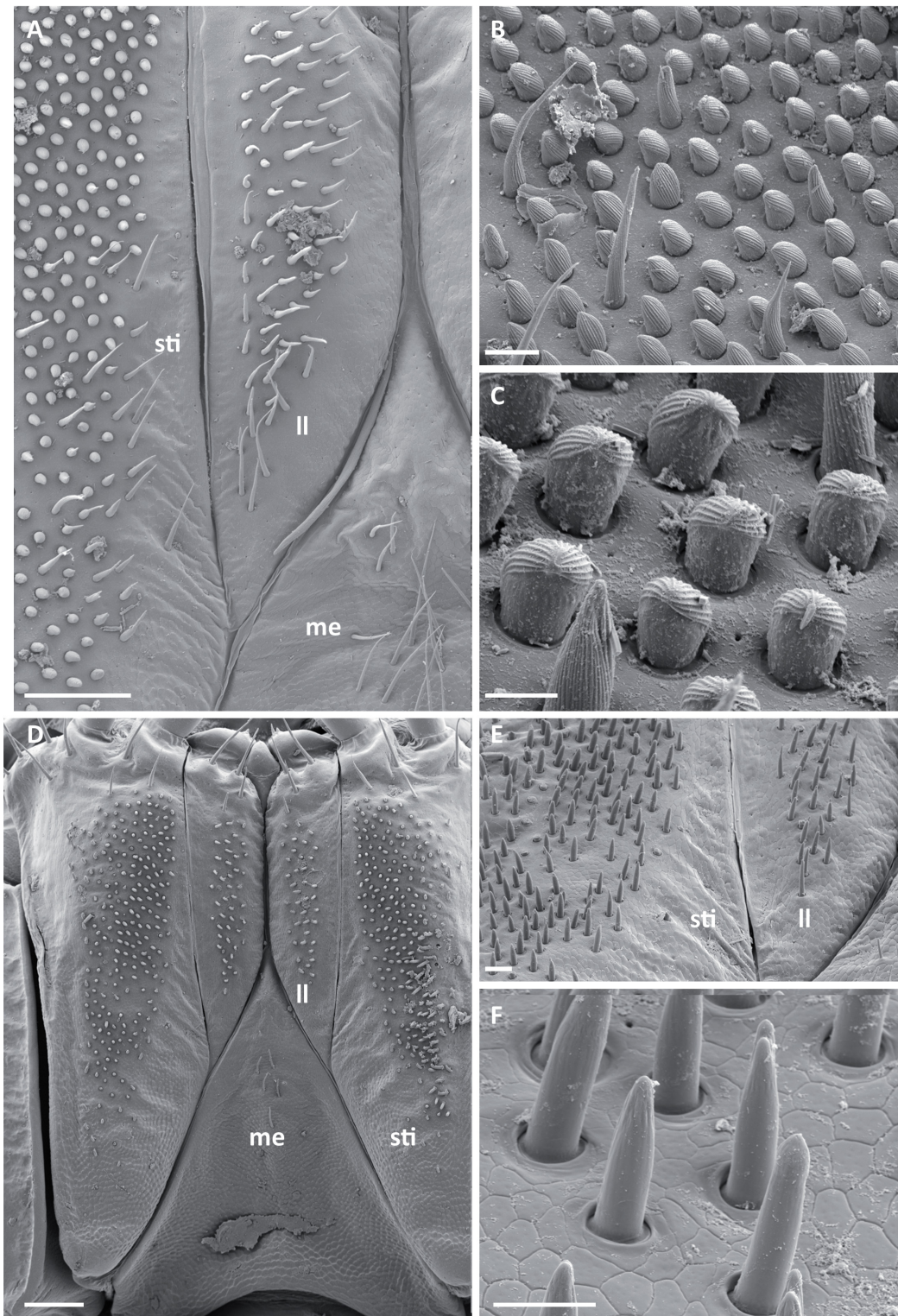


Fig. 7. *Eviulisoma* spp., gnathochilaria, ♂♂. **A–C.** *E. zebra* Enghoff, 2018, paratype from Udzungwa Mts National Park (NHMD1184625). **A.** Overview. **B–C.** Details of peg-/clublike trichomes from stipes. **D–F.** *E. biquintum* Enghoff, 2018, specimen from Udzungwa Mts National Park (NHMD 1184618). **D.** Overview. **E–F.** Details of trichomes from stipes and lamella lingualis. Abbreviations: *ll* = lamella lingualis; *me* = mentum; *sti* = stipes. Scale bars: A, D = 0.1 mm; B, E = 0.02 mm; C, F = 0.01 mm.

almost all other Udzungwan *Eviulisoma* species (cf. Enghoff 2018, see also VandenSpiegel & Ntashavu 2022). With the exception of *E. biquintum* Enghoff, 2018, which has been collected at 347–900 m a.s.l. (upper limit given as “3000 feet”), all other Udzungwa congeners have been collected between 1300 and 2100 m a.s.l. However, *E. kangense* Enghoff, 2018, from the Kanga Mts was collected at 400–500 m a.s.l.

The new specimens are somewhat smaller (width of males 2.2–2.5 mm vs 2.6–3.3 mm in type specimens), and the contrast between lighter prozonites and darker metazonites is less pronounced.

Eviulisoma biquintum Enghoff, 2018

Fig. 7D–F

Eviulisoma biquintum Enghoff, 2018: 72.

Material studied (total 1 ♂)

TANZANIA • 1 ♂; Morogoro Region, Kilombero District, Udzungwa Mountains National Park; 7°49'46.5348" S, 36°53'27.873" E; 347 m a.s.l.; 27 Feb. 2020; A. Ngute and A.R. Marshall leg.; Micro-force plot 20, open forest, COLL. NHMD. ACC.NO. 2020-EN-002; NHMD 1184618.

Descriptive notes on the new material (male)

Max. width 1.9 mm (2.0–2.4 mm in type material). Colour after five years in alcohol similar to that described by Enghoff (2018) for a paratype from Mito Mitatu: very dark body, amber-coloured sternal regions and contrastingly white legs; head, antennae, collum and prozonites medium brown, metazonites very dark brown.

