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**NEW SPECIES OF GELECHIID MOTHS OF THE GENUS *SABAHA*  
M. OMELKO ET N. OMELKO, 2019 (LEPIDOPTERA: GELECHIIDAE)  
FROM BORNEO ISLAND**

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**Summary.** Seven new species of the genus *Sabaha* M. Omelko et N. Omelko, 2019 are described from state of Sabah of East Malaysia. As result of study of their external characters and morphology of the male and female genitalia, the diagnosis of the genus was specified and supplemented. The taxonomic position of the genus *Sabaha* in the family Gelechiidae is discussed.

**Key words:** moths, Gelechiidae, Gelechiinae, *Sabaha*, diagnosis, new species, Malaysia.

**М. Г. Пономаренко, М. М. Омелько, Н. В. Омелько. Новые виды выемчатокрылых молей рода *Sabaha* М. Omelko et N. Omelko, 2019 (Lepidoptera: Gelechiidae) с острова Борнео // Дальневосточный энтомолог. 2023. N 486. С. 6-24.**

**Резюме.** Описано семь новых видов рода *Sabaha* М. Omelko et N. Omelko, 2019 из штата Сабах Восточной Малайзии. По результатам изучения внешних признаков и морфологии гениталий самцов и самок новых таксонов диагноз рода был уточнен и дополнен. Обсуждается таксономическое положение рода *Sabaha* в семействе Gelechiidae.

**INTRODUCTION**

The genus *Sabaha* M. Omelko et N. Omelko was recently described on the base a single specimen, male, collected in the vicinity of the Keningau, the capital of the same name district in the Sabah state of the Malaysia (Omelko & Omelko, 2019). The present work is devoted to the description of seven new species from this genus. The study of extensive new material, including males and females, became the basis for significant additions to the diagnosis of the genus *Sabaha*.

The holotypes and paratypes of the new species are deposited in the Federal Scientific Center of the East Asia Terrestrial Biodiversity (FSC of Biodiversity), Far Eastern Branch of Russian Academy of Sciences (Vladivostok).

**MATERIAL AND METHODS**

The study of moth collection kept in Mountain-Taiga Station made it possible to reveal the species belonging to the recently described genus *Sabaha*. The specimens of new species

were collected at light by the second author near Tawau in a lowland dipterocarp forest in 1995 in the state of Sabah on the island of Borneo. The male and female genitalia were prepared by traditional lepidopterological techniques (Falkovich & Stekolnikov, 1978). The membranous parts in the male and female genitalia were stained by Chlorazol black. The genitalia were studied in glycerol using a Nikon SMZ-10 stereomicroscope then mounted in Euparal following Robinson (1976). Photographs of adults were taken using a Nikon D300 camera equipped with 50 mm Macro lens. Photographs of the genitalia slides were made with an Olympus SZX16 microscope with an incorporated digital camera DP74 Nikon. In the descriptions the terminology follows Klots (1970) taking into account the clarification of the homology of sclerites on the base of functional and morphological study of the male genitalia (Ponomarenko, 2005, 2009).

### Genus *Sabaha* M. Omelko et N. Omelko, 2019

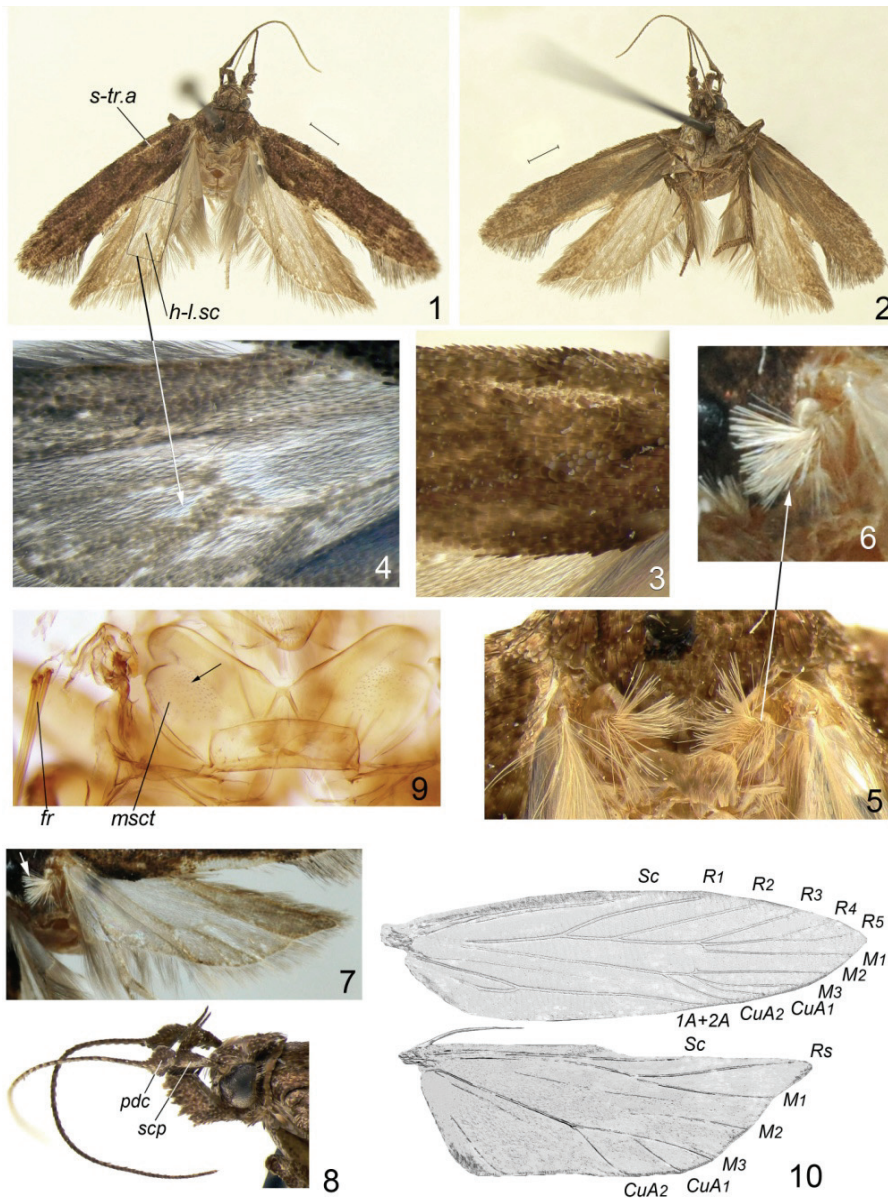
Type species: *Sabaha spathulata* M. Omelko et N. Omelko, 2019.

