KIRKAMFLATA, A NEW PLANTHOPPER GENUS FROM SOCOTRA ISLAND (HEMIPTERA: FULGOROMORPHA: FLATIDAE)

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Abstract.— The paper describes a new genus of the Hemiptera: Fulgoromorpha: Flatidae, *Kirkamflata* **gen. nov.**, and a new species *K. socotrana* **sp. nov.** from the Hagher Mountains in central Socotra island (Yemen). Habitus, external morphology, male and female terminalia and internal genital structures of the new species are illustrated. The new genus is similar to *Latois* Stål, 1866 in head morphology, wing shape and venation, male and female terminalia but differs in a rudimentary median carina on pronotum and mesonotum, longer apical cells of tegmen and details of the male reproductive parts: style, periandrium, aedeagus, as well as female ones: gonapophysis VIII and *diverticulum ductus*.

Key words.— Entomology, systematics, taxonomy, endemism, Flatinae, Sisciini, Afrotropical region, Arabia.

INTRODUCTION

The Flatidae constitutes one of the largest families within planthoppers (Fulgoromorpha, Hemiptera) with nearly 1500 species described in some 300 genera and 12 tribes worldwide (Bourgoin 2014). These insects are phytophagous, highly diverse in terms of their colour and size, and are found on all continents, being especially common and abundant in the tropics (O'Brien 2002). About 20 species of Flatidae are regarded as serious pests of economically important crops such as coffee, tea, cocoa, mango, citrus, apple and cherry (Wilson and O'Brien 1986). The state-of-the-art of the systematics and taxonomy of the Flatidae is still imperfect in some regions and there are many taxa which await description (e.g. Świerczewski and Stroiński 2013).

Socotra is the largest island of the Socotra archipelago, a governorate of the Republic of Yemen. It lies in the north-western part of the Indian Ocean, close to the African continent (232 km westwards of the Horn of Africa, Somalia) and the Arabian Peninsula (351 km southwards of the Ra's Fartaq cape in southern Yemen), roughly equidistant from the Tropic of Cancer in the north and the Equator in the south. Despite its relatively small area (3625 km^2 for Socotra island, 184 km^2 for the other three islands of the archipelago together), the flora and fauna of the Socotra archipelago

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are quite diverse and noteworthy for the presence of many endemic species. For example, 37% of 842 species of vascular plants (Miller and Morris 2004, Brown and Mies 2012), 95% of about 110 species of land snails (Neubert 2006, 2009), 90% of 31 species of reptiles (Razzeti *et al*. 2011, Sindaco *et al*. 2012) and 54% of 50 species of grasshoppers and crickets (Orthoptera; Desutter-Grandcolas and Felix 2012) recorded from the archipelago are endemic, as well as about 50 currently valid insect genera from ten different orders (Batelka 2012, Purchart 2013).

Socotra is a continental fragment of east Gondwana, which became separated from the mainland (probably the Dhofar region in Oman in southern Arabian Peninsula) in Oligocene–Miocene and has thus been isolated for 15 million years at least (Leroy *et al*. 2012). The geomorphology and geology of Socotra island is quite diverse, comprising sedimentary coastal plains, limestone plateaus at medium elevations, and the granitic peaks of the Hagher Mountains (reaching up to about 1550 m). The climate is generally arid, but the winter and summer monsoons, and the upland plateaus and mountains with their various exposures, offer a large spatial and temporal variation (Scholte and de Geest 2010). Additionally, while Socotra island has been inhabited by man since prehistoric times, its ecosystems have remained relatively intact thanks to long-term sustainable resource use, at least until very recently (Van Damme and Banfield 2011, Brown and Mies 2012). All these factors may account for the outstanding biodiversity and endemism in Socotra (Cronk 1997). The increasing population and anthropogenic impact in recent years have made the archipelago an important hotspot for international nature conservation and Socotra was declared a UNESCO World Heritage Site in 2008 (Van Damme and Banfield 2011).

Despite a relatively long history of zoological exploration in Socotra (first expeditions date back to the second half of the 19th century), many groups, particularly of invertebrates, have been insufficiently studied so far (Wranik 2003, Batelka 2012). With regard to planthoppers, the first species reported from Socotra was the lophopid *Elasmoscelis iram* Kirkaldy, 1899 described from the island (Kirkaldy 1899, 1903) and later synonymized by Distant (1910) with *Elasmoscelis trimaculata* Walker, 1851 recorded from whole sub-Saharan Africa (Metcaf 1957, Bourgoin 2014).

The only other planthopper taxon published from Socotra so far has been the genus *Mosiona* Melichar, 1923, which belongs to Flatidae and comprises three species endemic to the island: *Mosiona simonyi* (Melichar, 1902), *M. socotrina* (Melichar, 1902), and *M. squamosa* (Melichar, 1902). However, unidentified material in museum collections and recent field work in Socotra suggest that this is only a small fraction of the Socotran planthopper fauna. In this paper, we describe a new species of Flatidae from Socotra for which we establish a new genus.

Material and methods

Preparations and illustrations. 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 black chlorazol (CAS No. 1937–37–7) to dye the ectodermic genital ducts, following the method proposed by Carayon (1969) and Bourgoin (1993). Dissections and cleaning of genital structures were performed in distilled water. Final observations and drawings were done in glycerin using a camera lucida attached to a light microscope. The photos of the habitus and male and female genital structures 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, MIZ PAS (Warsaw), using a scanning electron microscope HITACHI S-3400N under low vacuum conditions.

Measurements and abbreviations. The following measurements made with an ocular micrometer, ratios and abbreviations were used in this study:

Total length – measured (in dorsal view) from the apex of head to the apex of tegmina,

A/B – width of vertex measured at anterior margin/length of vertex measured at midline,

C/E – width of frons between eyes/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 from the apex of clavus to the anterior margin.

Terminology. Vein nomenclature follows the interpretation proposed by Szwedo and Żyła (2009). 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.

Material. The material studied is deposited in the entomological collections of the Natural History

Museum, London, UK (BMNH) and the Moravian Museum, Brno, Czech Republic (MMBC).

TAXONOMY

Family Flatidae Spinola, 1839

Subfamily Flatinae Spinola, 1839

Tribe Sisciini Melichar, 1923

Kirkamflata gen. nov.
(Figs 1–68)

Type species. *Kirkamflata socotrana* gen. et sp. nov., here designated.

Etymology. The generic name is a combination of the words "kírkam" – yellow in Soqotri language (Leslau 1938, Nakano 1986) and "*Flata*", which is used here for the representative of the Flatidae family, and is descriptive for the uniformly yellow coloration of the dry-mounted specimens of the type species. Gender: feminine.

Diagnosis. *Kirkamflata* gen. nov. is similar to the genus *Latois* Stål, 1866 known from Madagascar and the Comoros Islands in the following characters: frons with short and wide protrusion in the upper part of head – between anterior margin of vertex and frontal carinae; clypeus without carinae; pronotal postocular eminences conical; costal cell with transverse veinlets, basally wider than costal area tapering apicad; Sc+RA elevated; basal part of tegmen with small bulla; postclaval margin present; male terminalia: anal tube elongate and narrow, curved at midlength, pygofer – upper part narrower than lower part, periandrium – divided by lateral split, dorsal part apically with two processes, ventral part with median keel, female terminalia: gonoplac unilobate, triangular, ventral margin with membranous part, posterior margin with denticles at upper part; *ductus receptaculi* with smooth basal part and widened and ribbed apical part.

Kirkamflata gen. nov. differs from *Latois* by the following characters: pronotum and mesonotum with only a trace of median carina (*Latois* – with distinct median carina); apical cells several times longer than wide (*Latois* – at most three times longer than wide); male terminalia: posterior-ventral part of genital style partly membranous, without process (*Latois* – well-sclerotised with sharp process); keel of ventral part of periandrium with ventral and posterior margins denticulate (*Latois* – keel smooth); aedeagus with triangular keel (*Latois* – without keel); female terminalia: gonapophysis VIII sabre-shaped (*Latois* – gonapophysis VIII spatula-like), *diverticulum ductus* smooth (*Latois* – *diverticulum ductus* with apical part ribbed).

The only other Flatidae so far described from Socotra, the genus *Mosiona* Melichar, 1923 from the tribe Seliziini Melichar, 1923, differs from *Kirkamflata* gen. nov. in many characters, e.g. a sinuate costal margin of tegmen and dark brown to grey general coloration of the whole body.

