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HALOFLATA GEN. NOV. – A NEW GENUS FROM SALT MARSHES IN SOCOTRA ISLAND (HEMIPTERA: FULGOROMORPHA: FLATIDAE)

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Abstract.— A new monotypic genus of flatid planthoppers (Hemiptera: Fulgoromorpha: Flatidae) is described from Socotra island (Yemen): *Haloflata* **gen. nov.** for *H. arthrocnemi* **sp. nov.** (type species). Habitus, male and female external and internal genital structures of the new species are illustrated and compared with similar taxa. The new species was found in association with *Arthrocnemum macrostachyum* (Amaranthaceae) in coastal saltmarshes in western Socotra.

Key words.— planthoppers, Fulgoroidea, Flatinae, systematics, taxonomy, new species.

INTRODUCTION

The unique biogeographical features of the island of Socotra, situated in the Indian Ocean close to Somalia and the Arabian Peninsula, make it a globally important centre of endemism (Cronk 1997, Batelka 2012, Brown and Mies 2012) and a part of the Horn of Africa biodiversity hotspot (CEPF 2017). Socotran insects have been less thoroughly studied than the flora and the vertebrate fauna of the island (e.g., Wranik 2003, Miller and Morris 2004, Razzetti *et al.* 2011, Sindaco *et al.* 2012), but they have been receiving an increasing attention of taxonomists in recent years (e.g., Hájek and Bezděk 2012, 2014). One of still little known groups of insect in Socotra are the planthoppers (Hemiptera: Fulgoromorpha), a phytophagous entity particularly diverse in the tropics and subtropics (O'Brien 2002, Bourgoin 2017). So far, seven planthopper species have been documented from Socotra: the widely distributed Afrotropical lophopid *Elasmoscelis trimaculata* Walker, 1851 (Kirkaldy 1899, 1903: as *E. iram* Kirkaldy, 1899, synonymy after Distant 1910), and six species of flatids in four genera, of which none has been recorded outside of Socotra yet – *Mosiona* Melichar, 1923, comprising three species (Melichar 1902, 1923), *Kirkamflata* Świerczewski, Malenovský et Stroiński, 2014, *Dixamflata* Stroiński, Malenovský et Świerczewski, 2016, and *Kesaflata* Stroiński, Malenovský et Świerczewski, 2016, the latter three genera being monotypic (Świerczewski *et al.* 2014, Stroiński *et al.* 2016). In this paper, we describe an additional new genus and species of Flatidae based on material collected in Socotra during a recent expedition.

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Material and methods

Material. The material studied is deposited in the entomological collections of the following institutions:
MMBC – Moravian Museum, Brno, Czech Republic;
MZPW – Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland;
NMPC – National Museum, Prague, Czech Republic.

Label information of all specimens examined is provided verbatim with each line separated by a slash (/) and each label given in square brackets.

Preparations and illustration. The abdomens of the specimens examined were removed and cleared for 30 min in warm (50°C) 10% KOH solution with a few drops of chlorazol black (CAS No. 1937–37–7) for dying the ectodermic structures based on the method introduced by Carayon (1969) and Bourgoin (1993). Dissections and cleaning of genital structures were performed in distilled water. Final observations and drawings were done in glycerol using a camera lucida attached to a light microscope. All colour images were taken using a stereomicroscope Leica MZ 16 with digital camera IC 3D; final images were produced using Helicon Focus and Adobe Photoshop software. The SEM photographs of uncoated specimens were taken in the Laboratory of Scanning Microscopy, Museum and Institute of Zoology, Polish Academy of Sciences (Warsaw), using a scanning electron microscope HITACHI S-3400N under low vacuum conditions.

Measurements and abbreviations. Measurements were made with an ocular micrometer. The following measurements, ratios and their abbreviations were used in this study:
Total length – measured (in dorsal view) from head apex to tegmina apex;
A/B – width of vertex measured at anterior margin / length of vertex measured at midline;
C/E – width of frons at upper margin / length of frons at midline;
D/E – maximum width of frons / length of frons at midline;
F/B – length of pronotum at midline / length of vertex at midline;
G/F – length of mesonotum / length of pronotum at midline;
G/B+F – length of mesonotum / cumulative length of vertex and pronotum at midline;
G/H – length of mesonotum at midline / width of mesonotum between lateral angles;
I/J – length of tegmen measured from the base to the apical margin in median portion / width of tegmen measured at the widest part.

Terminology. The nomenclature of forewing (tegmen) veins follows the interpretation proposed by Bourgoin *et al.* (2015). Antennal structures are named in accordance with Stroiński *et al.* (2011). The terminology of the genitalia follows Bourgoin (1988) and Bourgoin and Huang (1990) for the male, and Bourgoin (1993) for the female. Nomenclature of plants follows Brown and Mies (2012). Alternative names of the type locality are provided by Bezděk *et al.* (2012).

Taxonomy

Order **Hemiptera** Linnaeus, 1758
Suborder **Fulgoromorpha** Evans, 1946
Superfamily **Fulgoroidea** Latreille, 1810
Family **Flatidae** Spinola, 1839
Subfamily **Flatinae** Spinola, 1839

Haloflata gen. nov.
(Figs 1–56)

Type species. *Haloflata arthrocnemi* sp. nov., here designated.

Etymology. The generic name *Haloflata* is a combination derived from two words: the Greek "ἅλς" (*hals* = salt), referring to the ecological association of the type species with coastal saltmarshes and a halophilous plant, and "*Flata*" which is used here for a representative of the Flatidae family. Gender feminine.

Diagnosis. Disc of frons tricarinate, all carinae as obsolete ridges, their bases widely fused near frons apex. Tegmen short, coriaceous. Male anal tube with an acute tooth-like lobe laterally, deeply incised apically, ending in a minute acute tooth on each side of the incision. Genital styles sickle-shaped. See the Discussion for comparisons with similar taxa.

Description. **Head**. Head with compound eyes, in dorsal view, almost as wide as thorax (Figs 2, 4, 7, 12). Vertex transverse, width of vertex distinctly smaller than thorax; length of vertex in midline distinctly shorter than pronotum; all margins carinate; disc of vertex without carinae (Figs 2, 4, 7, 9–12). Frons widest at lower part, with upper margin almost straight, lateral margins regularly arcuate, without incisions; disc of frons tricarinate, all carinae as obsolete ridges, bases of carinae widely fused; frontoclypeal suture slightly arcuate (Figs 5, 11, 13–14).

Clypeus without carinae (Fig. 5). Rostrum with apical segment a bit shorter than subapical one, apex between hind coxae. Compound eyes elongately oval, with small callus at posterior and ventral margins. Lateral ocelli absent (Figs 3, 8–10). Antenna located ventrally in respect to eye; scapus distinctly shorter than diameter of eye, cylindrical, without setae; pedicel shorter than diameter of eye but distinctly longer than scapus, club-like, apical part concave, functional area at the

top and on dorsal surface with trichoid sensilla type 1, antennal plate organs present on apical concavity and delimiting laterally dorsal functional surface (Figs 3, 10, 14–16).

Thorax. Pronotum shorter than mesonotum in midline; anterior margin reaching the level of anterior margin of compound eyes. Pronotum disc delimited by lateral ridges, with median carina placed posteriorly, not reaching anterior margin; anterior part of pronotum depressed. Lateral carinae present, not reaching posterior margin; postocular eminence crest-shaped (Figs 2, 4, 7, 9–12). Mesonotum deltoid, wider than long in midline, disc of mesonotum with three parallel carinae; lateral carinae reaching posterior margin, median carina reaching scutellum; scutellum distinctly elevated, with truncate apex (Figs 2, 4, 9–12).