**DIAGNOSIS. Adult** (Figs 1, 2, 11–23). Wing length 5.0–8.2 mm. Scapus with prominent elongated scales along anterior or posterior margin, or along both edges; pedicellus and basal flagellomeres widened, if strongly widened, this part looks like an oblong or rounded lobe with elongated scales along the edges; flagellum of male with short or long cilia below, sometimes appears serrate due to tufts of raised scales (Fig. 8). Forewings with tufts of raised scales or covered with hair-like raised scales, giving them a velvety appearance. Hindwings with semi-transparent area between radial and cubital veins, covered with short hair-like scales (Fig. 4), the colour of this area changes to greenish, blue, purple, reddish or golden due to the refraction of light. Forewing with *Sc* to costa at about middle of wing length;  $R_1$ – $R_5$  to costa,  $R_1$  and  $R_2$  separate at the base,  $R_3$  and  $R_{4+5}$  connate basally,  $R_{4+5}$  stalked, diverging before middle;  $M_1$  and  $M_2$  separate basally, to termen,  $M_3$  and  $CuA_1$  shortly stalked basally,  $CuA_2$  separate basally, to termen; *CuP* present at basal part only, *1A* and *2A* merged distally. Hindwing with *Sc+R\_1* to costa beyond 2/3 of wing length, *Rs* to costa before apex, *Rs* and  $M_1$  stalked,  $M_2$  separate, to termen,  $M_3$  and  $CuA_1$  stalked,  $CuA_2$  separate, to dorsal margin (Fig. 10).

The moths of both sexes possess the bundles of long hair-like scales with a common cup-shaped or convex base, each is located on the lateral part of the metascutum posterad the hindwing (Figs 5–7, 9). Abdominal 2nd sternite with arched venulae and slightly curved medially apodemes (Fig. 43).

**Male genitalia** (Figs 24, 25, 27–42). Uncus relatively small, hood-shaped. Gnathos with well-developed culcitula divided by a longitudinal median constriction into two portions, and with small and flat median sclerite of different shape; besides two long flat sclerites curved medially articulated to lateral arms anterad gnathos. These sclerites of unknown homology called “fultura superior” in species from the genus *Gelechia* Hbn. Valva completely divided into cucullus and sacculus. Cucullus with more or less long neck, its distal setaceous part moderately dilated. Sacculus lamellar, oblong, with a claw-like apex curved ventrally, integrated with vinculum and juxta. Aedeagus tubular, arcuately curved, rarely almost straight, distally lobate, with apex of various shape, basally with apodemes and without caecum; fixed in the proximal part by a semi-sclerotized anellus. Vinculum with wide lateral parts and ventral excision, saccus wide, triangular or trapezoid.

**Female genitalia** (Figs 26, 44–48, 50–59). Papillae anales oblong and relatively small. Ovipositor very long, apophyses posteriores 7–12 times as longer as apophyses anteriores. 8th segment of abdomen strongly elongated, with narrow membranous gap ventrally, often sclerotized and bearing setae on posterior edge laterally. Ostium and anterior part of 8th sternite, covered by more or less semi-sclerotized two-layer fold fused with base of apophyses



Figs 1–10. *Sabaha* spp., adults, morphostructures. 1–8 – *S. spathulata*, male, holotype: 1 – adult, view from above; 2 – *ditto*, bottom view; 3 – semi-transparent area on forewing; 4 – hair-like scales on hindwing; 5 – metathorax with bundles of long hair-like scales; 6 – bundle of hair-like scales, shown by arrow; 7 – position of bundle of hair-like scales relative to hindwing; 8 – head. 9, 10 – *S. gemella* sp. n.: 9 – metascutum with thecae of hair-like scales, shown by arrow; 10 – venation. Abbreviations: *fr* – frenulum, *h-l.sc* – hair-like scales on hindwing, *msct* – metascutum; *pdc* – pedicellus; *s-tr.a* – semi-transparent area; *scp* – scapus. Scale bar on holotype photos 1 mm.

anteriores anteriorly. This fold forms vaginal sinus and with honeycomb-like sculpture on inner surface, more often as two elongated area (Figs 26, 45, 50, 53, 56, 58). Vaginal part of ductus bursae widened, membranous or slightly sclerotized; ductus bursae membranous, smoothly delated towards corpus bursae; the latter relatively small, membranous; signum more or less rhomboid plate with transverse gutter. Ductus seminalis arises beyond vaginal part of ductus bursae and forms saccular bulla often with small spines on inner side.