Description. **Head**. Head with compound eyes in dorsal view narrower than thorax (Figs 2, 5–6). Vertex much wider than long at midline, medially partly covered by pronotum (Figs 6–7, 9). Anterior margin straight, in form of elevated suture; posterior margin slightly arcuate; lateral margins carinated. Disc of vertex without median carina.

Frons (Figs 4, 12) a little longer than wide, widest at level of antennae, tricarinate; median carina shorter than lateral carinae; lateral carinae as ridges forming a horseshoe. Disc of frons rugose, with sensory and secretory structures (Fig. 13). Clypeus narrower than frons, convex, without carinae (Fig. 12). Rostrum with apical segment distinctly shorter than subapical, apex reaching hind coxae.

Compound eyes oval, with small callus placed at lower-posterior margin. Ocelli present (Figs 3, 7–8). Antennal pedicel short, widening apicad, with setae and plate organs distinctly restricted to a hollow area at apex and partly on dorsal surface (Figs 14–15). Sensilla placodea of the clover-leaf like type.

Thorax. Pronotum distinctly longer than vertex at midline (Figs 5–6); disc of pronotum with median carina and lateral impressions; postocular eminences conical (Fig. 8).

Mesonotum deltoid, bicarinate, about as long as wide, much longer than cumulative length of vertex and pronotum (Figs 5–7); lateral carinae well-visible, elevated, reaching posterior margin, median carina as a trace; disc of mesonotum with sensory and secretory structures (Fig. 11); scutellum massive and elevated (Fig. 10).

Tegmen (Figs 1, 18–25) membranous, elongated and weakly convex, with well-visible venation and small bulla, with one apical line; transverse veinlets forming irregular net in central part of tegmen. Costal margin arcuate in anterior one third, remaining part almost straight and parallel to posterior margin; costal angle rounded; apical margin arcuate; sutural angle obtusely rounded; postclaval sutural margin straight. Costal area about as wide as long, with transverse veinlets, extending beyond apex of clavus posteriorly. Costal cell tapering apicad, basally about as wide as costal area, with several transverse veinlets in posterior part.

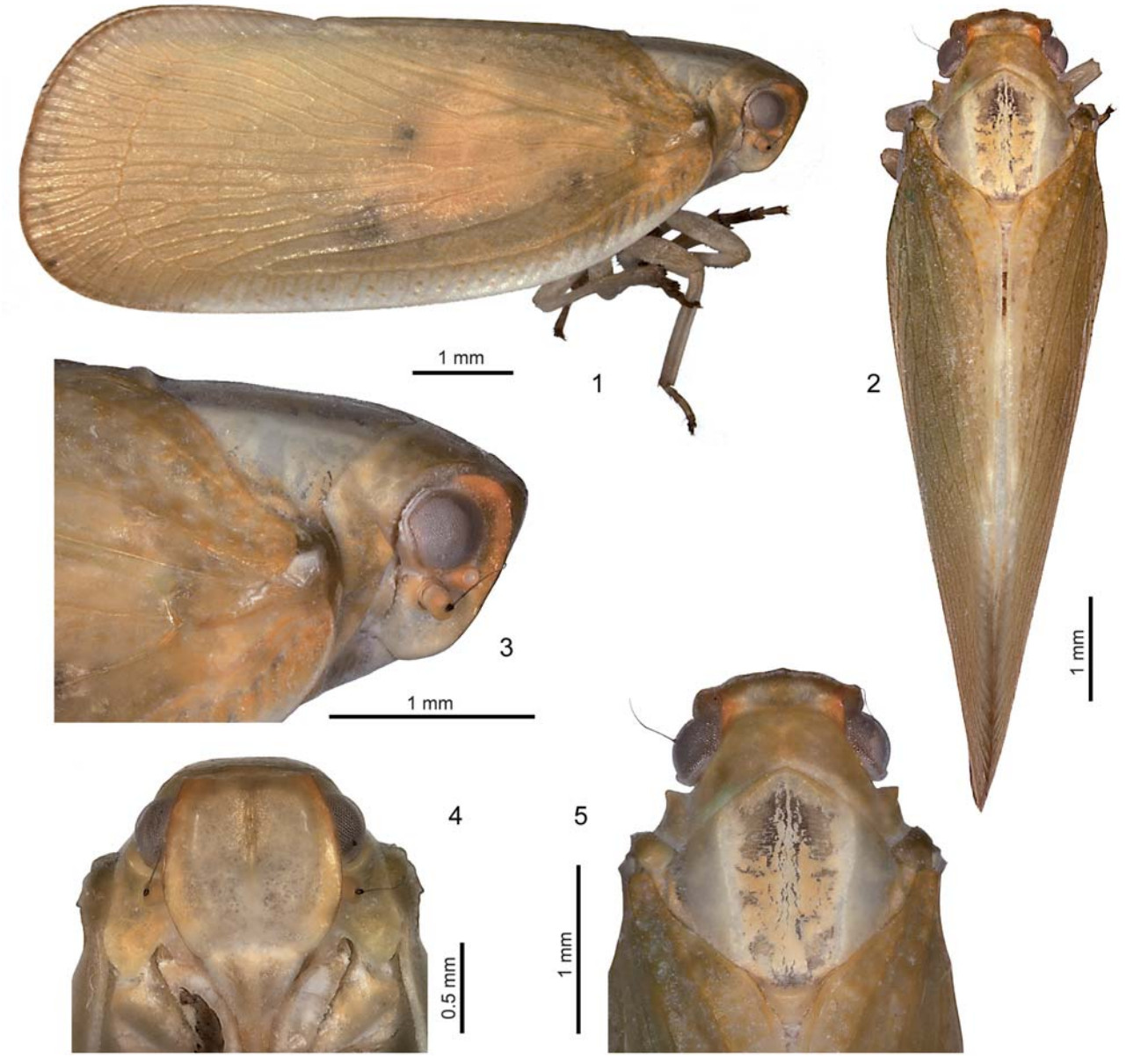
ScRA and RP veins leaving basal cell with a very short common stem, basal part of RP invisible on external side, but well-visible on the ventral side. ScRA elevated, forming small bulla; RP forked a bit before half of tegmen, distinctly posterior to M forking; Cu fork at

the same level as M fork. Claval veins Pcu and A_1 fused anterior to clavus apex; Pcu well-visible only in its basal part, A_1 vein elevated; transverse veinlets absent. Tubercles with concentration on costal area, between ScRA and M veins and on clavus. Veins covered with sensory and secretory structures (Figs 26–29).

Metafemora shorter than metatibiae; metatibia arcuate and partly flattened laterally with two lateral spines placed in apical half, apically with row of well-developed teeth; basitarsomere as long as cumulative length of tarsomeres 2 and 3, with row of partly flattened apical spines and thick setae; second tarsomere with two lateral spines and median pad with thick setae (Figs 16–17).

Male terminalia. Anal tube, in lateral view (Figs 30–31), elongated and curved at about midlength; anus placed approximately at midlength; anal tube, in dorsal view (Figs 32–33), elongated, basal part narrower than median portion.

Pygofer, in lateral view (Figs 30–31), higher than wide; dorsal part distinctly narrower than ventral part, posterior margin slightly arcuate; posterior-dorsal angle without process.



Figures 1–5. *Kirkamflata socotrana* gen. et sp. nov., habitus. (1) Lateral view; (2) dorsal view; (3) anterior part, lateral view; (4) same, frontal view; (5) same, dorsal view.

Genital styles (in lateral view, Fig. 31; in ventral view, Figs 34–35) longer than wide and bearing distinct, long and sharp capitulum; posterior part of ventral margin with membranous fold.

Phallic complex. Periandrium (Figs 48–49) elongate, divided by lateral split into dorsal and ventral parts; lateral split reaching almost midlength; basal part with two elongate folds – alongside and below dorsal margin; dorsal part slightly shorter than ventral part, divided into two lateral and two dorsal lobes; lateral lobes well-sclerotized with small apical teeth; ventral margin of dorsal part with two well-sclerotised processes: shorter one oriented basad, longer one oriented ventrad; ventral part longer than dorsal part, tapering apicad (in ventral view), with small ventral marginal teeth and several rows of denticles.

Aedeagus s.s. (in dorsal view, Fig 50) with short median split, not extending the level of lateral, well-sclerotized, bulb-like appendages; dorso-basal part (in lateral view, Fig. 51) with long fold with denticulate margin; ventral part apically with triangular keel.

Female terminalia. Abdominal tergites with ridged membranous median part covered with scattered sensory hairs (Figs 38–40). Pregenital sternite massive, lateral lobes weakly separated (Figs 42, 43, 45, 55, 56); anterior margin almost straight, medially with fold; posterior margin weakly concave.