GNATHOCHILARIUM (Fig. 7D–F). Mentum with a few setalike trichomes Stipites and lamellae linguales with a dense cover of stout, very slightly fluted, but otherwise setalike trichomes, distance between trichomes equal to their length.

Other non-gonopodal as well as gonopodal characters as in type material (cf. Enghoff 2018: fig. 35).

Eviulisoma breviscutum Enghoff, 2018

Fig. 8

Eviulisoma breviscutum Enghoff, 2018: 74.

Material studied (total 7 ♂♂, 1 ♀)

TANZANIA – **Iringa Region, Udzungwa Mountains National Park** • 1 ♂; above Kidatu; 7°40'34.5" S, 36°55'7.0" E; 1589 m a.s.l.; 25 Jul. 2017; R. Lowassary, T. Pape and N. Scharff leg.; pitfall trap; ACC. NO. 2017-EN-002 NHMD 1184602 • 3 ♂♂, 1 ♀; same data as for preceding; 3 Sep. 2016; ACC.NO. 2015-EN-001; NHMD 1184621. – **Morogoro Region, Udzungwa Mountains National Park** • 1 ♂; above Mito Mitatu; 7°49'00.7" S, 36°50'24.1" E; 1643 m a.s.l.; 25 Jul. 2017; R. Lowassary, T. Pape and N. Scharff leg.; pitfall trap; ACC.NO. 2017-EN-002; NHMD 1184619 • 1 ♂; same data as for preceding; 2 Mar. 2015; ACC.NO. 2015-EN-001; NHMD 1184620 • 1 ♂; Kidatu; 7°40'42.1" S, 36°55'06.8" E; 1482 m a.s.l.; J. Malumbres-Olarte leg.; plot 6; NHMD 1184622.

Descriptive notes on the new material (males)

GNATHOCHILARIUM (Fig. 8A–B): Mentum with a few setalike trichomes, stipites with a cover of trichomes, except in basal, mesal and lateral parts; trichomes in center of field short, stout, fluted, marginal trichomes setalike; lamellae linguales with a field of scattered, setalike ones.

Other non-gonopodal as well as gonopodal characters as in type material (Fig. 8C–G, Enghoff 2018: fig. 36).

Remarks

The new specimens were collected in very much the same area as the type specimens at altitudes 1482–1643 m a.s.l. (type material: 1487–1800 m a.s.l.).