COMPOSITION. The genus currently includes 8 species: *Sabaha spathulata* M. Omelko et N. Omelko, 2019 (type species), *S. cheemai* sp. n., *S. gemella* sp. n., *S. insolita* sp. n., *S. maculosa* sp. n., *S. parda* sp. n., *S. pilosa* sp. n., and *S. semiatrata* sp. n.

DISTRIBUTION. East Malaysia (Sabah).

## DESCRIPTION OF NEW SPECIES

### *Sabaha parda* Ponomarenko, M. Omelko et N. Omelko, sp. n.

<https://zoobank.org/NomenclaturalActs/BCC4DF13-D40E-493B-9F58-439DF4B430DB>

Figs 11, 12, 27–29, 44–46

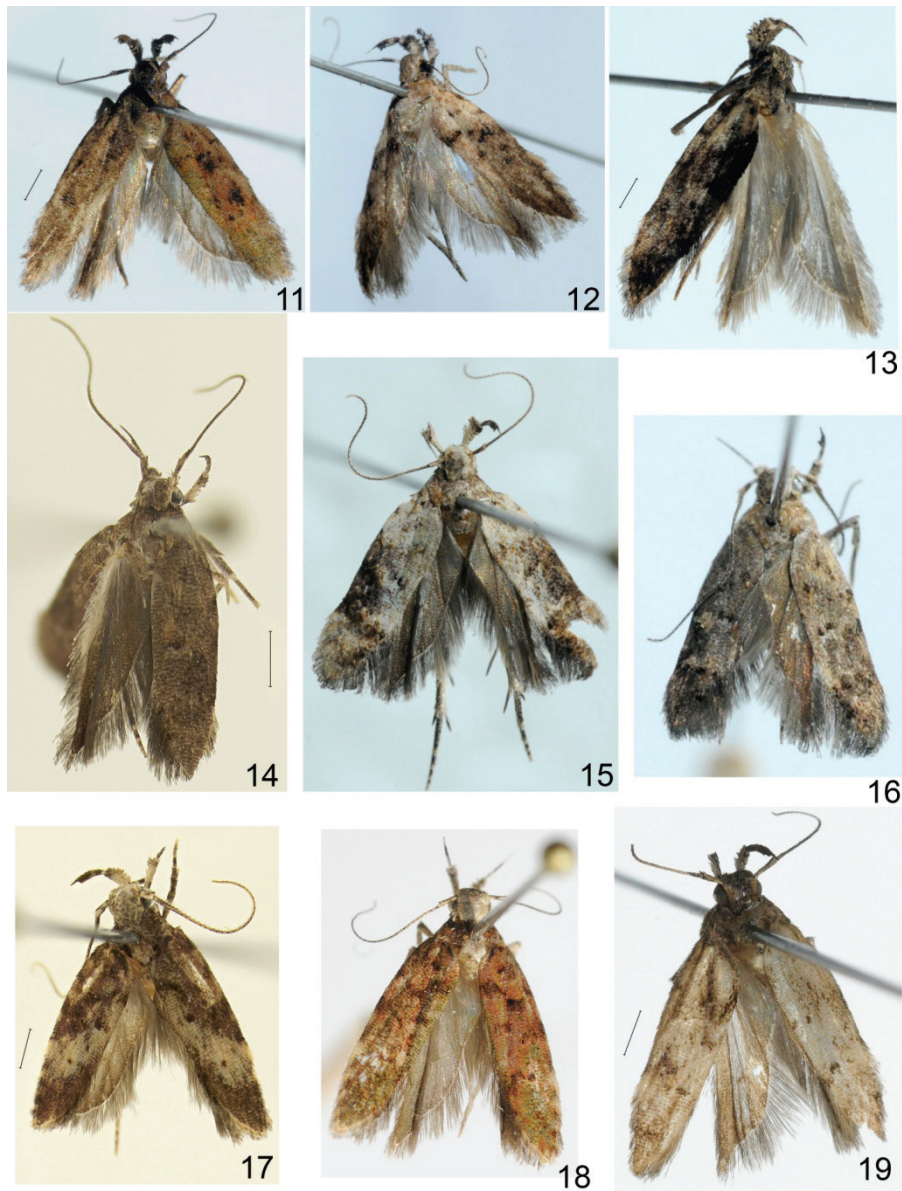
TYPE MATERIAL. Holotype: ♂, **Borneo**: E Malaysia, state of Sabah, 24 km N Tawau, 22.VIII 1995, gen. slide 198 MP (M. Omelko leg.). Paratypes: 1 ♂, 1 ♀, same locality, 28.VIII, 01.IX 1995, gen. slides 199 (m) MP, 200 (f) MP (M. Omelko leg.).

DIAGNOSIS. New species is similar to *S. spathulata* by general appearance, pattern of forewing and shape of sacculus in the male genitalia. It can be distinguished by slightly thickened basal part of flagellum and by uncus with conic lateral lobes, smaller process on ventral edge of cucullus and by distal part of aedeagus lacking tooth-like process in the male genitalia.