Anal tube, in lateral view (Fig. 44), elongate and narrow, curved, extending beyond gonoplac apex; anus placed anterior to midlength; anal tube, in dorsal view (Fig. 57), elongate oval.

Gonoplac unilobate, triangular, laterally flattened (Figs 46, 58); posterior and ventral margins with membranous part; posterior margin with long setae and two rows of teeth in upper part (Fig. 47).

Gonapophysis VIII sabre-shaped and laterally flattened, tapering apicad (Figs 59–60); apical part of ventral margin folded externally, apical part of ventral margin with six sharp teeth. Endogonocoxal process slightly shorter than gonaphophysis VIII, sabre-shaped with spiniferous microsculpture.

Gonaphophyses IX and gonospiculum bridge as in Figs 61–62.

Bursa copulatrix forming single, oval, huge pouch with narrow basis; cells well-visible, restricted to posterior-ventral part, with sclerites (Figs 52–53). Spermatheca well-developed; *ductus receptaculi* about the same length as *diverticulum ductus* (Fig. 54).

Distribution. Yemen: Socotra island (Fig. 68).

Kirkamflata socotrana sp. nov.
(Figs 1–68)

Etymology. The specific epithet *socotrana* comes from the name of Socotra island – *terra typica* of the newly described species (adjective, Ist declension).

Diagnosis. Only one species in the genus; see the diagnosis of the genus.

Description. Total length 12.2–16.3 mm.

Head. Vertex: ratio A/B = 16.00–20.00. Frons: ratio C/E = 0.71–0.79; D/E = 0.93–1.00. Clypeus with frontoclypeal suture weakly arcuate (Fig. 12).

Thorax. Pronotum: ratio F/B = 7.60–12.50, anterior part depressed (Fig. 9). Mesonotum: ratio G/F = 3.33–4.91, G/B+F = 3.00–4.32, G/H = 0.78–1.00; lateral carinae sub-parallel (Fig. 7), scutellum with straightly cut apex (Fig. 10). Metatibia apically with six teeth, basitarsomere with six apical spines (Figs 16–17). Tegmina: ratio I/J = 1.97–2.22.

Male terminalia. Anal tube, in lateral view, with basal part as wide as apical part (Figs 30, 31). Anal tube, in dorsal view, with apical part tapered and shallowly incised medially (Figs 32, 33).

Female terminalia. Anal tube, in dorsal view, with posterior margin shallowly incised (Fig. 57). *Ductus receptaculi* with proximal half smooth and distal half ribbed, *diverticulum ductus* smooth (Fig. 54).

Coloration. General coloration in dry-mounted specimens from light to dark yellow; tegmen alongside anterior margin till end of costal area with narrow white band, apical margin brownish; vertex laterally and margins of frons orange (Figs 1–5); alive specimens light green.

Type material. Holotype, ♂: [SOCOTRA: Kishin. 700m. 18.iv.1967, K. Guichard. B.M. 1967-455] – BMNH. Paratypes: [SOCOTRA: Kishin. 700m. 18.iv.1967, K. Guichard, B.M. 1967-455] – (3♂♂, 1♀, BMNH); [SOCOTRA: Hadibo Plain. Ras.H.M. 31.iv.1967, K. Guichard. B.M. 1967-455] – (1♂, 1 ♀, BMNH); [YEMEN, SOCOTRA Island, Skant area, 1300–1500m, N 12°34'33"E 54°01'31", 31.i–1.ii.2010, L. Purchart leg.], [Collectio Moravské muzeum Brno] – (1♂, MMBC); [YEMEN, SOCOTRA Island, Dixam plateau, Tudhen, montane shrubland with *Commiphora planifrons*, 18.vi.2012, 12°32.7'N, 53°59.9'E, 1135 m], [Socotra expedition 2012, I. Malenovský, P. Kment, J. Bezděk, J. Hájek, V. Hula, J. Niedobová and L. Purchart leg.], [Collectio Moravské muzeum Brno] – (1♀, MMBC)

Distribution. Yemen: Socotra island (Fig. 68).

Habitat and occurrence in Socotra. *Kirkamflata socotrana* sp. nov. has been recorded in four localities in central Socotra (Fig. 68), all largely situated in the Hagher Mountains, from the foothills to the highest part, spanning an altitudinal range from 400 m (Hadibo Plain, Ras H. M.) to 1450 m (Mt Skand) (cf. Bezděk *et al*. 2012). Most specimens of the type series come from Kishin, 700 m (upper part of wadi Dineghen sensu Bezděk *et al*. 2012) but no details are known for the habitat or host plants. In Tudhen (southern slopes of the Hagher mountains above the Dixam plateau), one specimen of *K. socotrana* sp. nov. was swept in afternoon hours from shrubs in a montane shrubland

vegetation dominated by the Socotran endemics *Cephalocroton socotranus* Balf.f., *Croton sulcifructus* Balf.f. (both Euphorbiaceae) and *Commiphora planifrons* (Balf.f.) Engl. (Burseraceae). The local vegetation community corresponds to the "submontane (semi-deciduous) shrubland" of Miller and Morris (2004) and the "*Cephalocroton socotranus* community" of Brown and Mies (2012). The shrubland at the Tudhen collecting site was quite open, interspersed with small grassland patches grazed by goats and a local small breed of cattle (Figs 66–67). The specimen from "Skant" (spelled Skand in Bezděk *et al*. 2012) was swept between 8–11 a.m. from shrubs growing at margins of a clearing (a grazing place for cattle and goats) within a well-preserved and species-rich montane evergreen woodland (L. Purchart pers. comm., Figs 63–65), named the "*Leucas hagghierensis-Pittosporum viridiflorum* community" by Kürschner *et al*. (2006) and Brown and Mies (2012).