Tegmen coriaceous, weakly convex, longer than wide, with distinct venation, tapering apicad; costal margin strongly arcuate, quite abruptly curved at midlength, sutural angle widely rounded, postclaval sutural margin very short (Figs 1, 7–9, 17–18). Costal area narrower than postcostal cell in basal part, as wide as or slightly wider than postcostal cell in median part, with wide, well sclerotized, transverse veinlets, each bearing 1–2 tubercules, area between veinlets membranous (Figs 19–20), costal area terminating at the level of clavus apex; postcostal cell with few transverse veinlets in posterior part; one apical line present, apical cells longer than wide, terminalia of longitudinal veins of the same type as costal veinlets. Basal cell long and narrow; ScRA+RP leaving basal cell with common stem, ScRA elevated, RP between basal cell and elongate bulla obsolete; RP single; MP forking posterior to curving point of costal margin; CuA forking before MP fork. Clavus with Pcu and A_1 not elevated and fused anterior to clavus apex, without transverse veinlets. Whole tegmen covered with scattered tubercles with their concentration in the following parts: transverse veinlets of costal area, bulla between ScRA, RP and MP, basal part of clavus – between Pcu and A_1 and A_1 and A_2 (Figs 8–9, 17–18). Hindwing well developed, membranous, with basal part well sclerotized, a bit surpassing abdomen, but shorter than tegmen. Main longitudinal veins ScRA, RP, MP and Pcu single, CuA and CuP fused before posterior margin; transverse veinlets absent. Anal lobe small with two separate anal veins A1 and A2 (Fig. 46)

Pro- and mesotibia with deep groove on the external side and about as long as pro- and mesofemur, apical tarsomere of both legs longer than cumulative length of second and basal tarsomeres; metatibia twice longer than metafemur, with two lateral spines placed close to each other in distal part and apical row of seven well-developed spines equal in size; basitarsomere of metatarsus about as long as cumulative length of second and apical tarsomeres, with row of 6–7 apical spines and setae; second tarsomere with two lateral spines and median pad with setae (Figs 21–24).

Male terminalia. Anal tube, in lateral view, elongate and curved, basal part narrower than apical part; anus placed in basal half (Figs 25–27, 31); anal tube, in dorsal view, with basal part wider than apical part, widest slightly posterior to anus, apical part with deep split (Figs 28–29, 32). Pygofer, in lateral view higher than long, dorsal margin distinctly narrower than ventral margin, anterior and posterior margins arcuate (Figs 25–26, 31). Genital styles sickle-shaped, longer than wide, distinctly tapering apicad and bearing short and acute capitulum which is oriented dorsad (Fig. 31).

Phallic complex. Periandrium elongate, upcurved, slightly longer than aedeagus, apical part wider than basal part; lateral split not reaching midlength (Figs 33–34). Dorsal part of periandrium, in lateral view, almost as long as but wider than ventral part, tapering apicad, with single appendage subapically. The sclerotized appendage possesses two membranous folds: first fold, placed medially on external side of appendage, wide and elongate, bearing single, well sclerotized, spine-like process; second fold, placed posteriorly on internal side of appendage, narrow and elongate, without process; the apex of appendage acute and strongly sclerotized. Ventral part of periandrium unilobate, tapering apicad; ventral side with distinct long keel. Aedeagus long, with apical, bulb-like, sclerotized appendages; deep median split reaching basal part; shaft of aedeagus, in lateral view, curved (Figs 35–36).

Female terminalia. Pregenital sternite with strongly sclerotized arcuate rods in median portion; lateral lobes weakly separated (Figs 41–42, 49). Anal tube, in lateral view (Figs 37–38, 50), covering gonoplac and reaching its posterior margin; basal part wider than apical part, anus placed in basal half; anal tube, in dorsal view, elongately oval (Figs 39, 51).

Gonoplac unilobate, triangular, oriented ventrad (Figs 37–38, 52–53); posterior margin with two rows of alternately placed teeth – large internally and small externally; large teeth of both gonoplacs fitting together in a zip-like manner (Figs 39–40, 43–45); upper part of gonoplac well sclerotized with stout setae on internal side, lower part membranous with short setae on baso-ventral margin (Figs 43, 52–53). Gonapophysis VIII triangular, laterally flattened (Fig. 54); endogonocoxal process about as long as gonapophysis, distinctly tapering apicad, membranous with distinct spiniferous microsculpture and ventro-apical setae. Gonospiculum as in Figs 55–56. Bursa copulatrix with single pouch, oval, cells with weakly sclerotized central areas with microsculpture on the surface (Fig. 48). Spermatheca well developed, *ductus receptaculi* distinctly longer than *diverticulum ductus*, divided into two parts (Fig. 47).

Distribution. Yemen: Socotra island.

Haloflata arthrocnemi sp. nov.
(Figs 1–56)

Etymology. The specific epithet comes from the name of the host plant genus *Arthrocnemum*.

Diagnosis. The only species in the genus; see Discussion.

Description. Total length 3.1–3.7 mm.

Head. Vertex: ratio A/B = 2.43–3.13, anterior margin obsolete, distinctly arcuate; lateral margins sharp and parallel, posterior margin sharp and elevated, weakly arcuate, with median portion flattened (Figs 2, 4, 11–12). Frons: ratio C/E = 0.70–0.79; D/E = 1.09–1.20, median carina only visible in median portion (Figs 2, 13–14). Disc of clypeus weakly convex.

Thorax. Pronotum: ratio F/B = 1.67–2.50, anterior margin strongly convex, posterior margin concave (Figs 4, 11–12). Mesonotum: ratio G/F = 1.91–2.00, G/B+F = 1.23–1.43, G/H = 0.60–0.66, area between lateral carinae weakly depressed (Figs 10–11). Tegmina: ratio I/J = 1.80–2.29, ScRA ending with 3 terminals, RP terminating posterior to clavus apex with 2 terminals, MP ending with 4 terminals, CuA terminating with 3 terminals (Figs 7–9, 17–18).

Male terminalia. Anal tube with ventral margin weakly concave in basal two thirds, bearing a sharp tooth-like lobe in apical third, dorsal margin posteriorly strongly convex, postero-dorsal angle with a minute apical tooth-like process (Figs 25–27, 30–31). Genital styles with ventral margin medially strongly convex (Fig. 31). Dorsal and ventral parts of periandrium apically with spiniferous microsculpture (Fig. 33–34). Shaft of aedeagus with narrow baso-lateral lobe (Fig. 36).

Female terminalia. Pregenital sternite with anterior and posterior margins almost straight medially (Fig. 49). Anal tube, in dorsal view, with posterior margin delicately pointed apically (Fig. 51). Gonapophysis VIII – dorsal margin sinuate with 3 teeth, ventral margin arcuate and slightly up-folded, with 4 teeth (Fig. 54).

Ducts receptaculi – basal part ribbed, widened apically,apical part wrinkled with the same width; *diverticulum ductus* smooth with long narrow ductus and elongate apical bulba (Fig. 47).

Coloration. Uniformly light, pale dirty yellow, compound eyes brownish (Figs 1–5).

Type material. Holotype ♂: [Yemen, Socotra Island/ ca. 3 km NE of Shuab/ 12°34.1'N, 53°23.9'E, 3m/ *Avicennia marina* mangrove/sand dunes, 20-21.vi. 2012], [SOCOTRA expedition 2012/ I. Malenovský, P. Kment,/ J. Bezděk, J. Hájek, V. Hula,/ J. Niedobová & L. Purchart leg.], [COLLECTIO/ Moravské museum/ Brno], [HOLOTYPE / *Haloflata* / *arthrocnemi* sp. nov. / det. D. Świerczewski, I. Malenovský / & A. Stroiński, 2017] – MMBC (dry-mounted).

Paratypes 13♂♂, 11♀♀ (9♂♂, 7♀♀ – MMBC; 2♂♂, 2♀♀ – MZPW; 2♂♂, 2♀♀ – NMPC): all specimens with the same collecting data as the holotype.

Host plant and habitat (Figs 57–62). The type series was collected from an extensive monospecific stand of *Arthrocnemum macrostachyum* (Moric.) C. Koch (family Amaranthaceae), which is probably the host plant (Figs 59–62). In Socotra, this plant forms dense, low and species-poor vegetation ("*Arthrocnemum macrostachyum* community") in salt marshes and coastal sabkha, usually in depressions behind the immediate coastline formed by sand dunes or in lagoons. Such sites are occasionally inundated or perturbed by the sea at high tides and frequently flooded by brackish water rising from the substrate, especially during the rainy monsoon season, while they form a salt crust during the dry season. In the west of Socotra, they are locally associated with small remnants of mangroves, *Avicennia marina* community (Brown and Mies 2012, De Sanctis *et al*. 2013). The same character of the vegetation was also recorded for the type locality of the new genus (Figs 57–58).