DESCRIPTION. **Adult** (Figs 11, 12). Forewing length 6.3–6.8 mm. Head covered by brown scales with lighter top. Scapus large, with comb of scales along the edges, blackish-brown; pedicellus and basal flagellomeres slightly thickened, blackish-brown, rest part of flagellum with alternate brown and brownish segments. First segment of labial palpus blackish; second segment beige or dark beige with black basal and apical parts, with brush of elongated blackish-brown or black scales ventrally; third segment with tuft of elongated scales and thin distal part, black in male, black with indistinct band at middle and whitish distal part in female. Thorax brownish. Forewing with small tufts of raised scales and brownish ground colour; pattern consisting of small indistinct dark brown or blackish spots and strokes; fringe beige interspersed with brownish or blackish scales with a beige apex. Hindwing and fringe brownish-grey. Legs beige in the male and light beige in the female, with a brownish or brown shading, intense on the tibia, fore and middle tarsi, tibia of the hind leg with beige brush.

Female with two lateral longitudinal grooves bearing short, pointed scales on 7th abdominal segment.

**Male genitalia** (Figs 27–29). Uncus hooded, with slightly concave posterior margin and conic lateral lobes. Culcitula divided by median constriction into lobes, each with finger-like median projection directed caudally. Median sclerite of gnathos flat, convex along ventral margin, with slightly attenuated apex and small concave before it on the dorsal margin. Cucullus with long narrow neck, about half of its total length, and more or less lanceolate distal part with sinuous ventral margin just beyond small tooth-like process; smoothly narrowed to a non-sharp apex, medially curved. Sacculus narrow, arcuately curved, with knee-like bend at the base, pointed and hook-shaped apex, turned laterally, fused basally with lobe of juxta. Juxta divided into two triangular lobes with rounded convex posterior margin. Aedeagus arcuately curved, its distal part flat and oval, with ventral protrusion, basal part with two small rounded outgrowths (apodemes). Vinculum with ventral notch and relatively wide lateral arms; saccus wide, triangular with rounded apex.

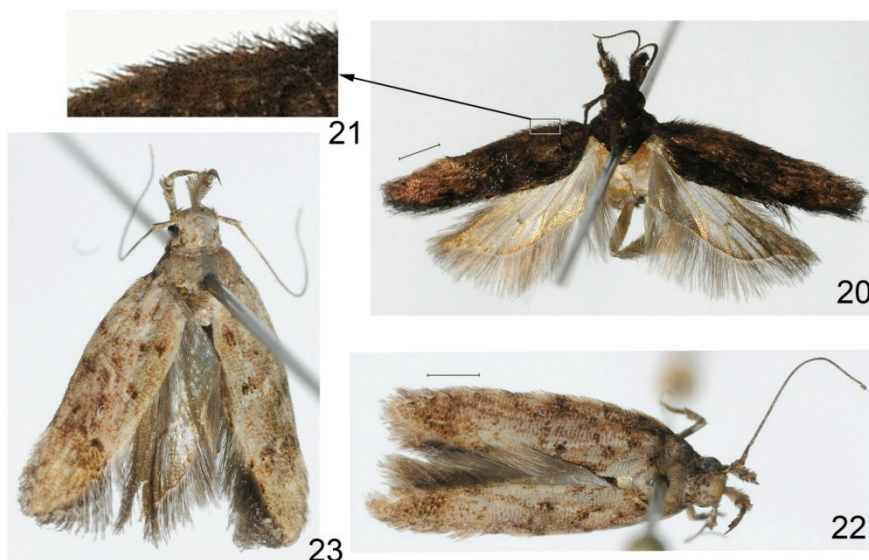


Figs 11–19. *Sabaha* spp., adults. 11, 12 – *S. parda* sp. n.: 11 – male, holotype; 12 – female, paratype. 13 – *S. insolita* sp. n., female, holotype. 14–16 – *S. cheemai* sp. n.: 14 – male, holotype; 15 – female, paratype; 16 – male, paratype. 17, 18 – *S. gemella* sp. n.: 17 – male, holotype; 18 – male, paratype. 19 – *S. semiatrata* sp. n., male, holotype. Scale bar on holotype photos 1 mm.

**Female genitalia** (Figs 44–46). Ovipositor very long, papillae anales slightly scleroized laterally. Apophyses posteriores 12,5 times longer than apophyses anteriores. Membranous fold covered anterior part of 8th sternite and ostium with two oblong honeycomb-like zones on the inner surface. 8th sternite with wedge-shaped notch on anterior margin. Vaginal sinus semioval, slightly sclerotized. Vaginal part of ductus bursae broadened, goblet-shaped, membranous; then ductus proper narrowed and gradually expanded towards oblong corpus bursae. Signum rhomboid with serrate edges, a groove-like transverse notch bounded by two ridges. Ductus seminalis arises from vaginal part of the ductus anteriorly.

**DISTRIBUTION.** Sabah, East Malaysia.

**ETYMOLOGY.** The specific name is derived from the Latin word of Greek origin *pardus*, meaning leopard, due to the similarity of the animal's reddish-brown fur with black spots and the coloration of the forewings in the described species.



Figs 20–23. *Sabaha* spp., adults. 20, 21 – *S. pilosa* sp. n.: 20 – male, holotype; 21 – fragment of forewing. 22, 23 – *S. maculosa* sp. n.: 22 – male, holotype; 23 – female, paratype. Scale bar on holotype photos 1 mm.