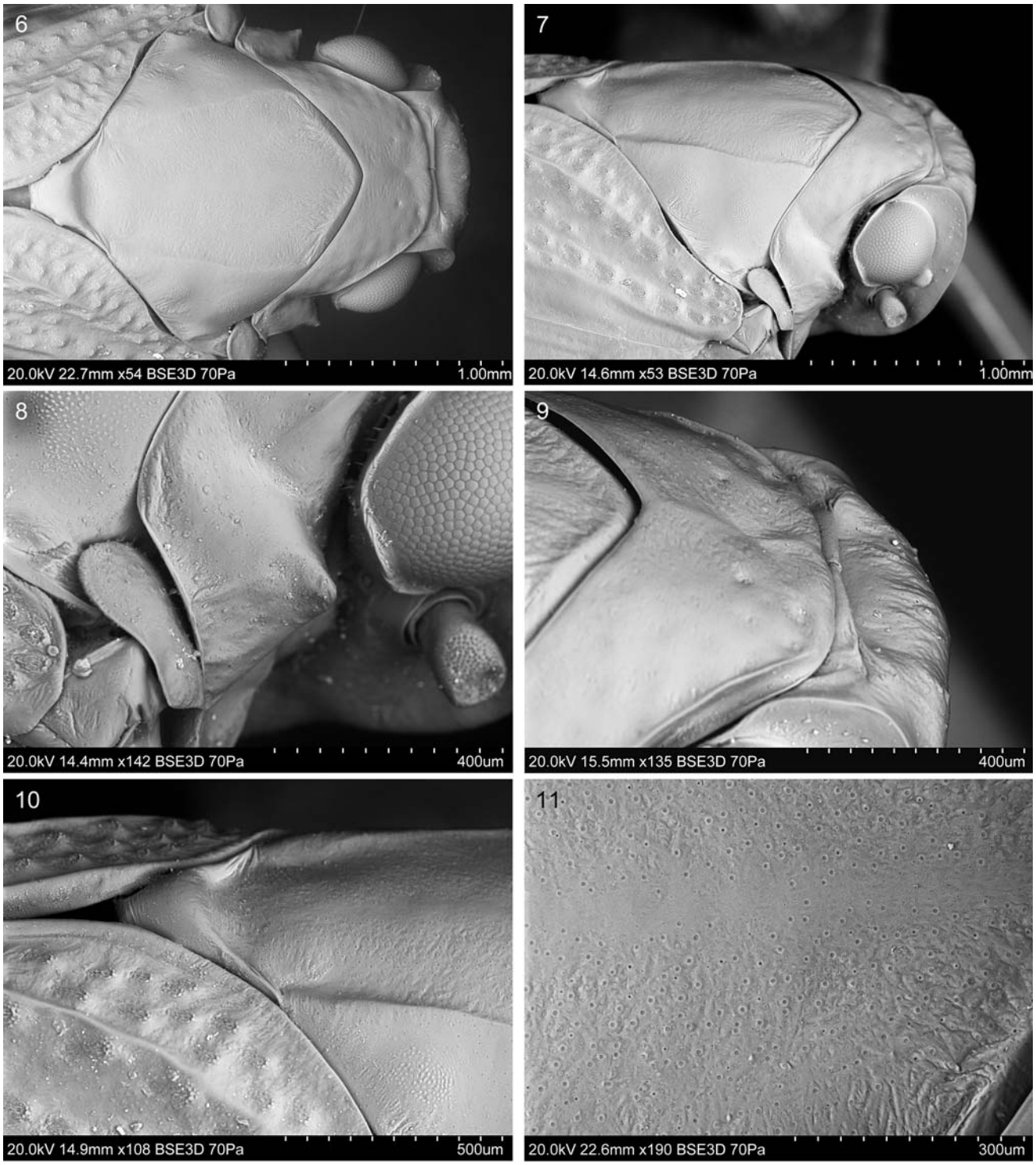
Discussion

From described flatid taxa, *Kirkamflata socotrana* gen. et sp. nov. is perhaps most similar in general morphology (head, wing shape and venation, male and female terminalia) and tentatively considered here as related to the genus *Latois* Stål, 1866, comprising seven species from Madagascar and Comoros Islands (Świerczewski and Stroiński 2012, Mąkol *et al*. 2014). *Latois* belongs to the small tribe Sisciini Melichar, 1923 (placed within the subfamily Flatinae), which includes other three genera from the Afrotropical Region including Madagascar: *Euryprosthius* Karsch, 1890, *Phlebopterum* Stål, 1854 and *Aulophorina* Strand, 1928, and two genera from the Oriental Region (the Philippines and Sulawesi island): *Siscia* Stål, 1870 and *Miniscia* Medler, 1991 (Świerczewski and Stroiński 2012a, 2012b; Metcalf 1957; Medler 1991). Melichar (1923) defined the Sisciini by a more or less deeply excavated frons with leaf-like, raised lateral margins. Although still the only one available, Melichar's (1923) higher classification of Flatidae is generally based only on superficial resemblances in tegmen and head shape and it is probable that many of his tribes including Sisciini are artificial. A revision of Flatidae classification based on a rigorous phylogenetic analysis of complex morphological and molecular data is needed to properly define monophyletic groups, understand the homology and polarity of morphological characters as well as the underlying biogeographical patterns. Such an analysis would also test the hypothesis of a possible sister-group relationship of *Kirkamflata* to *Latois* or some other taxa, as well as its status as separate valid genus. Since Flatidae are a very species-rich group worldwide, this task is quite challenging and probably won't be completed in a near future. In this context we prefer to describe the new monotypic genus despite the absence of a desirable phylogenetic background while giving as much details on its morphological characters as possible to enable future comparisons; not least, also to document the diversity of the still very little known planthopper fauna of Socotra which is currently facing many environmental threats (Van Damme and Banfield 2011, Brown and Mies 2012).

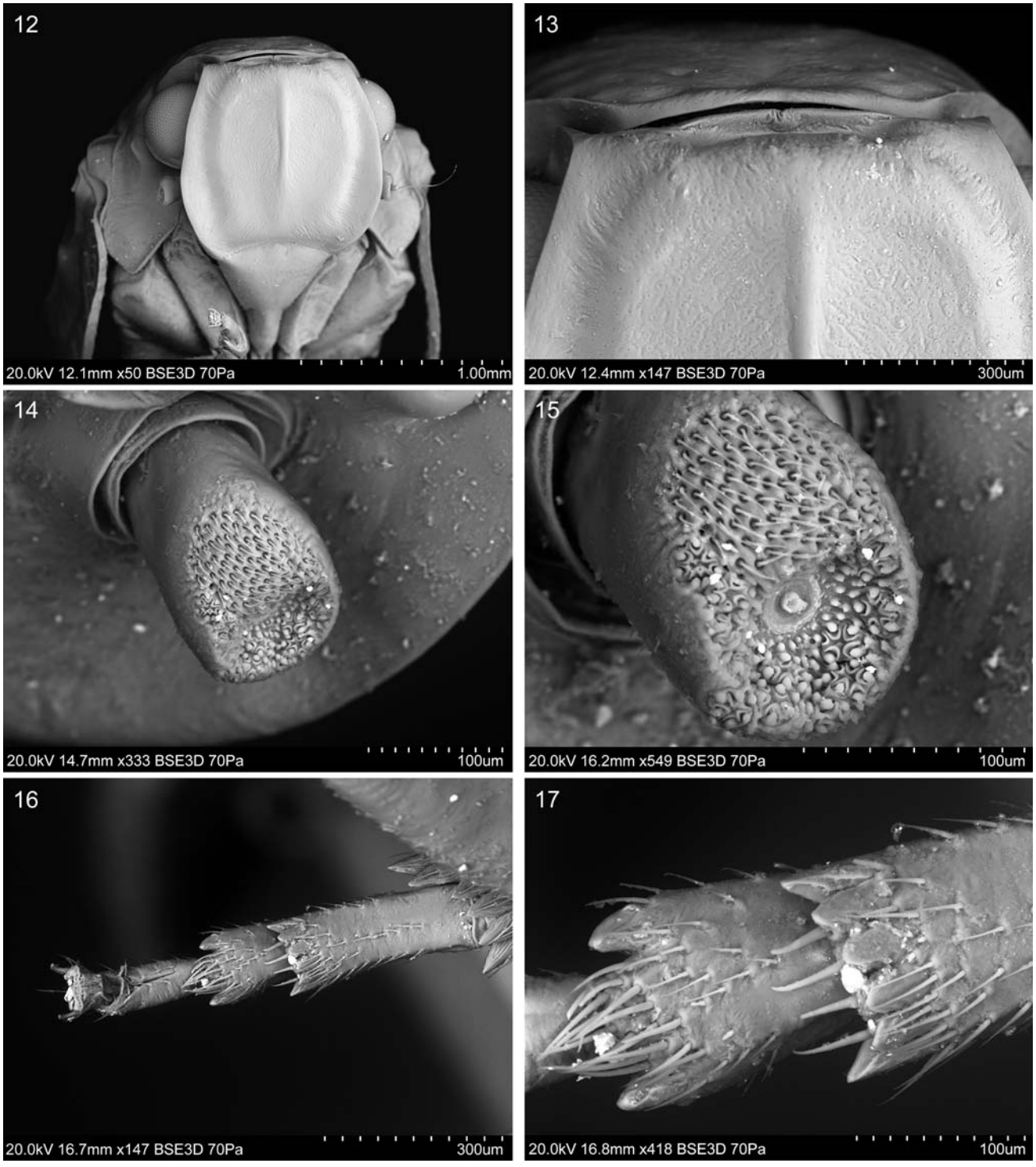
Kirkamflata socotrana gen. et sp. nov. is currently known only from Socotra and might be a taxon endemic to the island as are many other plants and animals, including insects (Batelka 2012). From a historical-biogeographical perspective, the Socotran flora and fauna are represented by several groups: 1) putatively relictual species which had once been widely distributed and became extinct in ancestral areas with the exception of Socotra, 2) species arisen from vicariance at the time of the separation of Socotra from the Arabian mainland, and 3) species having their origins in more recent dispersal events from Africa and Arabia (Brown and Mies 2012). In respect of endemic species, relicts can be referred to as palaeoendemics, while species that have dispersed to the island more recently and then undergone speciation *in situ* as neoendemics (Cronk 1997). Evidence from relatively well-studied groups, such as vascular plants and reptiles, emphasises the role of neoendemism in shaping the biota of Socotra and the dispersal in the origin of endemics while vicariance events were probably much less common (e.g. Macey *et al*. 2008, Brown and Mies 2012, Gómez-Díaz *et al*. 2012, Šmíd *et al*. 2013). The data available at the moment unfortunately do not allow formulation of a well-constructed hypothesis on the evolutionary origin of *K. socotrana*. A long-term taxonomic work on Afrotropical Flatidae combined with extensive collecting in the field, especially in continental eastern Africa, are also required to confirm the status of *K. socotrana* as a Socotran endemic as data on flatids from the wider region are still fragmentary and based largely on historical collections.