Distribution. Yemen: Socotra island; so far only known from the mangroves near the Shuab village and cape at the western coast of Socotra.

Discussion

Haloflata arthrocnemi sp. nov. is superficially similar to two other flatid genera recently described from Socotra, *Dixamflata* and *Kesaflata*, as well as the western Palaearctic genera *Cyphopterum* Melichar, 1905, *Riodeorolix* Lindberg, 1956, and some species currently classified in *Persepolia* Dlabola et Safavi, 1972 (*P. jasmuriana* Dlabola, 1982, *P. secunda* Dlabola, 1981, and *P. servadeina* Dlabola, 1982; see Stroiński *et al*. 2016 for details), in the following characters: relatively small body size, issid-like habitus with relatively short, coriaceous tegmina, vertex transverse, ocelli absent, tegminal bulla present, ScRA+RP leaving basal cell with common stem, RP in basal part obsolete. These genera can be distinguished from *H. arthrocnemi* by the characters given in Table 1. It is unclear for the time being, if all these taxa are closely related or not, as a phylogenetic framework for Flatidae is still lacking. The issid-like habitus itself has clearly evolved many times independently in several other families of planthoppers, perhaps as a result of adaptation to a life in semi-arid and arid conditions, in association with low-growing sclerophyllous vegetation (Fennah 1967, Stroiński *et al*. 2011, Gnezdilov 2013). We have been unable to reveal any special resemblance (putative synapomorphy) of *Haloflata arthrocnemi* sp. nov. to any of the previously described issid-like genera of Flatidae and this is the reason why we

Table 1. Diagnostic characters of *Haloflata* gen. nov. and other issid-like genera of Flatidae in Socotra and western Palaearctic region. Characters of *Riodeorolix* are recorded based on published information only (Lindberg 1956, 1963), representatives of the other genera were examined from the MMBC and NMPC collections.

	Haloflata gen. nov.	*Dixamflata*	*Kesaflata*	*Persepolia*	*Cyphopterum*	*Riodeorolix*
		Stroiński et al., 2016	Stroiński et al., 2016	Dlabola & Safavi, 1972 (in part.: *jasmuriana*, *secunda*, *servadeina*)	Melichar, 1905	Lindberg, 1956
Distribution	Socotra	Socotra	Socotra	Iran	Macaronesia, NW Africa,NW Africa	SW Europe
HEAD						
Crown of frons	absent	present, large, rounded, longer than vertex in midline	absent	present, small, shorter than or as long as vertex in midline	absent, vertex and frons slightly protruded anteriorly in some spp.	absent, vertex and frons slightly protruded anteriorly
Median carina of frons	obsolete, distinct in median portion only	faint but distinct throughout most of frons	well developed, sharp throughout most of frons	indistinct or obliterated and hardly distinct	well developed, usually sharp throughout most of frons	?
Lateral carinae of frons	as obliterated ridges, widely fused with median carina in the middle of frons subapically	as obliterated ridges forming horseshoe-shaped bulge apically	relatively sharp but shorter than median carina, narrowly connected at frons apex	as obliterated ridges forming horseshoe-shaped bulge apically	absent	?
THORAX						
Median carina of pronotum	distinct posteriorly	distinct medially	absent, replaced by median groove	absent, replaced by median groove	absent	distinct throughout
Postocular eminences of pronotum	crest-like	conical	bluntly rounded	crest-like	crest-like	?
Disc of mesonotum	with median carina distinct throughout; lateral carinae sub-parallel, separated anteriorly	with median carina distinct only in median portion; lateral carinae subparallel, separated anteriorly	with median groove; lateral carinae converging anteriad in form of horseshoe	with median groove; lateral carinae sub-parallel, separated anteriorly	with median groove; lateral carinae sub-parallel, separated anteriorly	with median carina distinct throughout; lateral carinae sub-parallel, separated at base
Scutellum apex	blunt, slightly truncate	sharply pointed	blunt, narrowly	blunt, slightly	blunt, narrowly	blunt, narrowly

Table 1. Continued.

	Haloflata gen. nov.	*Dixamflata*	*Kesaflata*	*Persepolia*	*Cyphopterum*	*Riodeorolix*
			rounded	truncate	rounded	rounded?
Tegmen						
Costal margin	abruptly curved medially	regularly arcuate	abruptly curved medially	abruptly curved medially	regularly arcuate	regularly arcuate
Costal area	transverse veinlets widely sclerotized, each bearing 1–2 tubercules; area between veinlets membranous	uniformly sclerotized, lacking well-developed tubercles	uniformly sclerotized, lacking well-developed tubercles	transverse veinlets widely sclerotized, each bearing 1–2 tubercules; area between veinlets membranous	uniformly sclerotized, with tubercles on or between transverse veinlets	?
Claval vein A1	not elevated	strongly elevated	strongly elevated	not or weakly elevated	strongly elevated	strongly elevated
Sensory structures (excluding tubercles)	absent	present	absent	?	?	?
MALE TERMINALIA						
Anal tube in lateral view	long, extending beyond genital styles, broad, ventro-lateral margin with a subapical lobe ending with a sharp tooth-like process; anus in basal half	long, extending beyond genital styles, narrow, ventro-lateral margin regularly concave, apical margin curved ventrad; anus at midlength	unknown	short, not extending beyond genital styles, robust, straight, with convex ventral margin, anus placed in basal half	short to long, ventral margin strongly concave, with or without a blunt tooth-like lobe medially, anus placed in apical half or subapically	?
Anal tube in dorsal view	narrowly ovoid, apical part deeply split, ending in a minute, sharp tooth-like process on each side of the split	cuneate, apical part not split	unknown	broadly ovoid, apically truncate, not split or weakly incised	narrow, parallel-sided or cuneate, apical part not split	broadly ovoid, apically incised
Styles	sickle-shaped, tapering apicad, dorsal margin concave without extra fold, capitulum short, posteroventral margin	triangular, broad apically, dorsal margin straight without extra fold, capitulum long, arcuate, posteroventral	unknown	semicircular, broad apically, dorsal margin with another tooth-like process subapically andan extra fold,	triangular or rectangular, broad apically, dorsal margin straight without extra fold,	triangular, broad apically, capitulum moderately long, arcuate, posteroventral angle

Table 1. Continued.

	Haloflata gen. nov.	*Dixamflata*	*Kesaflata*	*Persepolia*	*Cyphopterum*	*Riodeorolix*
Periandrium	rounded, lacking process on inner side	angle with short, blunt process on inner side	unknown	capitulum short, posteroventral angle rounded, lacking process on inner side	capitulum short to long, arcuate, posteroventral angle rounded, lacking process on inner side	rounded, lacking process on inner side
	with a single long, well-sclerotised process on each side, placed subapically and bearing a lateral spine	with a single long, well-sclerotised, one-armed process on each side, placed apically		with a single, very short or moderately long, one-armed, weakly sclerotized process on each side, placed apically	with a two-armed process on each side, the outer arm of which is further ramified, or with a one-armed process; process placed subapically	with two one-armed processes on each side, placed apically, one dorsally, the other ventrally

formally erect a new genus for it here. It would be, of course, desirable to test its status and reveal its sister-group relationships in a rigorous phylogenetic analysis in future.

Haloflata arthrocnemi sp. nov. was found in Socotra in association with *Arthrocnemum macrostachyum* which is a hygrohalophytic semi-succulent dwarf shrub widely distributed along the coasts of the Mediterranean Sea and the Red Sea, Macaronesia, as well as in the Middle East, Iran and Pakistan (Missouri Botanical Garden 2016, Sukhorukov and Nilova 2016, Walter 2016). Very similar saltmarsh vegetation to that occurring at the type locality of *H. arthrocnemi* has been recorded also in southern mainland Yemen and along the coastline in the United Arab Emirates (Brown and Mies 2012). Future targeted field work is needed in these habitats outside of Socotra to reveal a possible wider distribution of the new species or to confirm its status as a species endemic to Socotra. Conservation of the only locality of *H. arthrocnemi* known so far, the saltmarshes and fragments of mangroves in Shuab, representing one of the best preserved sites with coastal vegetation in Socotra (Brown and Mies 2012), is therefore very important, given the increasing intensity of devastating anthropogenic impact on the island's biodiversity in recent times (Van Damme and Banfield 2011, Brown and Mies 2012).