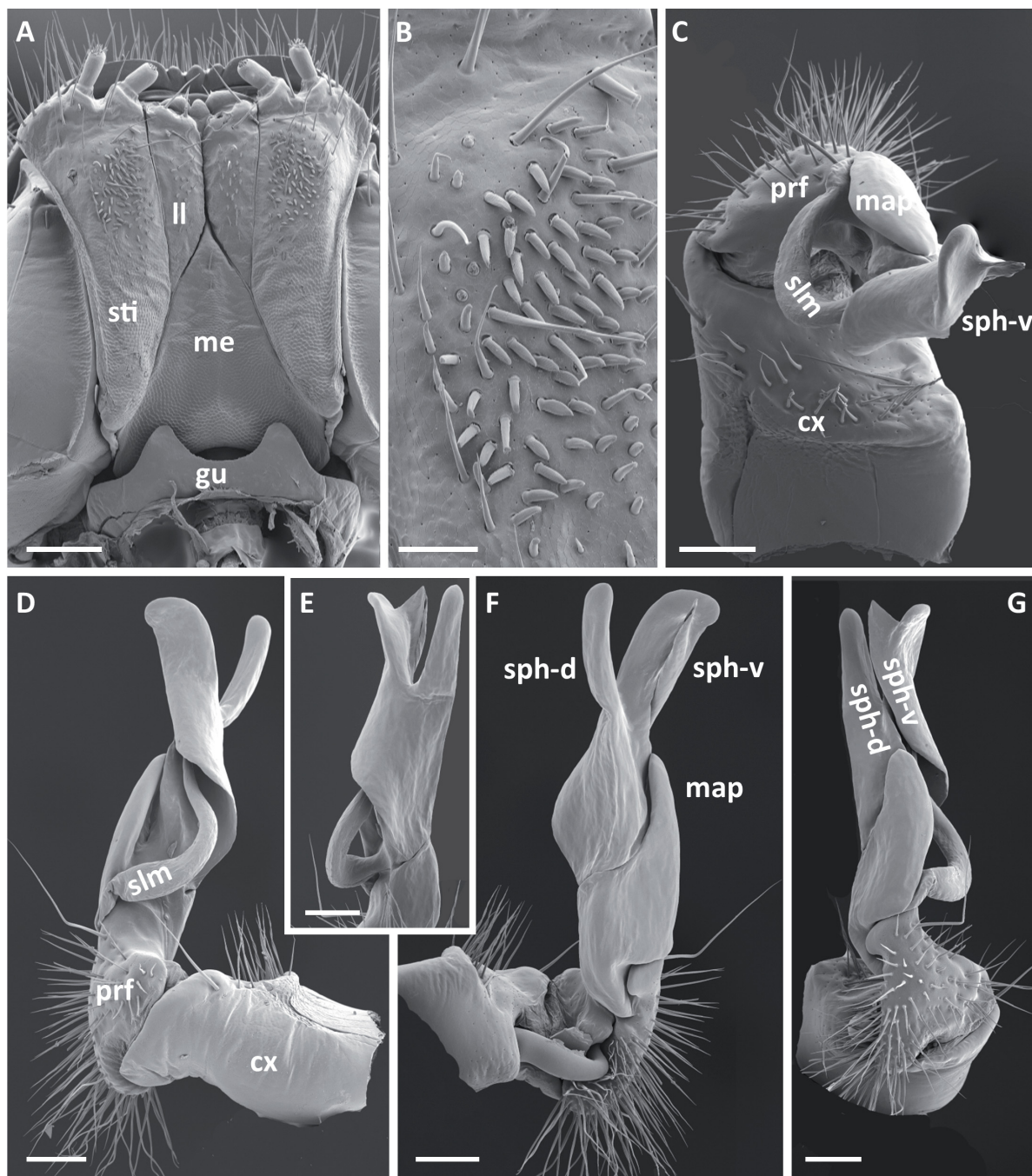


Fig. 8. *Eviulisoma breviscutum* Enghoff, 2018, paratype, ♂, from Udzungwa Mts National Park (NHMD1184602). **A–B.** Gnathochilarium. **A.** Overview. **B.** thickened trichomes on right stipes. **C–G.** Left gonopod. **C.** Apical (anterior) view. **D.** Lateral view. **E.** Dorsal view. **F.** Mesal view. **G.** Ventral view. Abbreviations: *cx* = coxa; *gu* = gula; *ll* = lamella lingualis; *map* = mesal acropodital process; *me* = mentum; *prf* = prefemoral part; *slm* = solenomere; *sph-d*, *sph-v* = dorsal and ventral lobe of solenophore; *sti* = stipes. Scale bars: A = 0.2 mm; B = 0.05 mm; C–G = 0.1 mm.

Eviulisoma cetafi Enghoff, 2018

Eviulisoma cetafi Enghoff, 2018: 28.

Material studied (total 2 ♂♂)

TANZANIA – Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve • 1 ♂; Uhafiwa; 8°31'58.872" S, 35°51'33.444" E; 1426 m a.s.l.; 6 Feb. 2022; A. Ngute, W. Mhagawale, H. Mnendendo and A. Marshall leg.; Plot 105, closed canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184608 • 1 ♂; Uhafiwa; 8°31'58.404" S, 35°51'28.368" E; 1375 m a.s.l.; 25 Jan. 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo, A. Mpoto and A. Marshall leg.; Plot 106, open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184623.

Descriptive notes on the new material (males)

Colour all whitish like type material although the new material has spent only 3 years in alcohol.

GNATHOCHILARIUM. Mentum with a dense field of setalike trichomes; stipites and lamellae linguales with a very dense cover of regularly fluted trichomes, except in a narrow marginal zone; distance between these trichomes in general less than their length. In 'perpendicular' view, they look spherical; in oblique view they resemble stout, curved clubs.

Other non-gonopodal as well as gonopodal characters as in type material (cf. Enghoff 2018: fig. 13).

Remarks

The new material was collected in the Udzungwa Scarp area, like the type material, and at similar altitudes.

Eviulisoma coxale Enghoff, 2018

Eviulisoma coxale Enghoff, 2018: 50.

Material studied (total 2 ♂♂, 1 ♀)

TANZANIA • 2 ♂♂, 1 ♀; Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Luala; 7°45'51.336" S, 36°29'16.08" E; 2007 m a.s.l.; 1 Nov. 2022; A. Ngute, R. Malanda, W. Mhagawale, A. Mpoto and A. Marshall leg.; Plot 72; open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184607.

Descriptive notes on the new material (males)

After three years in alcohol colour all whitish, no trace of brownish lateral spots as seen in the holotype and paratypes from the type locality.

GNATHOCHILARIUM. Mentum with a field of setalike trichomes; stipites and lamellae linguales with a very dense cover of short, thick, pointed, regularly fluted peglike trichomes, except in a narrow marginal zone; distance between these trichomes in general $\sim 1\frac{1}{2} \times$ length of trichomes.

Other non-gonopodal as well as gonopodal characters as in type material (cf. Enghoff 2018: fig. 23).

Remarks

The new material was collected in Kilombero Nature Reserve, close to the type locality, but at a higher altitude (2007 m a.s.l., vs 1500–1650 m a.s.l. for the original material).

Eviulisoma dabagaense Kraus, 1958

Fig. 1

Eviulisoma dabagaense Kraus, 1958: 2.

Eviulisoma dabagaense – Enghoff 2018: 47.

Material studied (total 2 ♂♂, 1 ♀)

TANZANIA • 2 ♂♂, 1 ♀; Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve, Kipanga; 8°24'49.86" S, 35°55'17.9394" E; 1685 m a.s.l.; 12 Jan. 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo, A. Mpoto and A. Marshall leg.; Plot 100, open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1164606.

Descriptive notes on the new material (males)

After three years in alcohol basically whitish, but dorsal part of metazonites down to a little below ozopores contrastingly dark brown (Fig. 1).

GNATHOCHILARIUM. Mentum with a field of setalike trichomes; stipites and lamellae linguales with a very dense cover of short, thickened, pointed, regularly fluted trichomes, except in a narrow marginal zone; distance between these trichomes in general $1-1\frac{1}{2} \times$ length of trichomes.

Other non-gonopodal as well as gonopodal characters as in type material (cf. Enghoff 2018: fig. 22).

Remarks

The new material was collected in Udzungwa Scarp Nature Reserve, from where one of the specimens studied by Enghoff (2018) likewise comes. The species has also been collected in the New Dabaga-Ulangambi and Kiranzi/Kitungulu Forest Reserves.

Eviulisoma ottokrausi Enghoff, 2018

Fig. 9

Eviulisoma ottokrausi Enghoff, 2018: 43.

Material studied (total 2 ♂♂)

TANZANIA • 1 ♂; Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Chawemba; 7°45'17.1714" S, 36°27'44.0274" E; 2020 m a.s.l.; 12 Nov. 2021; A. Ngute, R. Malanda, W. Mhagawale, A. Mpoto and A. Marshall leg.; Plot 47, closed canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184601 • 1 ♂; same data as for preceding; 7°44'49.956" S, 36°29'6.864" E; 2300 m a.s.l.; 10 Nov. 2021; Plot 80, closed canopy; NHMD 1184624.

Descriptive notes on the new material (males)

Max. width 2.0–2.2 mm (2.0 mm in type material). Colour: after four years in alcohol uniform light brown.