Most specimens of *K. socotrana* sp. nov. have been collected in the granitic massif of the Hagher Mountains, the highest part of Socotra island. The montane and high-montane zone of the Hagher Mts. can generally be characterised by relatively low temperatures in the late afternoon and evening, which leads to the regular formation of clouds. Dew and mist are quite common and make this part of Socotra relatively humid. The vegetation, thanks to water and better developed soils, is more luxuriant compared to all other places on Socotra and forms distinct communities not seen elsewhere (Kürschner *et al*. 2006, Scholte and de Geest 2010, Brown and Mies 2012). Quite a few plant species, including some endemics and Afromontane elements,

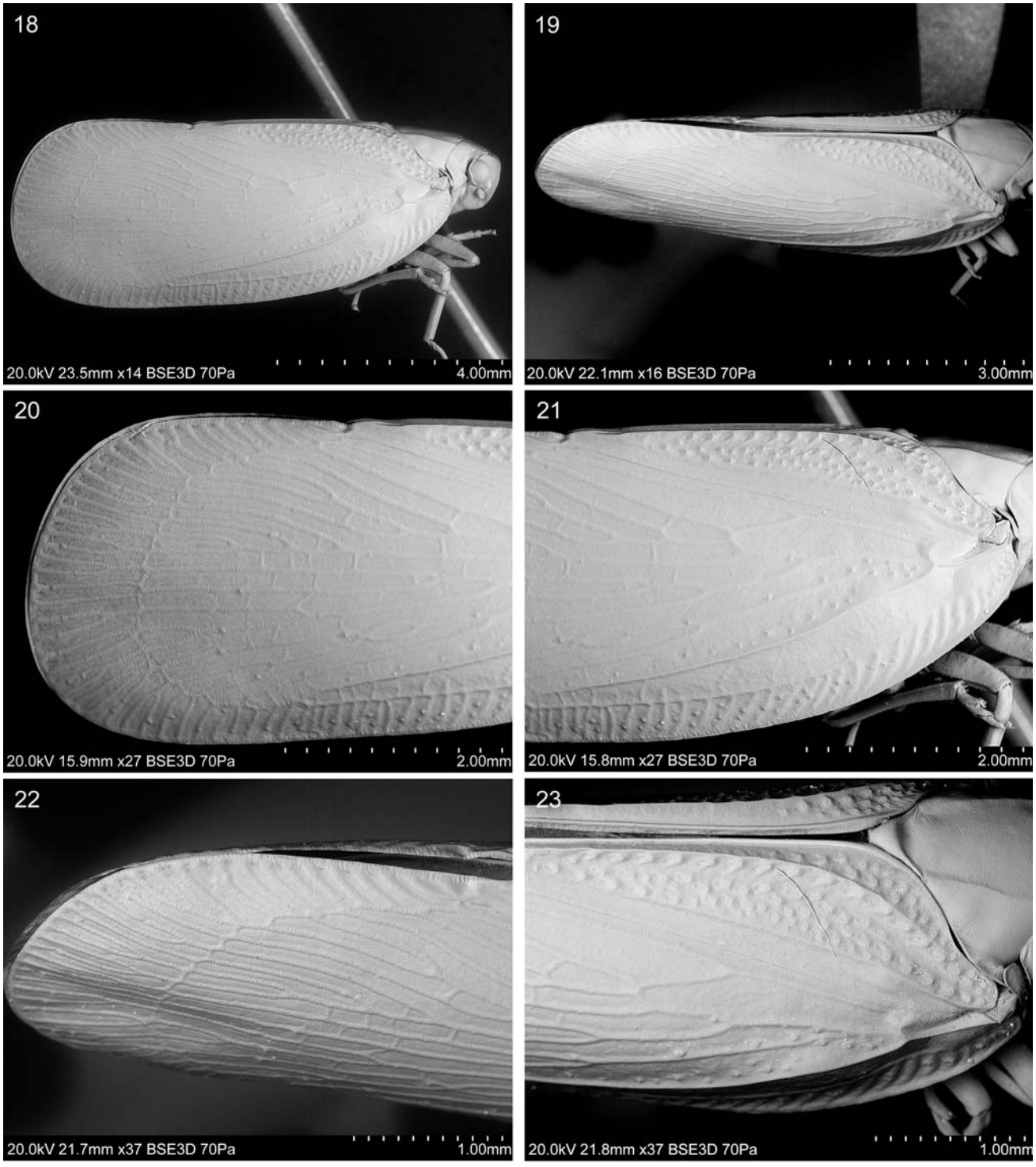
are restricted only to the Hagher Mts. in Socotra (Miller and Morris 2004, Brown and Mies 2012). This is also reflected by the phytophagous insect fauna, including Hemiptera (Malenovský and Burckhardt 2014, Malenovský unpubl. observations). Further field work is, however, needed to clarify the fine distribution of *K. socotrana* in Socotra, its habitat requirements and host plant associations.



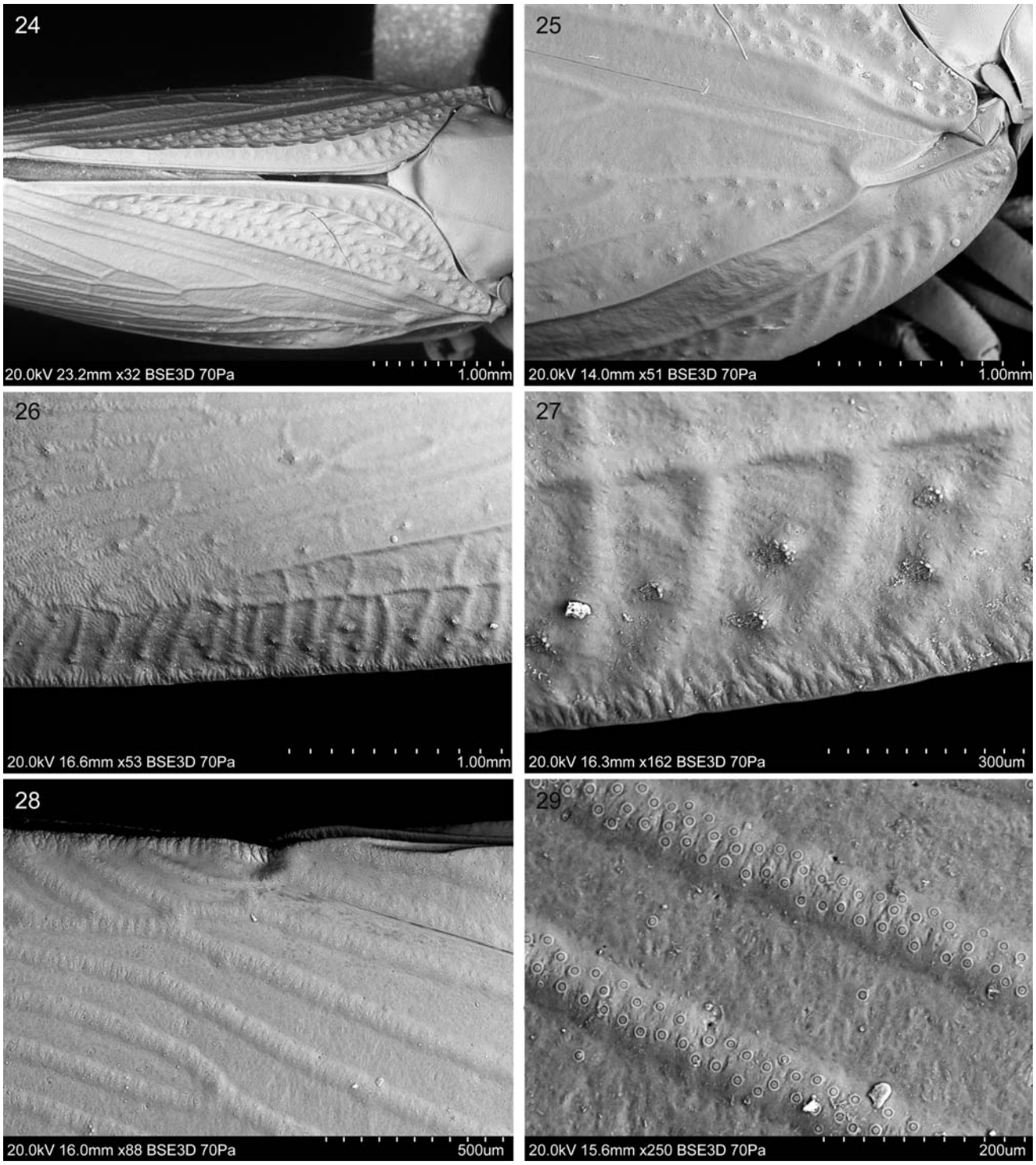
Figures 6–11. *Kirkamflata socotrana* gen. et sp. nov., SEM images. (6) Habitus, anterior part, dorsal view; (7) same, dorso-lateral view; (8) pronotum, postocular eminence; (9) vertex and pronotum, dorso-lateral view; (10) mesonotum, basal part and scutellum; (11) mesonotum, sensory and secretory structures.