***Sabaha insolita* Ponomarenko, M. Omelko et N. Omelko, sp. n.**

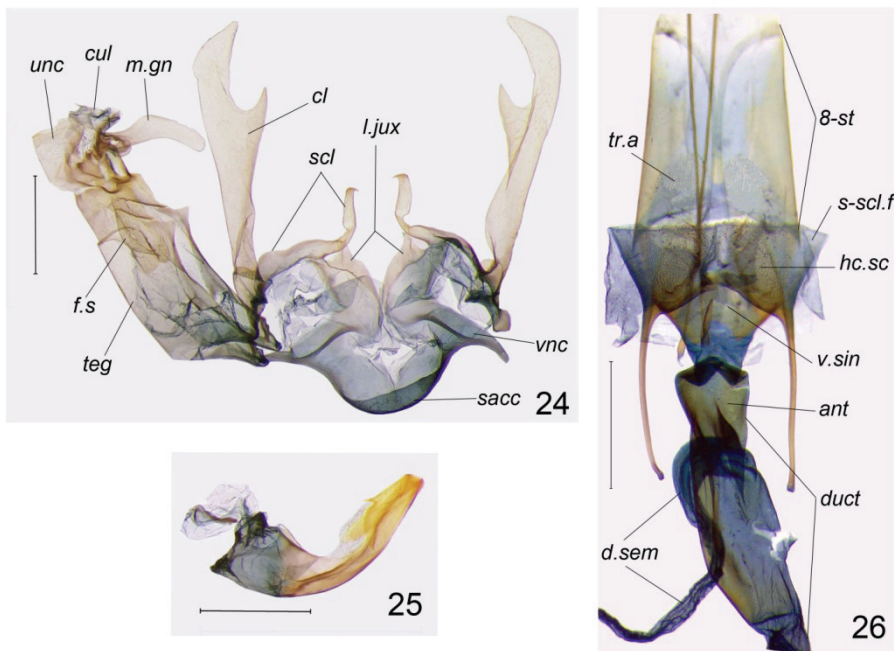
<https://zoobank.org/NomenclaturalActs/B011B0D8-1F49-4E33-A689-9104369EC806>

Figs 13, 26, 47–49

**TYPE MATERIAL.** Holotype: ♀, **Borneo:** E Malaysia, state of Sabah, 24 km N Tawau, 27.VIII 1995, gen. slide 201 MP (M. Omelko leg.).

**DIAGNOSIS.** The species is similar to all congeneric species by long ovipositor, elongated 8th segment with narrow sternal membranous gap and covered by semi-sclerotized fold with honeycomb-like zones on inner surface in the female genitalia. It is similar to *S. parda* sp. n. by rhomboid signum and by two lateral longitudinal grooves bearing short, pointed scales on 7th abdominal segment in female (Fig. 49). The new species differs by significantly larger size, by sclerotized antrum and ductus bursae in the female genitalia.

**DESCRIPTION. Adult** (Fig. 13). Forewing length 8.2 mm. Head covered by scales beige basally, greyish brown distally and with white apex. Scapus widened distally, beige with intense blackish-brown shading, with elongated scales along posterior margin which black with white apex; pedicellus and basal flagellomeres significantly thickened, rest flagellum with alternate beige and greyish-brown segments. First segment of labial palpus black, second segment light beige with blackish-brown base and interspersed brownish and blackish-brown scales, with a brush of elongated scales on under edge; third segment with pointed apex, beige with brown shading. Patagia covered by dark grey and brown scales with white apex. Thorax dark grey with blackish-brown shading; tegula covered by scales greyish proximally, greyish-brown distally with white apex. Forewing dark grey with intense greyish-brown and blackish brown shading; fringe dark-grey and beige on costal margin, dark grey interspersed with blackish scales on outer and dorsal margins. Hindwing dark beige, fringe dark greyish-beige, darker along dorsal margin. Legs light beige with greyish brown shading, brush on hind tibia light beige, tarsi of all legs with long spines on under side.