GNATHOCHILARIUM (Fig. 9A–C). Mentum (*me*) with a dense field of rather stout setalike trichomes; stipites (*sti*) and lamellae linguales (*ll*) with a very dense cover of clublike, regularly fluted trichomes, except in a narrow marginal zone; distance between clublike trichomes in general less than their length. In ‘perpendicular’ view, these trichomes look spherical; in oblique view they resemble stout, curved clubs.

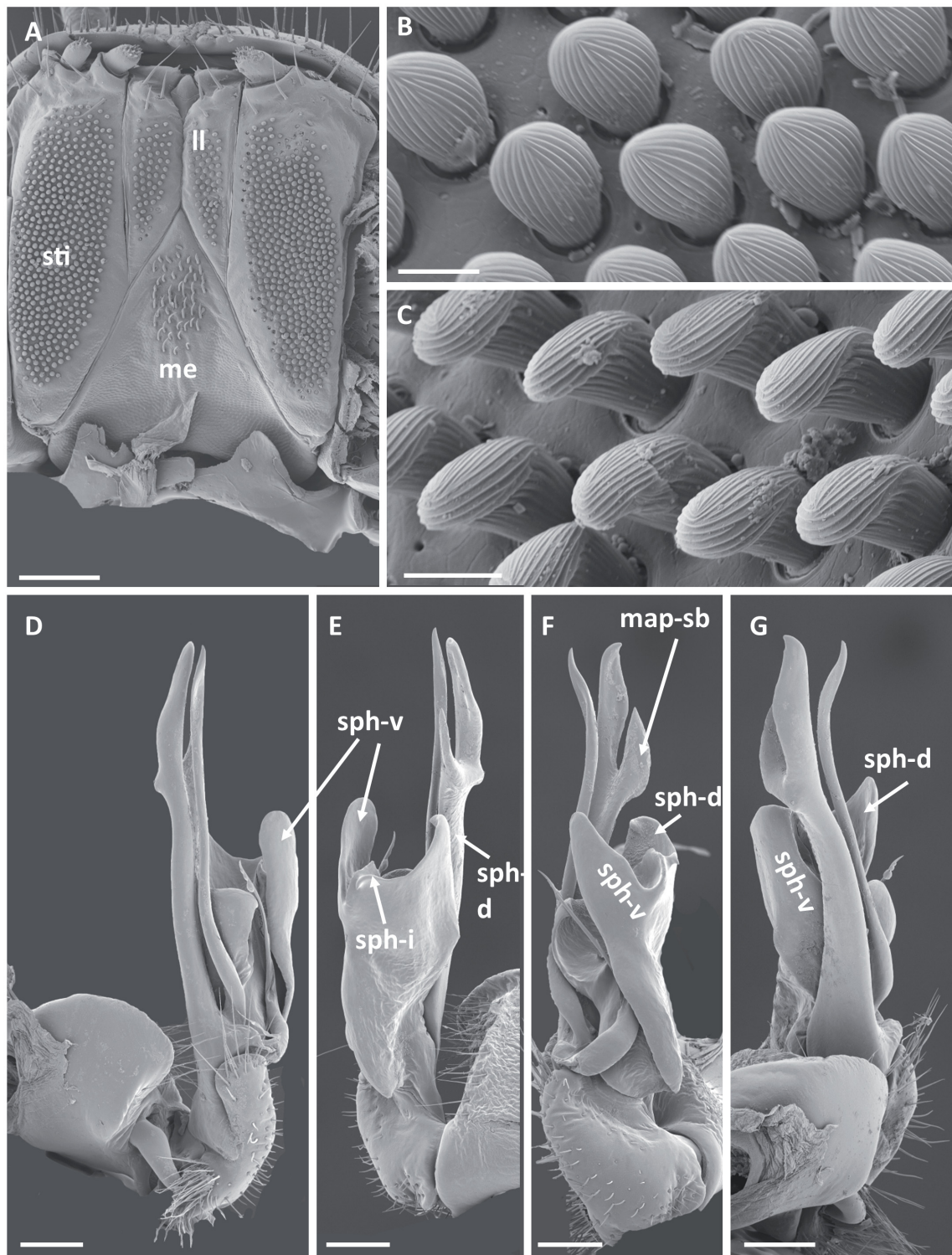


Fig. 9. *Eviulisoma ottokrausi* Enghoff, 2018, ♂, from Kilombero Nature Reserve, Ndundulu (NHMD 1184601). A–C. Gnathochilarium. A. Overview. B–C. Clublike trichomes. B. Perpendicular view. C. Oblique view D–G. Left gonopod. D. Mesal view. E. Lateral view. F. Ventral view. G. Sub-dorsal/meso-dorsal view. Abbreviations: *ll* = lamella lingualis; *map-sb* = side-branch of mesal acropodital process; *me* = mentum; *sph-d*, *sph-i*, *sph-v* = dorsal intermediate and ventral lobes of solenophore; *sti* = stipes. Scale bars: A, D–F = 0.2 mm; B–C = 0.01 mm.

GONOPODS (Fig. 9D–G). Differing slightly from those of type material in two characters: the subterminal side branch of the mesal acropodital process (*map-sb*) is larger, and the dorsal lobe of the solenophore (*sph-d*) is not much longer than the ventral and intermediate branches (*sph-v*, *sph-i*).

In other characters as in type material.

Remarks

The new material was collected in the Ndundulu areas of the Kilombero Nature Reserve, at 2020–2300 m a.s.l., whereas the type material came from the New Dabaga-Ulangambi Forest Reserve further west, at 1800–1962 m a.s.l. There are slight gonopodal differences between specimens from these two places, but with the limited material at hand, the new specimens are conservatively referred to *E. ottokrausi*.

Shape of trichomes on male gnathochilarium

In almost all the species of *Eviulisoma* treated here, the trichomes on the stipites and lamellae linguales of the male gnathochilarium, except for a few setalike ones near the frontal margin, are more or less swollen, often clublike, similar to what VandenSpiegel & Ntashava (2022) described for four congeners from Burundi. The modified trichomes form a dense to very dense cover of the entire sclerites, excepting a marginal zone. In females, the gnathochilarial trichomes are all setalike (Fig. 6B).