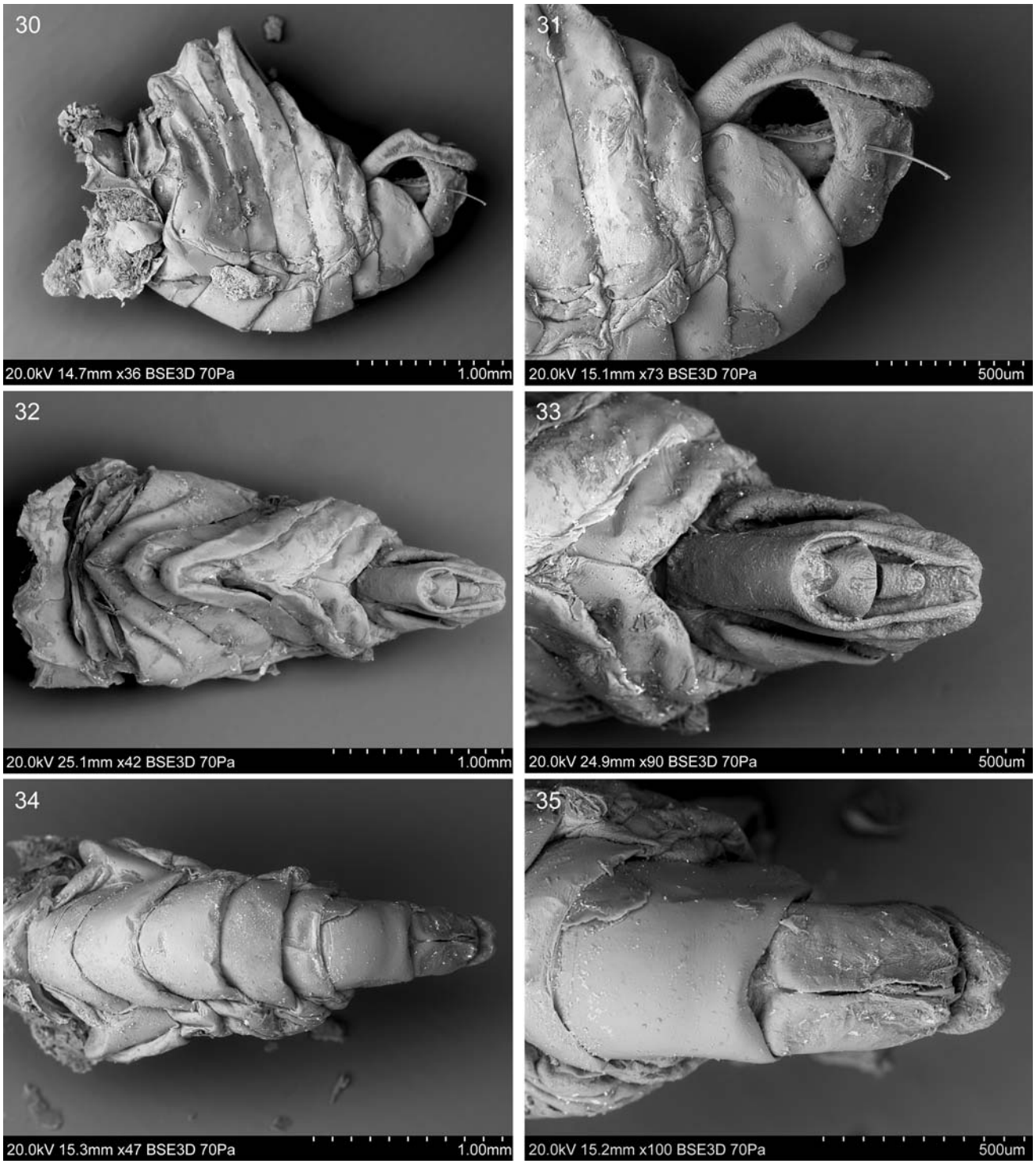
Figures 12–17. *Kirkamflata socotrana* gen. et sp. nov., SEM images. (12) Habitus, anterior part, frontal view; (13) frons, upper part; (14–15) antenna; (16–17) hind tarsomere.



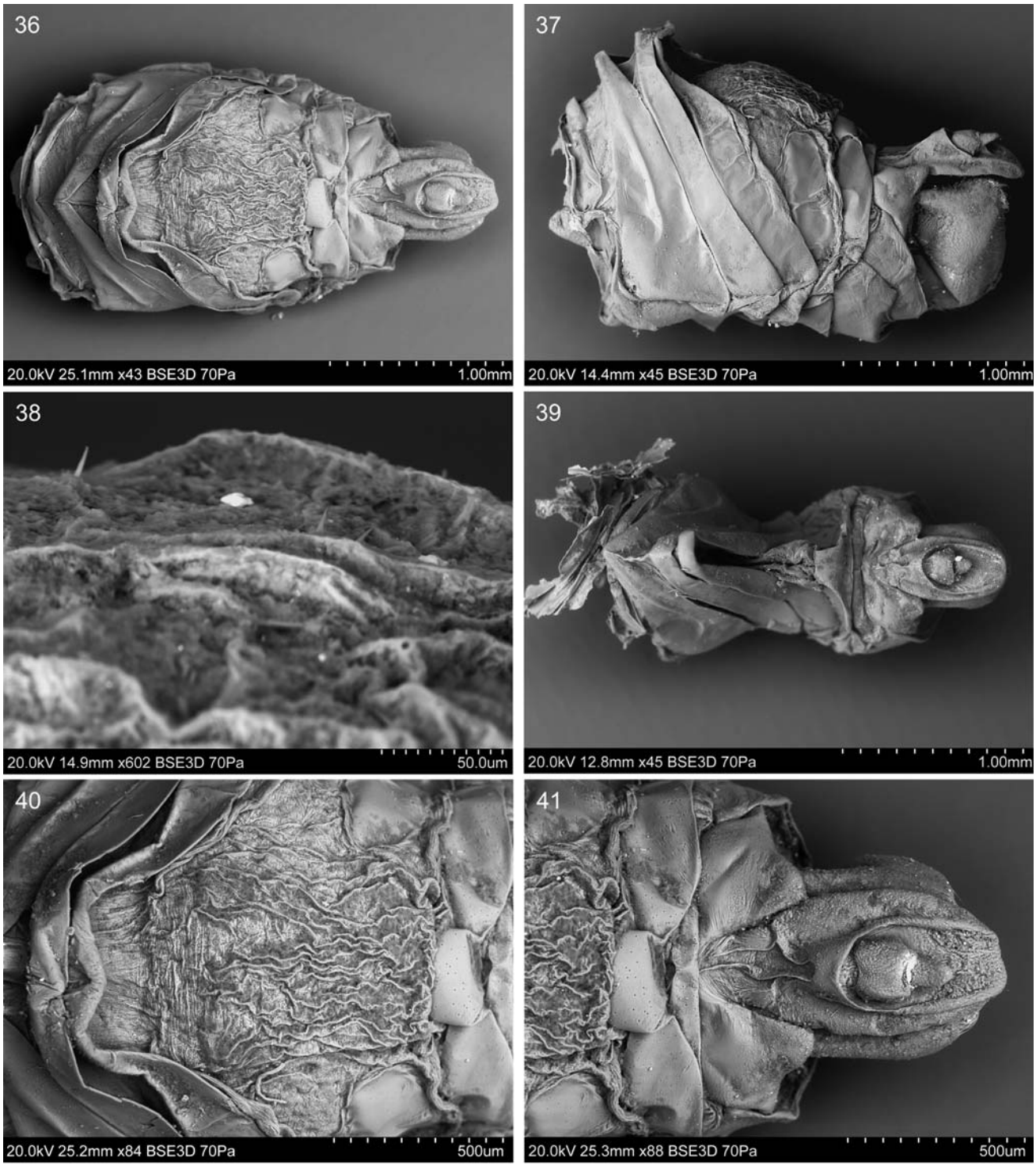
Figures 18–23. *Kirkamflata socotrana* gen. et sp. nov., tegmen, SEM images. (18) General view; (19) dorso-lateral view; (20) apical part; (21) basal part; (22) apical part, dorso-lateral view; (23) clavus.