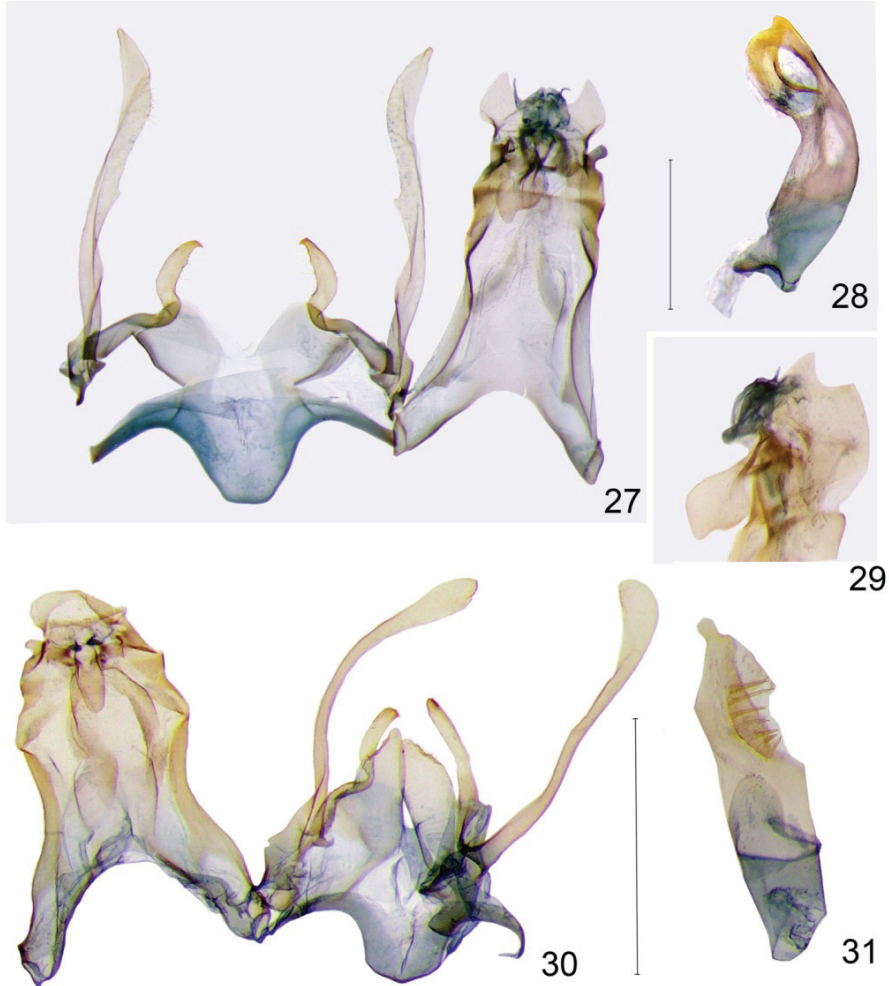


Figs 24–26. *Sabaha* spp., genitalia. 24, 25 – *S. spathulata*, holotype: 24 – male genitalia without aedeagus, tergal part in lateral view, sternal part in ventral view; 25 – aedeagus, lateral view. 26 – *S. insolita* sp. n., female, holotype, 8th sternite with peeled back fold, antrum and proximal part of ductus bursae. Abbreviations: *ant* – antrum, *cl* – cucullus, *cul* – culcitula, *d.sem* – ductus seminalis, *duct* – ductus bursae, *f.s* – fultura superior, *hc.sc* – honeycomb-like sculpture, *l.jux* – lobes of juxta, *m.gn* – median sclerite of gnathos, *sacc* – saccus, *s-scl.f* – semi-sclerotized fold, *scl* – sacculus, *teg* – tegumen, *tr.a* – area with trichae, *unc* – uncus, *v.sin* – vaginal sinus, *vnc* – vinculum, *8-st* – 8th sternite. Scale bar 0.5 mm.

Female with two lateral longitudinal grooves bearing short, pointed scales on 7th abdominal segment (Fig. 49).

Male unknown.

**Female genitalia** (Figs 26, 47–48). Ovipositor very long, papillae anales slightly sclerotized. Apophyses posteriores 6,5 times longer than apophyses anteriores. Membranous fold covered anterior part of 8th sternite and ostium with honeycomb-like sculpture on whole inner surface. 8th sternite with two semi-oval zone of microtrichia and hollowed anterior margin.



Figs 27–31. *Sabaha* spp., male genitalia. 27–29 – *S. parva* sp. n.: 27 – ventral view, paratype; 28 – aedeagus, lateral view, holotype; 29 – uncus, gnathos and culcitula, lateral view, holotype. 30, 31 – *S. cheemai* sp. n., holotype: 30 – ventral view; 31 – aedeagus, lateral view. Scale bar 0.5 mm.

On the 8th sternite anteriorly, under mentioned fold, there are two zones of microtrichia corresponding to described areas of honeycomb-like sculpture, forming with the latter a velcro-like fastener (Figs 26). Vaginal sinus funnel-like, sclerotized in posterior 2/3, narrowed before antrum. Antrum more or less cylindrical, sclerotized, its sclerotization continues on left side and in anterior part of ductus bursae. The latter smoothly narrowed towards ovoid membranous corpus bursae. Signum in posterior part of corpus bursae, as gutter-like plate with anterior and posterior tetragonal lobes. Ductus seminalis arises from ductus bursae beyond antrum, forms large oval bulla with small spines on inner surface (Figs 47, 48).

DISTRIBUTION. Sabah, East Malaysia.

ETYMOLOGY. The specific name is derived from the Latin word *insolitus*, meaning unusual, which is corresponding with the significantly larger size of the moth compared to other congeners.