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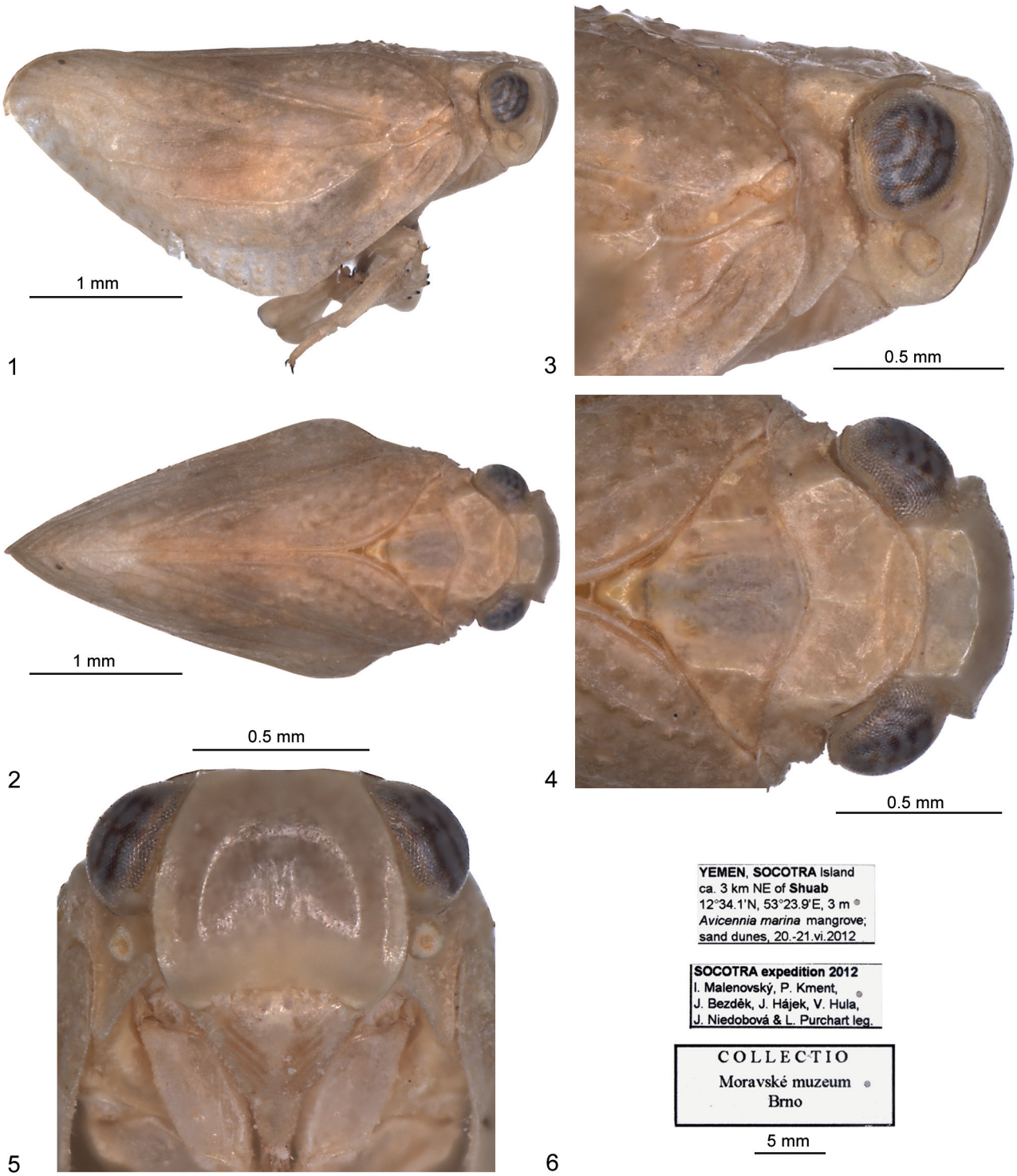
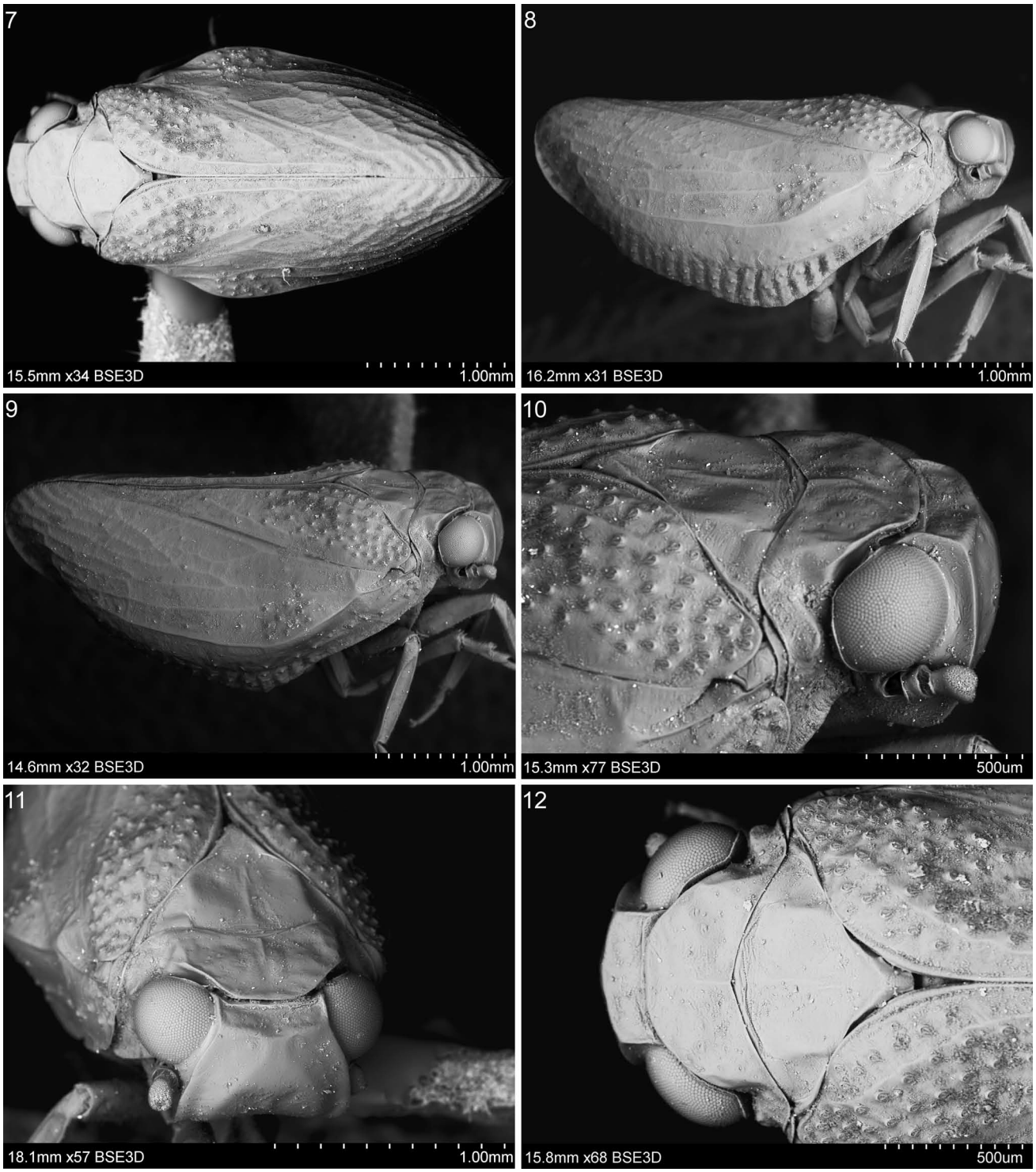
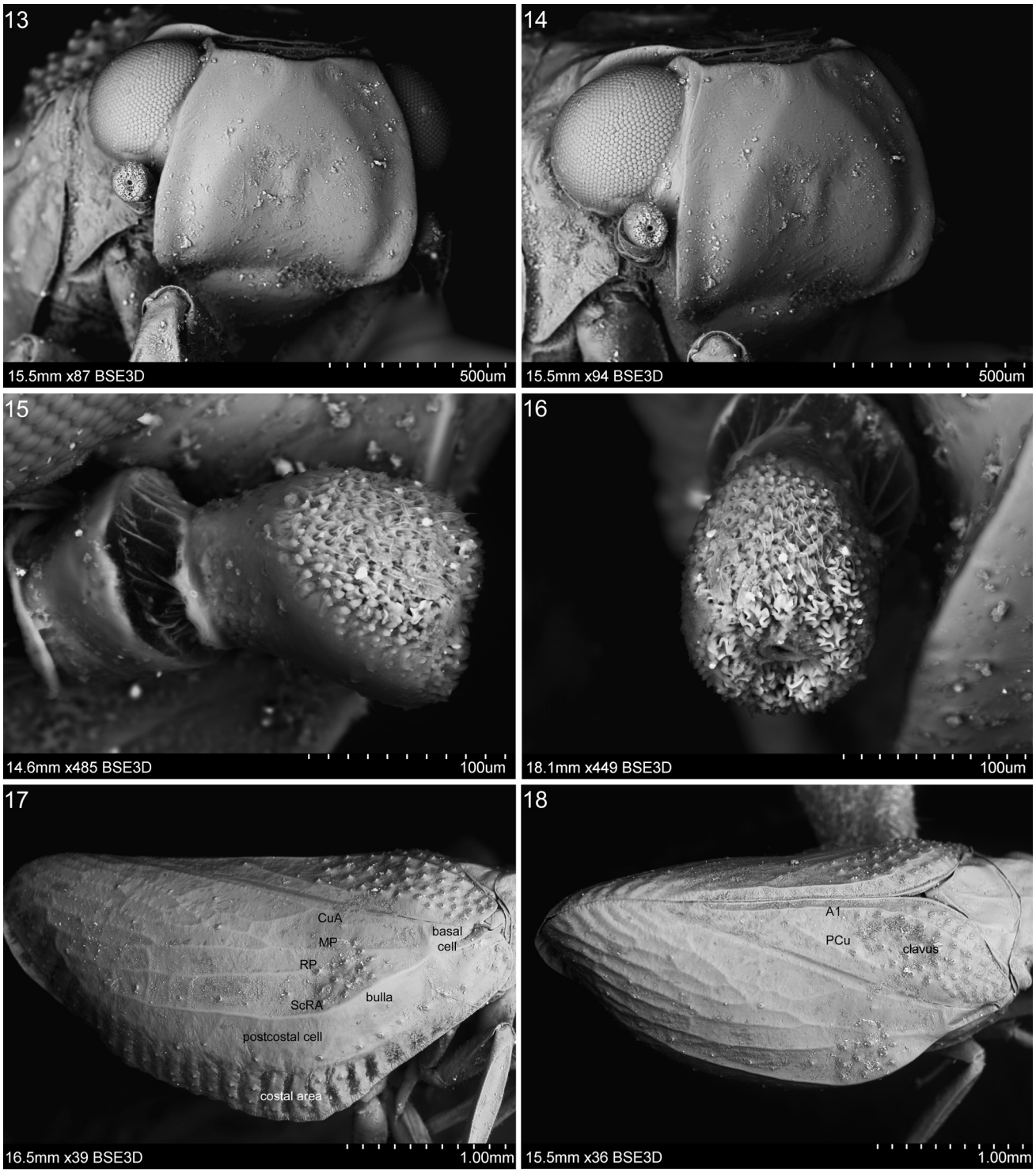