In addition to the species represented in the new material, gnathochilaria of additional species were examined with SEM in order to get a better overview of the diversity of trichome shape.

In many species (e.g., Fig. 3B–C), they are short, thick and regularly fluted; in ‘perpendicular’ view, these trichomes look spherical; in oblique view they resemble stout, curved clubs. For details, see Table 1.

Discussion

While *E. zmuci* sp. nov. and *E. intricatum* sp. nov. clearly fall in the *kwabuniense* group as defined by Enghoff (2018), *E. brachyaspis* sp. nov. mostly resembles *E. breviscutum* which was left ungrouped by Enghoff (2018). These two species may be considered as constituting a new species group, the *breviscutum* group, characterized by lack of a deep excavation on sternum 6, lack of an intermediate acropodital process, and a very short mesal acropodital process.

The new species were collected in two areas: Ndundulu in Kilombero Nature Reserve, and Udzungwa Scarp Nature Reserve. The new finds of previously described species were all found in areas from where they were recorded by Enghoff (2018), with exception of *E. ottokrausi* which was described from New Dabaga/Ulangambi Forest Reserve, whereas the new specimens (which differ slightly from the type specimens in gonopod morphology) were collected in Ndundulu in Kilombero Nature Reserve.

The peculiar, more or less clublike trichomes on the male gnathochilarium, first described by VandenSpiegel & Ntashava (2022) were found to be present on most species of *Eviulisoma* examined for this character (Table 1). The shape of the trichomes ranges from a moderate thickening (Fig. 7F) to an extreme, asymmetric swelling resulting in an almost spherical shape when viewed ‘perpendicularly’ and curved clublike in lateral view (e.g., Fig. 3B–C). In the related *Suohelisoma ulugurensis* the deviation from ‘normal’ setalike is quite moderate (Fig. 10). Non-setalike gnathochilarial trichomes are known from no other paradoxosomatid, except *Stosatea italica* (Latzel, 1886) in which the distal parts of the male gnathochilarial stipites and lamellae linguales bear a dense cover of strongly incrassate, three-pronged trichomes (Leif Moritz, pers. com.). The trichomes most likely play a role during courtship/mating. Mating in *Eviulisoma* has not been observed, but in some other polydesmidans, males have been

Table 1 (continued on next three pages). Gnathochilarial setae/trichomes in males of *Eviulisoma* spp. and *Suohelisoma ulugurense* Hoffman, 1964.

Species	mentum	stipites and lamellae linguales	Studied specimens
<i>kwabuniense</i> group			
<i>E. akkariae</i> Enghoff, 2018	field of setalike trichomes	dense cover of short, thick, regularly fluted, peglike trichomes, distance between trichomes equal to or slightly longer than their length	Fig. 6A, C–E ♂; TANZANIA • Morogoro Region, Kilombero District, Udzungwa Mountains National Park, Mwanihana, Sanje; 7°47'2.9754" S, 36°54'5.76" E; 410 m a.s.l.; 17 Feb. 2022; A. Ngute, E. Kivambe, W. Mhagawale, H. Mnendo, M. Mpoto, A. Marshall leg.; FoRCE Plot 93, open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184598 ♂; TANZANIA • Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve, Uhaflwa; 8°31'58.872" S, 35°51'33.444" E; 1426 m a.s.l.; 6 Feb. 2022; A. Ngute, W. Mhagawale, H. Mnendo, A. Marshall leg.; Plot 105, closed canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184608
<i>E. cetafi</i> Enghoff, 2018	field of setalike trichomes	very dense cover of short, thick, regularly fluted, clublike trichomes, distance between trichomes in general less than their length	–
<i>E. intricatum</i> sp. nov.	field of setalike trichomes	very dense cover of short, thick, regularly fluted, clublike trichomes, distance between trichomes in general equal to or less than their length	Fig. 3A–C ♂ holotype; TANZANIA • Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Luana; 7°46'00.372" S, 36°29'33.2154" E; 1903 m a.s.l.; 26 Oct. 2021; A. Ngute, R. Malanda, W. Mhagawale, A. Marshall leg.; closed canopy, FoRCE plot 70; COLL. NHMD - ACC.NO. 2022-EN-003; NHMD 1184604
<i>E. ottokrausi</i> Enghoff, 2018	field of setalike trichomes	very dense cover of short, thick, regularly fluted, clublike trichomes, distance between trichomes in general less than their length	Fig. 9A–C ♂; TANZANIA • Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Chawemba; 7°45'17.1714" S, 36°27'44.0274" E; 2020 m a.s.l.; 12 Nov. 2021; A. Ngute, R. Malanda, W. Mhagawale, A. Marshall leg.; Plot 47, closed canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184601

Table 1 (continued). Gnathochilarial setae/trichomes in males of *Eviulisoma* spp. and *Suohelisoma ulugurens* Hoffman, 1964.

Species	mentum	stipites and lamellae linguales	Fig. 2A–D	Studied specimens
<i>E. zmuci</i> sp. nov.	field of relatively short, stout setalike trichomes	very dense cover of short, thick, regularly fluted, clublike trichomes, distance between trichomes in general equal to or less than their length.	Fig. 2A–D	♂; paratype; TANZANIA • same collection data as for holotype; NHMD 1184610 • 1 ♂; Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve, Luaha; 8°25'3.0714" S, 35°56'7.9794" E; 1697 m a.s.l.; 14 Jan 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo, A. Mpoto leg; open canopy, plot 101; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184599
<i>dabagaense</i> group				
<i>E. coxale</i> Engghoff, 2018	field of setalike trichomes	dense cover of short, thick, regularly fluted, peglike trichomes, distance between trichomes equal to or slightly longer than their length	–	♂; TANZANIA • Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Luaha; 7°45'51.336" S, 36°29'16.08" E; 2007 m a.s.l.; 1 Nov. 2022; A. Ngute, R. Malanda, W. Mhagawale, A. Mpoto, A. Marshall leg.; Plot 72; open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1184607
<i>E. dabagaense</i> Kraus, 1958	field of setalike trichomes	dense cover of short, thick, regularly fluted, peglike trichomes, distance between trichomes equal to or slightly longer than their length	–	♂; TANZANIA • Iringa Region, Kilolo District, Udzungwa Scarp Nature Reserve, Kipanga; 8°24'49.86" S, 35°55'17.9394" E; 1685 m a.s.l.; 12 Jan. 2022; A. Ngute, R. Malanda, W. Mhagawale, H. Mnendendo, A. Mpoto, A. Marshall leg.; Plot 100, open canopy; COLL.NHMD - ACC.NO. 2022-EN-003; NHMD 1164606