***Sabaha cheemai* Ponomarenko, M. Omelko et N. Omelko, sp. n.**

<https://zoobank.org/NomenclaturalActs/dd172409-bfec-4d26-af44-231218102643>

Figs 14–16, 30, 31, 53–56

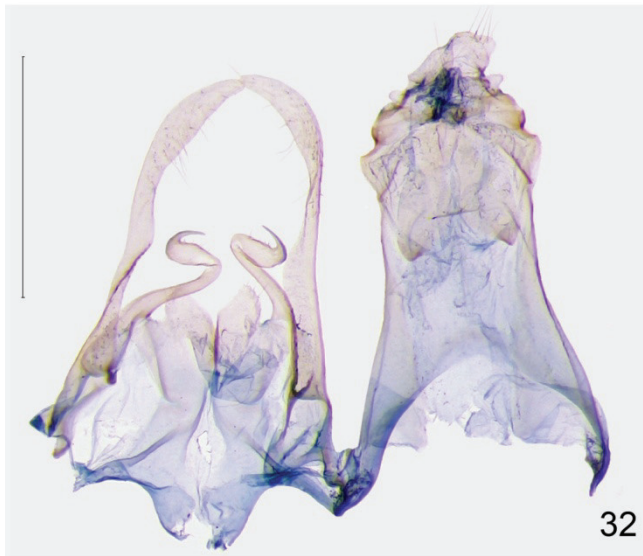
TYPE MATERIAL. Holotype: ♂, **Borneo**: E Malaysia, state of Sabah, 24 km N Tawau, 19.VIII 1995, gen. slide 202 MP (M. Omelko leg.). Paratypes: 6 ♂♂, 5 ♀♀, same locality, 16. VIII – 04.IX 1995, gen. slides 203 (m), 207 (m), 204–206 (ff), 219 (m) MP (M. Omelko leg.).

DIAGNOSIS. The species is similar to *S. parva* **sp. n.** in appearance, but it can be distinguished by darker greyish-brown or brownish-black groundcolour of forewing. New species differs well from all congeners by inflated rhomboid median sclerite of gnathos and row of long spines in semi-oval cavity in distal part of aedeagus in the male genitalia; by relatively narrow long corpus bursae and signum as gutter-like plate with flat serrate lobe in the female genitalia.

DESCRIPTION. **Adult** (Figs 14–16). Forewing length 4.8–5.0 mm in male, 5.2–6.0 mm in female. Head in male dark grey, in female covered by scales beige basally, brownish distally and with white apex. Scapus relatively large, gradually widened distally, greyish-brown in male and beige with greyish brown strokes in female. Flagellum with basal segments significantly widened; in male with long sparse cilia on the underside, monochrome greyish brown; in female with alternated beige and brownish segments. First segment of labial palpus short, brownish, greyish brown or blackish, interspersed with beige scales; second segment wide, with tuft of elongated scales ventrally, light beige or beige with shading by brownish, greyish brown, or blackish scales; third segment narrow, as long as second one, with tuft of scales on upper edge, blackish-brown or beige with intense blackish-brown shading. Thorax and groundcolour of forewing brownish with intense greyish brown or brownish black shading in male, and beige with brownish or greyish brown shading in female. Forewing with small tufts of raised scales and small black and blackish-brown spots. Scales of fringe on costal margin greyish brown and blackish (or beige and brownish in female) with white apex; along wing apex and outer margin blackish and dark grey (or greyish brown in female) with white apex.

Hindwing mostly brown, fringe blackish brown, narrow part of wing along costal margin, from base to middle pale grayish, same as fringe here. Legs beige or light beige with shading of greyish brown or blackish scales, more intense in males. Fore and middle tibiae with light beige or beige collars of elongated scales in the middle and distal parts; hind tibia with brush of light beige or beige hair-like scales on the upper side.

In male the two androconial bundles of long hair-like and oval scales placed in the deep lateral pockets on the 2nd abdominal tergite.



Figs 32–35. *Sabaha* spp., male genitalia. 32, 33 – *S. gemella* sp. n., holotype: 32 – ventral view; 33 – aedeagus, lateral view. 34, 35 – *S. pilosa* sp. n., holotype: 34 – ventral view; 35 – aedeagus, lateral view. Scale bar 0.5 mm.

**Male genitalia** (Figs 30, 31). Uncus relatively small, slightly narrowed towards rounded apex. Culcitula of gnathos with shallow median constriction. Median sclerite of gnathos swollen and with rounded apex, rhomboid in ventral view, convex and arched in lateral view. Cucullus with long narrow sinusoidal neck and small lobe at distal 1/5, medially curved. Sacculus narrow, knee-like curved in middle part, with beak-shaped apex directed ventrolaterally, basally merged with lobe of juxta. The juxta is divided into 2 large wedge-shaped lobes projecting far beyond the posterior margin of the vinculum, and bears setae in the distal part. Aedeagus tubular, wider in basal half, with dorsal and ventral hollows before rounded apex curved ventrally; its distal half with longitudinal row of long spine-like cornuti placed on arcuate sclerotization similar to sparse-toothed scallop. Vinculum with band-like arms narrowed laterally, saccus wide and trapezoid.

**Female genitalia** (Figs 53–56). Ovipositor very long, papillae anales oblong and slightly sclerotized. Apophyses posteriores 9,5 times longer than apophyses anteriores. Membranous fold covered anterior part of 8th sternite and ostium with elongated oval zone of honeycomb-like sculpture on the inner surface. Vaginal sinus asymmetric funnel-like. Vaginal part of ductus bursae widened and slightly sclerotized, its rest part inseparable from corpus bursae: ductus smoothly dilated towards corpus bursae. The latter relatively small, membranous with signum in anterior part, near bottom; signum as gutter-like plate with serrate median lobe. Ductus seminalis arises from ductus bursae right beyond its vaginal part.

DISTRIBUTION. Sabah, East Malaysia.

ETYMOLOGY. The species is named after Malaysian naturalist and conservationist Mr. Shavez Cheema, founder of the Borneo Wildlife Conservation Organization (1StopBorneo Wildlife).