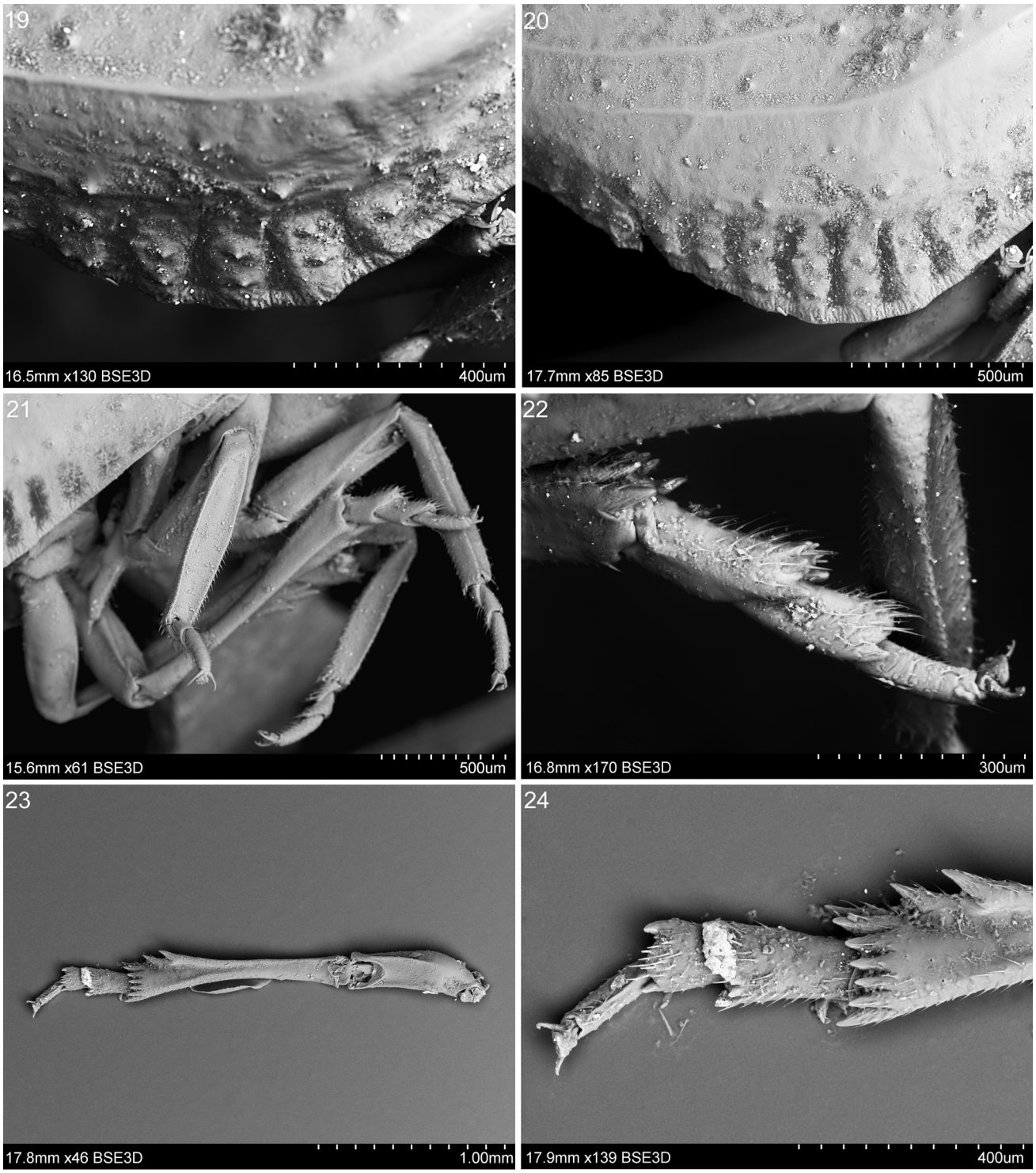
Figures 1–6. *Haloflata arthrocnemi* gen. et sp. nov. (1) Habitus, lateral view; (2) same, dorsal view; (3) anterior part of body, lateral view; (4) same, dorsal view; (5) same, frontal view; (6) labels.