Table 1 (continued). Gnathochilarial setae/trichomes in males of *Eviulisoma* spp. and *Suohelisoma ulugurens* Hoffman, 1964.

Species	mentum	stipites and lamellae linguales	Studied specimens
<i>sternale</i> group			
<i>E. zebra</i> Enghoff, 2018	field of setalike trichomes	dense cover of trichomes; those of lamellae linguales and some of the ones close to mesal margin of stipes setalike, the rest very short, thick, regularly fluted and slightly curved, distance between modified trichomes equal to their length	♂ paratype; TANZANIA • Udzungwa Mts National Park; 7°40'47.16" S, 36°55'7.2" E; 1450 m a.s.l.; 8 Oct. 2014; Martin Nielsen leg.; NHMD1184625
<i>breviscutum</i> group			
<i>E. brachyaspis</i> sp. nov.	no trichomes	cover of setalike trichomes, except in basal, mesal and lateral parts	♂ holotype; TANZANIA • Iringa Region, Kilolo District, Kilombero Nature Reserve, Ndundulu, Chawemba; 7°44'49.956" S, 36°27'54.864" E; 2300 m a.s.l.; 10 Nov. 2021; A. Ngute, R. Malanda, W. Mhagawale, A. Mpoto, A. Marshall leg.; FoRCE Plot 80, closed canopy; COLL.N.
<i>E. breviscutum</i> Enghoff, 2018	a few setalike trichomes	stipites with cover of trichomes, except in basal, mesal and lateral parts; trichomes in center of field short, stout, fluted, marginal trichomes setalike; lamellae linguales with field of setalike trichomes	♂; TANZANIA • Iringa Region, Udzungwa Mts Natl. Park, above Kidatu; 7°40'34.5" S, 36°55'7.0" E; 1589 m a.s.l.; 25 Jul. 2017; R. Lowassary, T. Pape & N. Scharff leg., pitfall trap; ACC.NO. 2017-EN-002 NHMD 1184602
ungrouped species			
<i>E. angulatum</i> Enghoff, 2018	a few setalike trichomes	very dense cover of short, thick, regularly fluted, clublike trichomes, distance between trichomes in general less than their length	♂ paratype; 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, J. Malumbres-Olarte leg.; pitfall trapping; NHMD 1184626

Table 1 (continued). Gnathochilarial setae/trichomes in males of *Eviulisoma* spp. and *Suohelisoma ulugurens* Hoffman, 1964.

Species	mentum	stipites and lamellae linguales	Studied specimens
<i>E. biquintum</i> Engghoff, 2018	a few setalike trichomes	dense cover of stout, very slightly fluted trichomes, distance between trichomes equal to their length	♂; TANZANIA • Morogoro Region, Kilombero District, Udzungwa Mountains National Park; 7°49'46.5348" S, 36°53'27.873" E; 347 m a.s.l.; 27 Feb. 2020; A. Ngute & A.R. Marshall leg.; Micro-force plot 20, open forest, COLL. NHMD. ACC. NO. 2020-EN-002; NHMD 1184618
<i>E. julinum</i> (Attems, 1909)	field of setalike trichomes	cover of setalike trichomes, except in basal, mesal and lateral parts	♂; TANZANIA • Kilimanjaro Region, Moshi Vijijini (rural) District, Mt Kilimanjaro, lower montane forest plot 4; 03°15'27.79" S, 37°25'12.74" S; 1623 m a.s.l.; 9 Apr. 2014; S. Frederiksen leg.; NHMD 1184627
Genus <i>Suohelisoma</i>			
<i>S. ulugurens</i> Hoffman, 1964	field of setalike trichomes	dense cover of stout, pointed trichomes, distance between trichomes equal to their length	♂; TANZANIA • Uluguru Mts, Lupanga W, 1900 m a.s.l.; 1 Jul. 1981; M. Stoltze & N. Scharff leg.; NHMD 1184628

observed to press their gnathochilarium against the female's head capsule during the process, see Causey (1943) for *Oxidus gracilis* (C.L. Koch, 1847) (Paradoxosomatidae), Bhakat (2020) for *Chondromorpha severini* Silvestri, 1897 (Paradoxosomatidae), and Tanabe & Sota (2008) for the genus *Parafontaria* Verhoeff, 1936 (Xystodesmidae). The trichomes superficially remind of sensilla basiconia, a sensillum type found in many millipede groups (Müller & Sombke 2015) but based only on SEM photos, they cannot be referred to any particular sensilla type, hence the functionally neutral term trichome is used here on the advice of Carsten Müller and Andy Sombke (pers. com.).