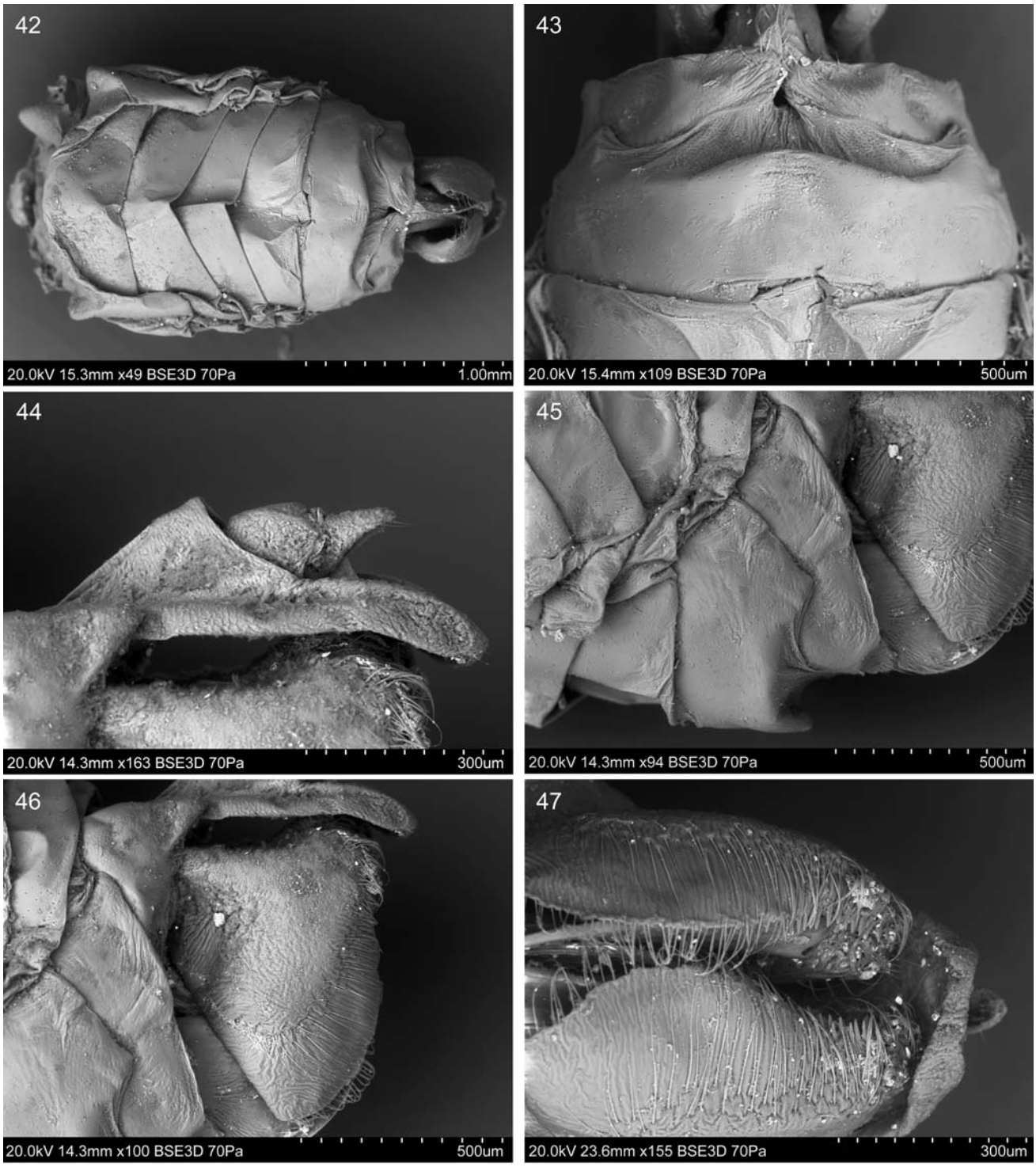
Figures 24–29. *Kirkamflata socotrana* gen. et sp. nov., tegmen, SEM images. (24) clavus, dorsal view; (25) basal part, dorso-lateral view; (26–29) sensory and secretory structures.



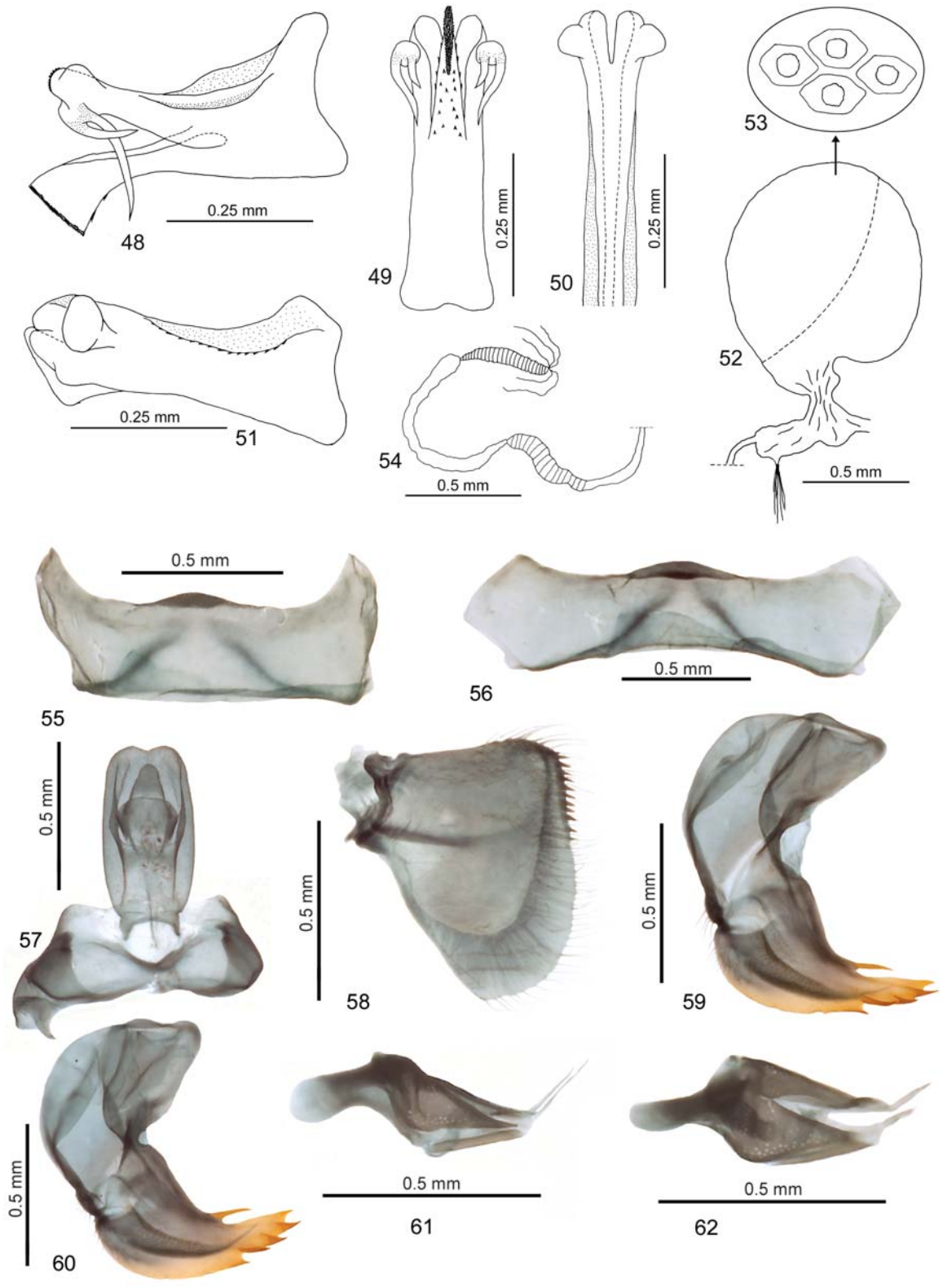
Figures 30–35. *Kirkamflata socotrana* gen. et sp. nov., male, SEM images. (30) Abdomen, lateral view; (31) terminalia, lateral view; (32) abdomen, dorsal view; (33) terminalia, dorsal view; (34) abdomen, ventral view; (35) terminalia, ventral view.