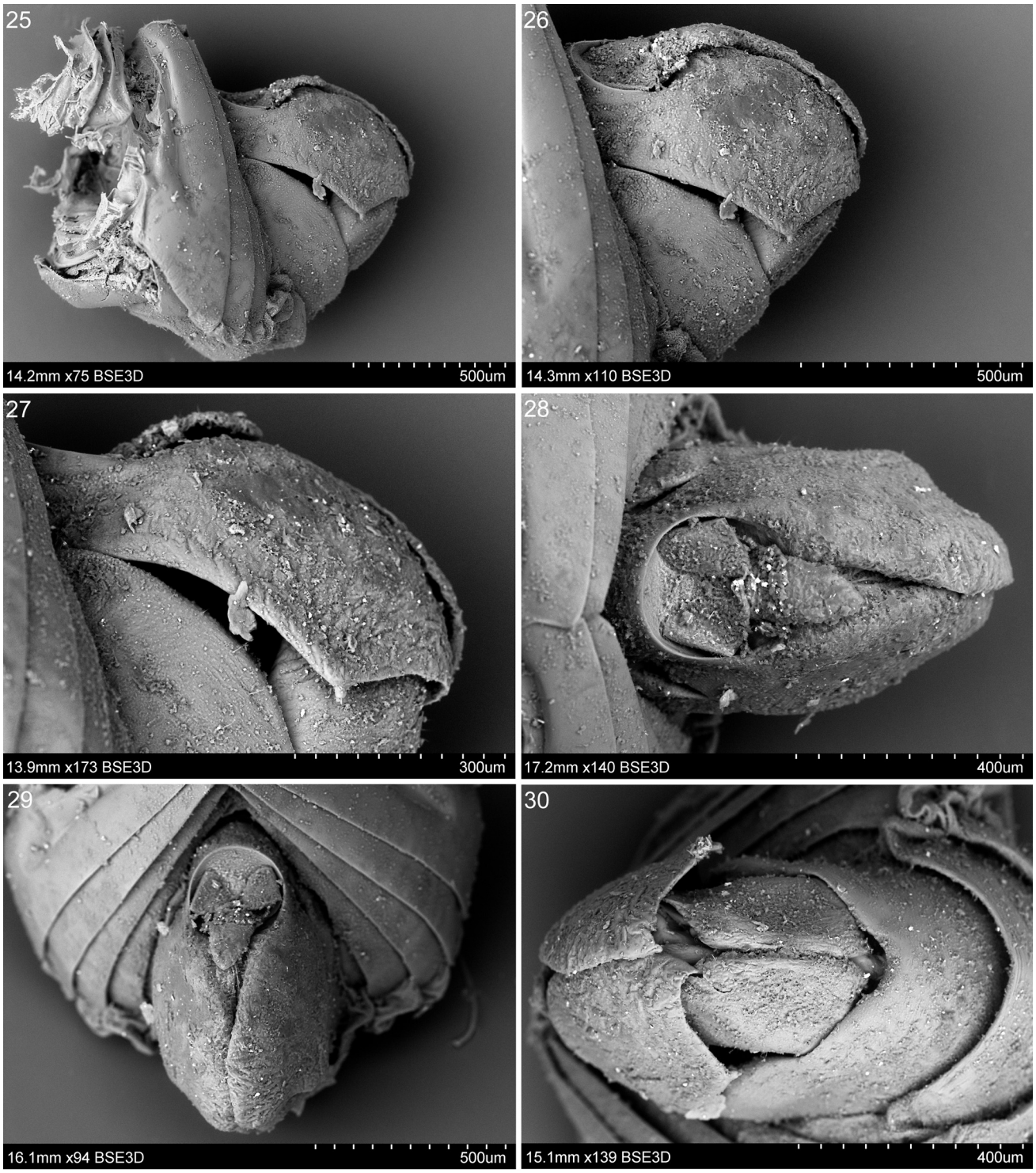
Figures 7–12. *Haloflata arthrocnemi* gen. et sp. nov., SEM photographs. (7) Habitus, dorsal view; (8) same, lateral view; (9) same, dorso-lateral view; (10) anterior part of body, dorso-lateral view; (11) same, fronto-dorsal view; (12) same, dorsal view.



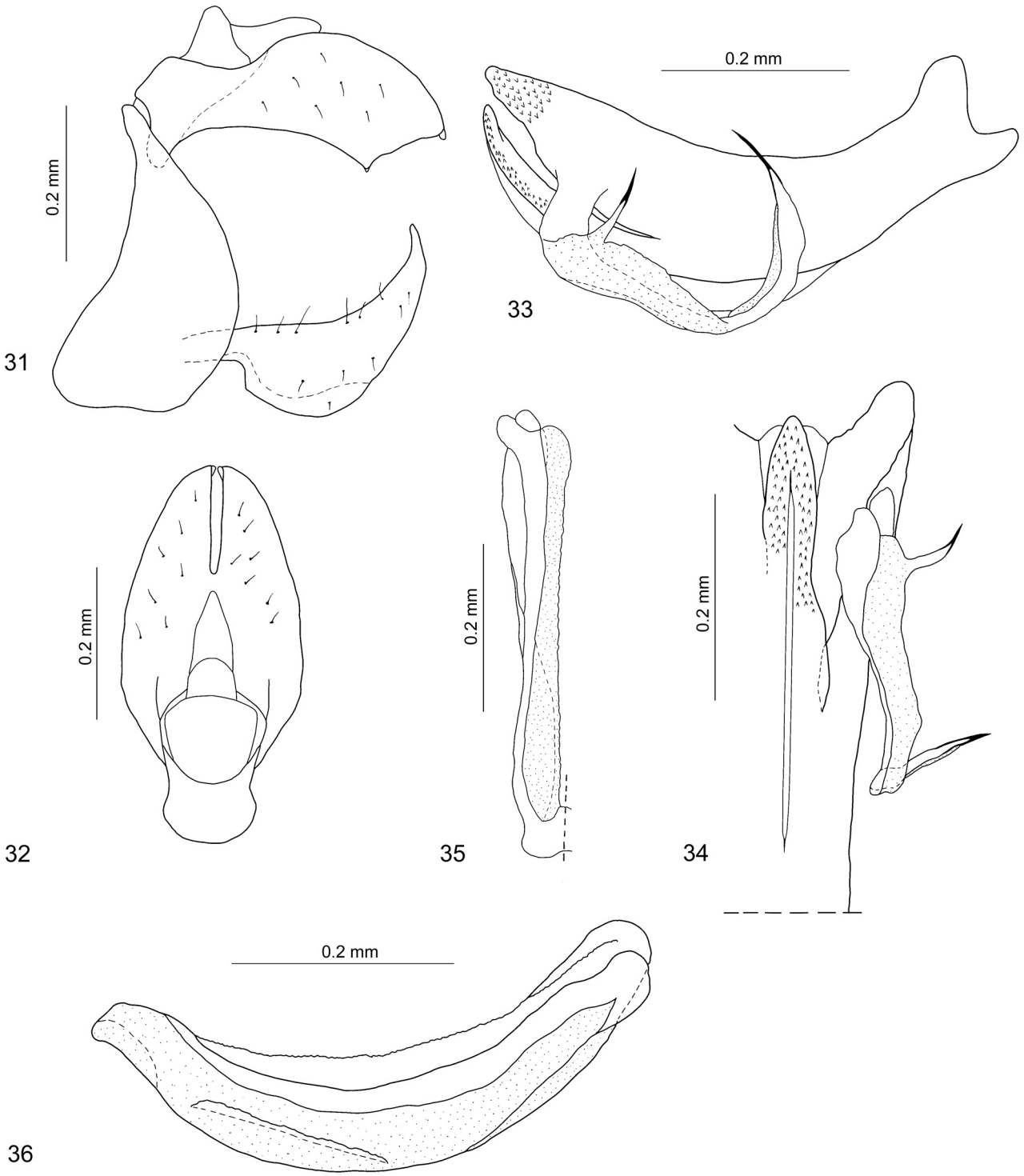
Figures 13–18. *Haloflata arthrocnemi* gen. et sp. nov., SEM photographs. (13) Frons, frontal view; (14) same, fronto-lateral view; (15) antenna, lateral view; (16) same, frontal view; (17) tegmen, lateral view; (18) same, dorso-lateral view.