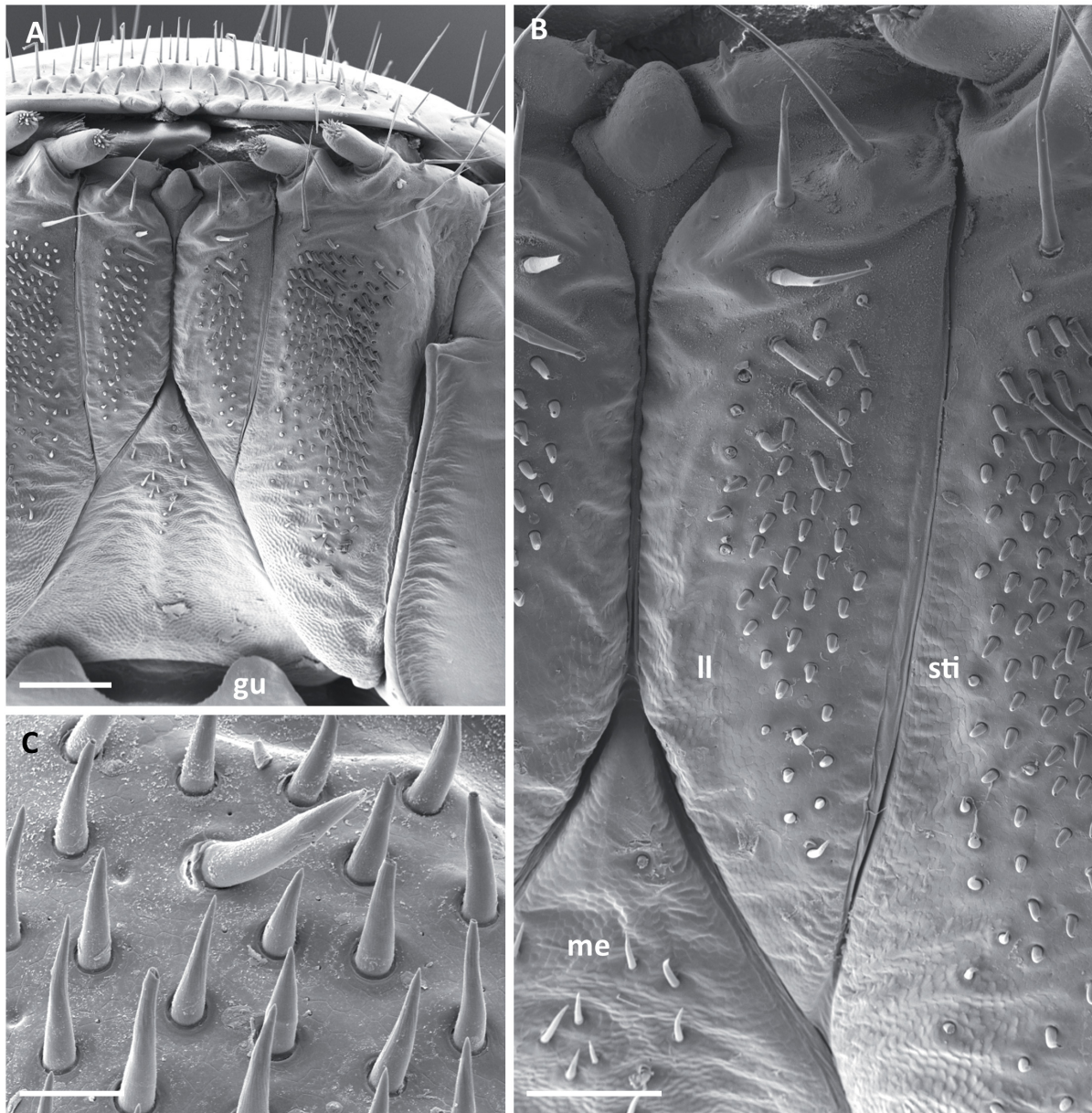


Fig. 10. *Suohelisoma ulugurenses* Hoffman, 1964, ♂, from Uluguru Mts, Lupanga W (NHMD 1184628), gnathochilarium. **A.** Overview. **B.** Close-up. **C.** Stout trichomes from lamella lingualis. Abbreviations: *gu* = gula; *ll* = lamella lingualis; *me* = mentum; *sti* = stipes. Scale bars: A = 0.2 mm; B = 0.1 mm; C = 0.025 mm.

Acknowledgements

We thank the Australian Research Council and the University of the Sunshine Coast for funding this study, through the Forest Restoration and Climate Experiment, ARC grant code FT170100279. We are grateful to the Tanzania Commission for Science and Technology (COSTECH), Tanzania Wildlife Research Institute (TAWIRI), Tanzania National Parks (TANAPA), and the Directorate of Veterinary Services for providing the necessary permits and permissions to conduct this research and collect and export specimens. We further extend our thanks to the ForCE assistants (Hamidu Mnendendo, Exaud Kivambe, Waziri Mhagawale, Revocatus Kwezaura, Robin Malanda, and Athuman Mpoto), to other collectors (Richard Lowassary, Jagoba Malumbres-Olarte, Thomas Pape & Nikolaj Scharff), to Sree Gayathree Selvantharan for photography, to Petr Dolejš, Leif Moritz, Carsten Müller, Andy Sombcke and Bill Shear for comments and suggestions concerning the gnathochilarial trichomes, to reviewers, including Dragan Antić and Ruttapon Srisonchai, and subject editor Nesrine Akkari, for careful, constructive scrutiny of the manuscript.