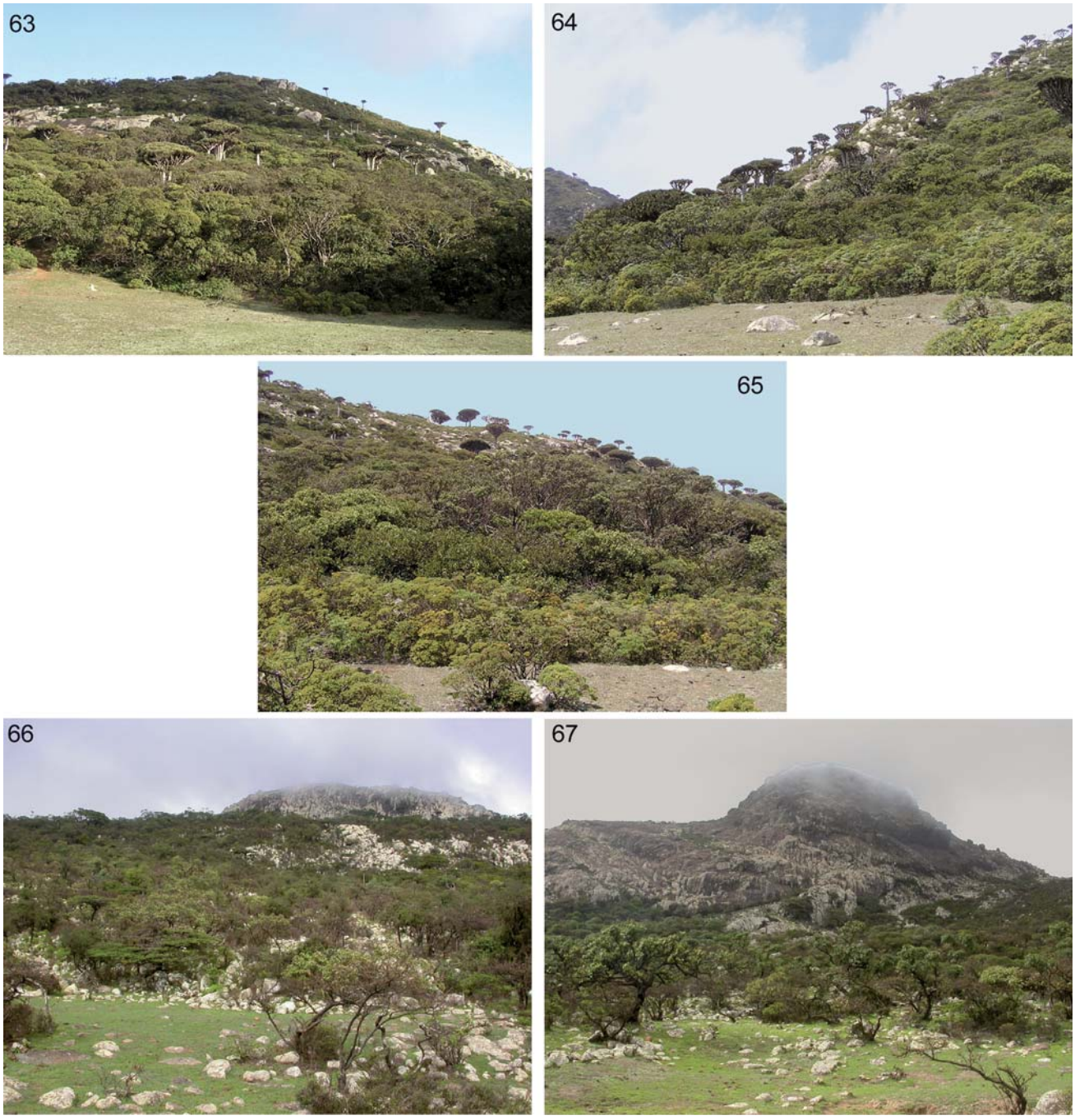
Figures 36–41. *Kirkamflata socotrana* gen. et sp. nov., female, SEM images. (36) Abdomen, dorsal view; (37) same, lateral view; (38–40) tergites, membranous part; (41) terminalia, dorsal view.



Figures 42–47. *Kirkamflata socotrana* gen. et sp. nov., female, SEM images. (42) Abdomen, ventral view; (43) pregenital sternite, ventral view; (44) anal tube, lateral view; (45) pregenital sternite, lateral view; (46) terminalia, lateral view; (47) terminalia, frontal view.



Figures 48–62. *Kirkamflata socotrana* gen. et sp. nov. (48–51) Male, (52–62) female. (48) Periandrium, lateral view; (49) same, ventral view; (50) aedeagus, dorsal view; (51) aedeagus, lateral view; (52) bursa copulatrix, lateral view; (53) same, cells; (54) spermatheca; (55) pregenital sternite, not flattened; (56) pregenital sternite, flattened; (57) anal tube, dorsal view; (58) gonoplac, external view; (59) gonapophysis VIII, lateral view; (60) same, latero-dorsal view; (61) gonapophyses IX and gonospiculum bridge, lateral view; (62) same, dorsal view.



Figures 63–67. Collecting sites of *Kirkamflata socotrana* gen. et sp. nov. in Socotra. (63–65) Hagher Mts, Skand (photographs by L. Purchart); (66–67) Hagher Mts, Tudhen (photographs by P. Kment).

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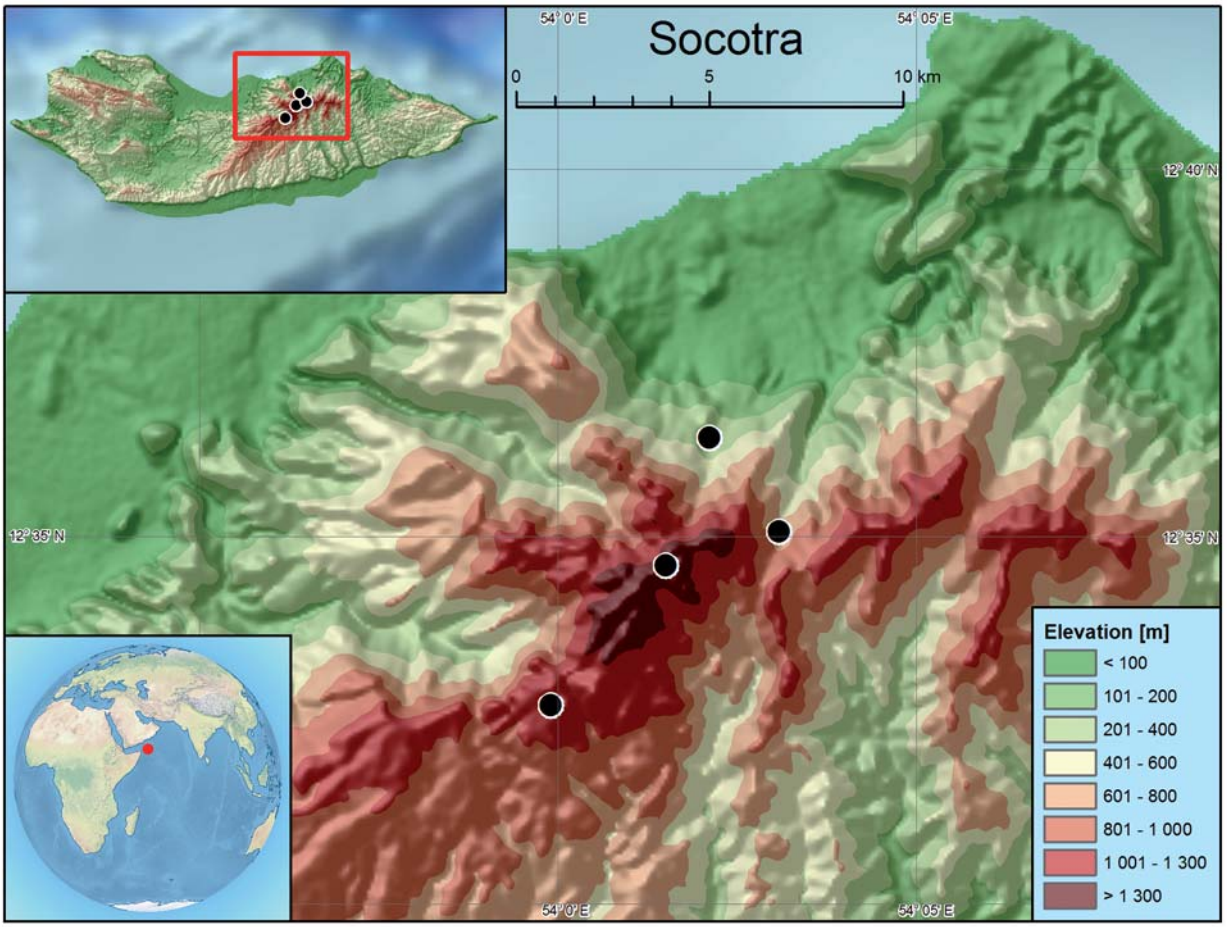

Figure 68. Distribution map of *Kirkamflata socotrana* gen. et sp. nov.

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