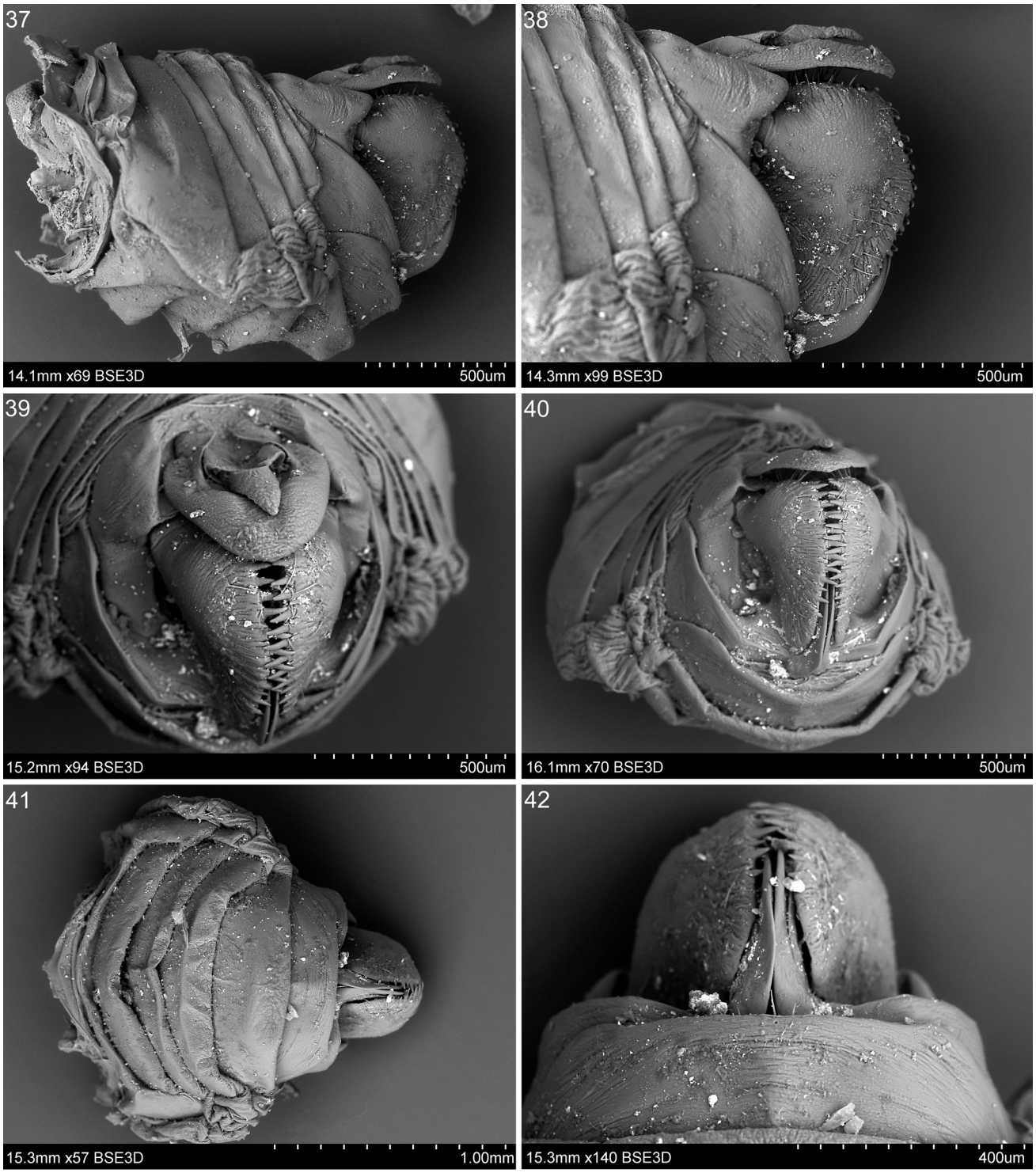
Figures 19–24. *Haloflata arthrocnemi* gen. et sp. nov., SEM photographs. (19–20) Costal area of tegmen; (21) legs; (22) metatarsus, lateral view; (23) hind leg, internal view; (24) apical part of metatibia and metatarsus, internal view.



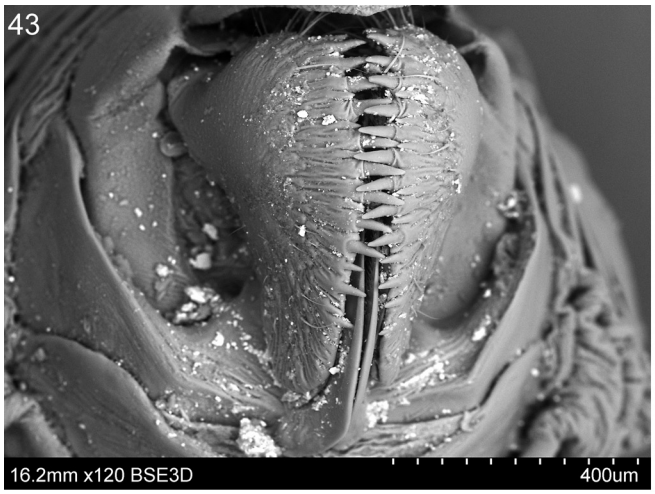
Figures 25–30. *Haloflata arthrocnemi* gen. et sp. nov., male, SEM photographs. (25) Abdomen, lateral view; (26) terminalia, dorso-lateral view; (27) anal tube, lateral view; (28) same, dorsal view; (29) same, postero-dorsal view (30) terminalia, ventral view.

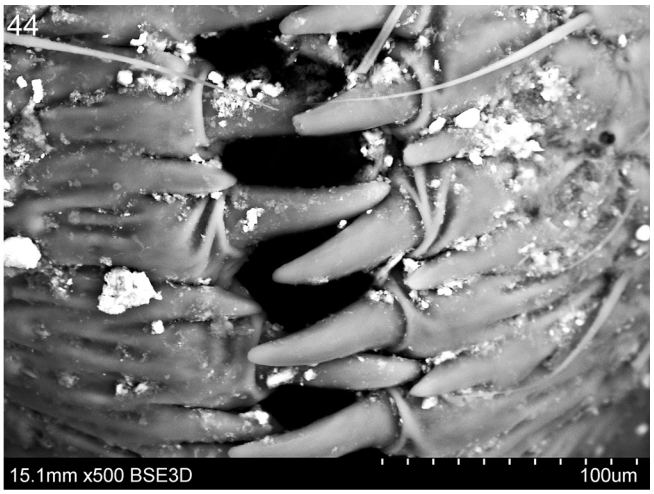


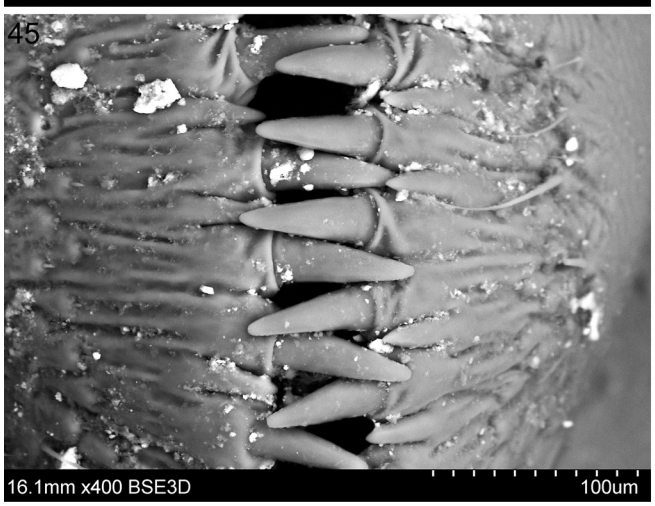
Figures 31–36. *Haloflata arthrocnemi* gen. et sp. nov., male, drawings. (31) Terminalia, lateral view; (32) anal tube, dorsal view; (33) periandrium, lateral view; (34) same, ventral view; (35) aedeagus, ventral view; (36) aedeagus, lateral view.