References

- Attems C. 1909. Myriopoda. In: Sjöstedt Y. (ed.) *Wissenschaftliche Ergebnisse der schwedischen zoologischen Expedition nach dem Kilimanjaro, dem Meru und den umgebenden Massaiesteppen Deutsch-Ostafrikas 1905–1906 unter Leitung von Prof. Dr. Yngve Sjöstedt* 3 (19): 1–64. Available from <https://biodiversitylibrary.org/page/1410223> [accessed 8 Dec. 2025].
- Bhakat S. 2020. Mating patterns, duration and multiple mating in *Chondromorpha severini* Silvestri (Diplopoda: Polydesmida). *bioRxiv preprint* 11 pp. <https://doi.org/10.1101/2020.08.23.263863>
- Causey N.B. 1943. Studies on the life history and the ecology of the hothouse millipede, *Orthomorpha gracilis* (C.L. Koch, 1847). *The American Midland Naturalist* 29 (3): 670–682. <https://doi.org/10.2307/2421156>
- Enghoff H. 2014. A mountain of millipedes I: An endemic species-group of the genus *Chaleponcus* Attems, 1914, from the Udzungwa Mountains, Tanzania (Diplopoda, Spirostreptida, Odontopygidae). *European Journal of Taxonomy* 100: 1–75. <https://doi.org/10.5852/ejt.2014.100>
- Enghoff H. 2018. 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). *European Journal of Taxonomy* 445: 1–90. <https://doi.org/10.5852/ejt.2018.445>
- Enghoff H. 2022. A mountain of millipedes X. Species of Pyrgodesmidae and Cryptodesmidae in the Udzungwa Mountains, Tanzania (Diplopoda, Polydesmida). *European Journal of Taxonomy* 845: 66–100. <https://doi.org/10.5852/ejt.2022.845.1955>
- Enghoff H., Ngute A.S.K., Kwezaura R.L., Laizzer R.L., Lyatuu H.M., Mhagawale W., Mnendendo H.R. & Marshall A.R. 2024. A mountain of millipedes XI. The trachystreptoform spirostreptids of the Udzungwa Mountains, Tanzania (Diplopoda, Spirostreptida, Spirostreptidae). *European Journal of Taxonomy* 918: 1–50. <https://doi.org/10.5852/ejt.2024.918.2405>
- Enghoff H., Ngute A.S.K., Mnendendo H.R., Kivambe E.E., Mhagawale W., Malanda R.C., Mpoto A. & Marshall A.R. 2025. A mountain of millipedes XII. The Chelodesmidae of the Udzungwa Mountains, Tanzania (Diplopoda, Polydesmida). *European Journal of Taxonomy* 997: 210–255. <https://doi.org/10.5852/ejt.2025.997.2935>
- Hoffman R.L. 1964. Über einige ostafrikanische Diplopoda Polydesmida der Zoologischen Staatssammlung München. *Opuscula Zoologica München* 79: 1–10.

- Kraus O. 1958. Myriapoden aus Ostafrika (Tanganjika-Territory). *Veröffentlichungen aus dem Überseemuseum Bremen (A)* 3: 1–16.
- Marshall A.R., Platts P.J., Chazdon R.L., Seki H., Campbell M.J., Phillips O.L., Gereau R.E., Marchant R., Liang J., Herbohn J. & Malhi Y. 2020. Conceptualising the global forest response to liana proliferation. *Frontiers in Forests and Global Change* 3: 35. <https://doi.org/10.3389/ffgc.2020.00035>
- Müller C.H.G. & Sombke A. 2015. Diplopoda – sense organs. In: Minelli A. (ed.) *The Myriapoda. Volume 2*: 181–235. Brill, Leiden, Boston. https://doi.org/10.1163/9789004188273_010
- Ngute A.S.K., Schoeman D.S., Pfeifer M., van der Heijden G.M.F., Phillips O.L., van Breugel M., Campbell M.J., Chandler C.J., Enquist B.J., Gallagher R.V., Gehring C., Hall J.S., Laurance S., Laurance W.F., Letcher S.G., Liu W., Sullivan M.J.P., Wright S.J., Yuan C. & Marshall A.R. 2024a. Global dominance of lianas over trees is driven by forest disturbance, climate and topography. *Global Change Biology* 30: e17140. <https://doi.org/10.1111/gcb.17140>
- Ngute A.S.K., Pfeifer M., Schoeman D.S., Gereau R.E., Mnendendo H.R., Lyatuu H.M., Seki H.A., Shirima D.D. & Marshall A.R. 2024b. Dynamics of tree stems and biomass in old-growth and secondary forests along gradients in liana dominance, elevation and soil. *Journal of Ecology* 112 (7): 1638–1654. <https://doi.org/10.1111/1365-2745.14347>
- Nzoko Fiemapong A.R., Tamesse J.L. & VandenSpiegel D. 2018. The first record of the genus *Eviulisoma* Silvestri, 1910 (Diplopoda, Polydesmida: Paradoxosomatidae) in Cameroon, with descriptions of three new species. *Arthropoda Selecta* 27 (4): 278–283. <https://doi.org/10.15298/arthscl.27.4.02>
- Scharff N., Rovero F., Jensen F.P. & Brøgger-Jensen S. (eds) 2015. *Udzungwa. Tales of Discovery in an East African Rainforest*. Natural History Museum of Denmark, Copenhagen and MUSE – Science Museum, Trento, Italy.
- Silvestri F. 1910. Collezioni zoologiche fatte nell' Uganda dal Dott. E. Bayon. V. Contribuzione alla conoscenza dei miriapodi dell' Uganda. *Annali del Museo Civico di Storia Naturale di Genova, Serie 3*, 4 (44): 457–478.
- Tanabe T. & Sota T. 2008. Complex copulatory behavior and the proximate effect of genital and body size differences on mechanical reproductive isolation in the millipede genus *Parafontaria*. *The American Naturalist* 171 (5): 692–699. <https://doi.org/10.1086/587075>
- VandenSpiegel D. & Ntashavu D. 2022. First records of the millipede genus *Eviulisoma* (Diplopoda: Polydesmida: Paradoxosomatidae) from Burundi, with descriptions of two new species. *Journal of East African Natural History* 111 (1): 19–26. <https://doi.org/10.2982/028.111.0102>

Printed versions of all papers are deposited in the libraries of two of the institutes that are members of the *EJT* consortium: Muséum national d'Histoire naturelle, Paris, France and Royal Museum for Central Africa, Tervuren, Belgium. The other members of the consortium are: Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Meise Botanic Garden, Meise, Belgium; Natural History Museum of Denmark, Copenhagen, Denmark; Naturalis Biodiversity Center, Leiden, the Netherlands; Museo Nacional de Ciencias Naturales-CSIC, Madrid, Spain; Leibniz Institute for the Analysis of Biodiversity Change, Bonn – Hamburg, Germany; National Museum of the Czech Republic, Prague, Czech Republic; The Steinhardt Museum of Natural History, Tel Aviv, Israël.