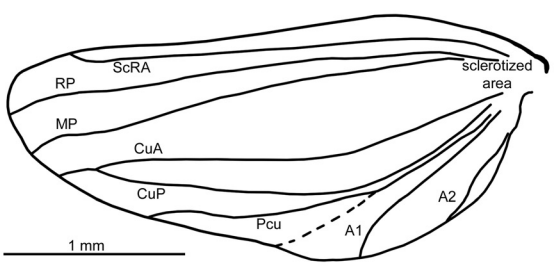


Figures 37–42. *Haloflata arthrocnemi* gen. et sp. nov., female, SEM photographs. (37) Abdomen, lateral view; (38) terminalia, lateral view; (39) same, postero-dorsal view; (40) same, posterior view; (41) abdomen, ventral view; (42) pregenital sternite, ventral view.









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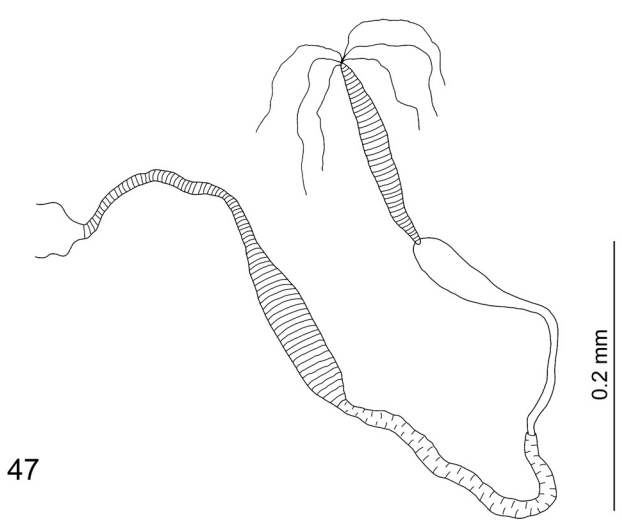

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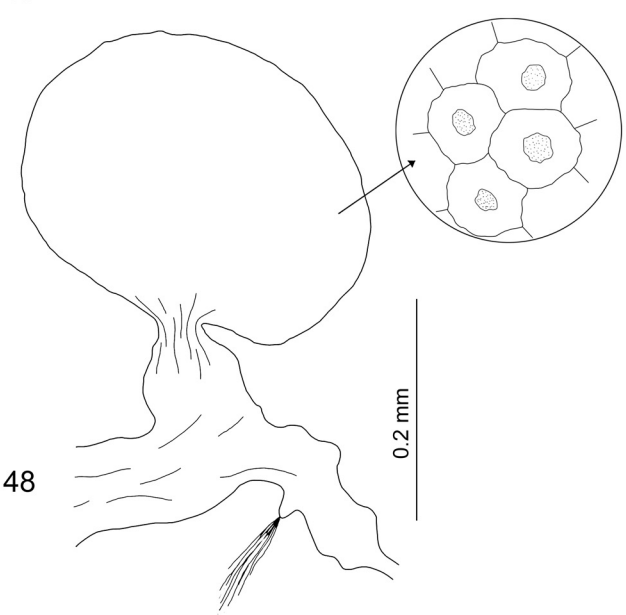

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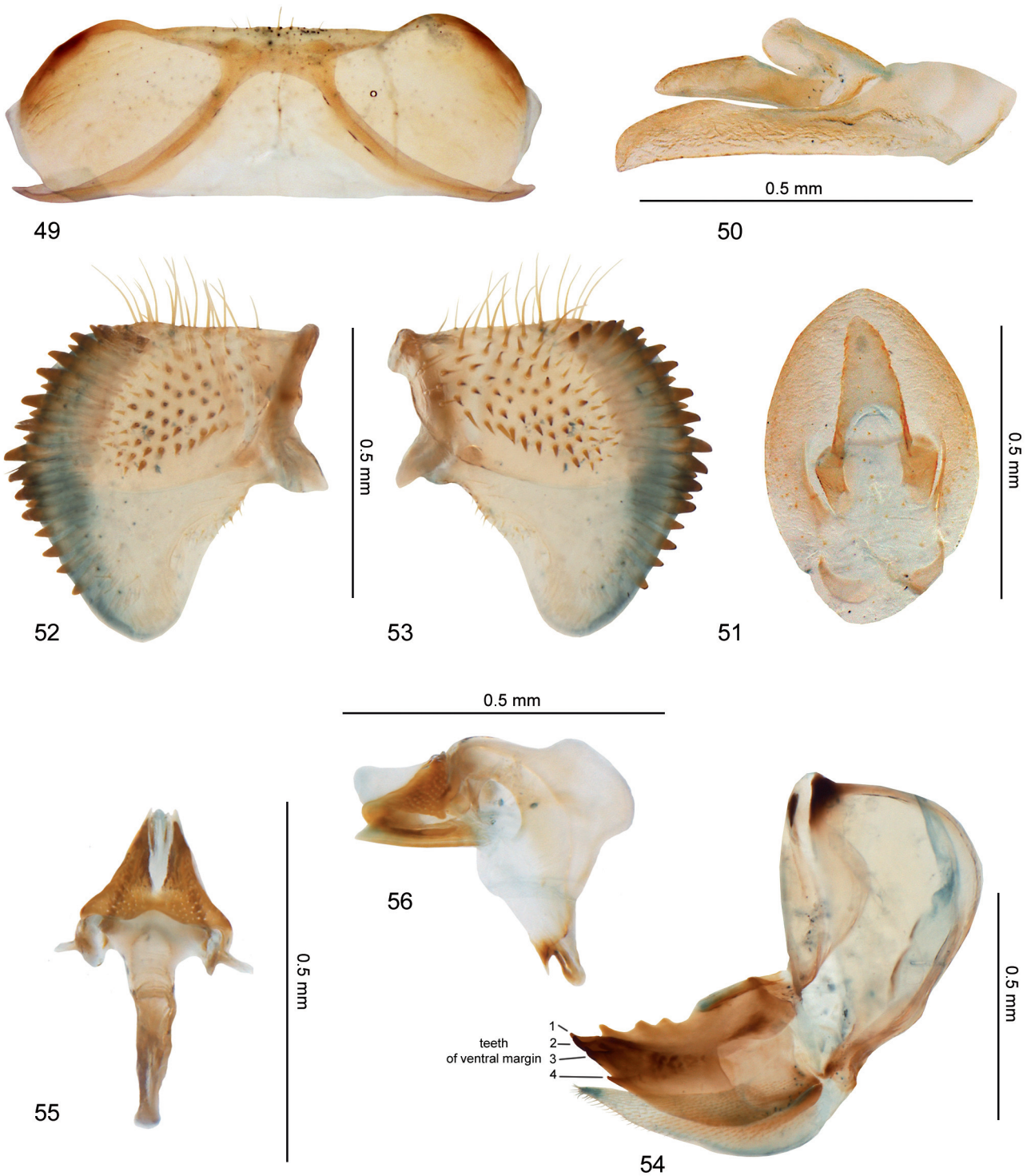
Figures 43–48. *Haloflata arthrocnemi* gen. et sp. nov., female. (43–45) SEM photographs, (46–48) drawings. (43–45) Gonoplac teeth, posterior view; (46) hind wing, dorsal view; (47) spermatheca; (48) bursa copulatrix, lateral view.



Figures 49–56. *Haloflata arthrocnemi* gen. et sp. nov., female. (49) Pregenital sternite, flattened, ventral view; (50) anal tube, lateral view; (51) same, dorsal view; (52–53) gonoplac, lateral view: (52) external side, (53) internal side; (54) gonapophysis VIII, lateral view; (55) gonapophyses IX and gonospiculum bridge, dorsal view; (56) same, lateral view.

Figures 57–62. Habitat and host plant of *Haloflata arthrocnemi* gen. et sp. nov. at the type locality in Shuab in western Socotra. (57–58) remnants of mangroves with *Avicennia marina* trees; (59–62) stands of *Arthrocnemum macrostachyum* (photographs 57–58 by J. Hájek, 59–62 by P. Kment).