***Sabaha gemella* Ponomarenko, M. Omelko et N. Omelko, sp. n.**

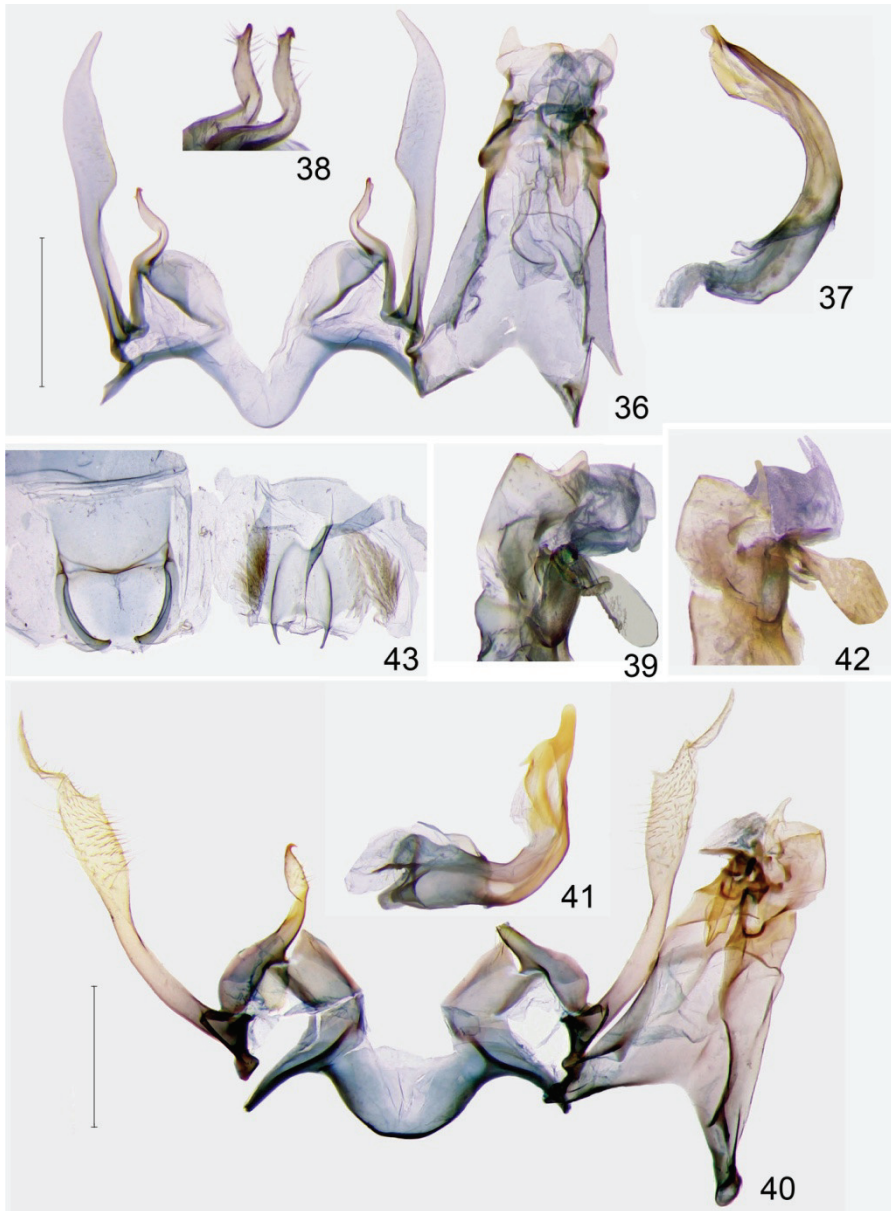
<https://zoobank.org/NomenclaturalActs/9C18818E-DA85-4AAB-B0C5-3511C8CC52D2>

Figs 9, 10, 17, 18, 32, 33, 57–59

TYPE MATERIAL. Holotype: ♂, **Borneo**: E Malaysia, state of Sabah, 24 km N Tawau, 21.VIII 1995, gen. slide 220 MP (M. Omelko leg.). Paratypes: 7 ♂♂, 18 ♀♀, same locality, 17. VIII – 04.IX 1995, gen. slides 208 (m) MP, 209-212 (ff) MP (M. Omelko leg.).

DIAGNOSIS. The species is similar to *S. cheemai* sp. n. in appearance. New species differs from all congeners by sacculus S-shaped in distal third, which is inflated before claw-like apex like scorpion telson in the male genitalia and by flat semicircular signum in the female genitalia.

DESCRIPTION. **Adult** (Figs 17, 18). Forewing length 5.0–6.0 mm. Head with whitish, cream and light greyish frons and grey vertex; eyes encircled by brown, brownish or blackish collar with interspersed scales whitish basally or at apex. Scapus large, whitish dorsally or darkened by brownish scales, its distal edge with protruding elongated scales, brown or blackish-brown with white apex. Flagellum with alternated brown and brownish segments; in male basal segments fusiformly expanded and flagellum with cilia on under side. First segment of labial palpus small, brown; second segment wide, ventrally with dense brush of scales, brown basally and whitish distally, with brownish shading of varying intensity; third segment brownish or brown interspersed with light beige scales, in male shorter and wider than in female, with raised scales to thin apical part; in some female it thin with a small tuft of elongated scales on upper side. Patagia grey. Ground colour of forewing varying – pale beige with intense brownish shading, brown with blackish-brown shading, blackish-brown, often interspersed with greyish-bluish scales on distal half. Forewing with small tufts of raised brown or blackish-brown scales, some moths with a wide oblique transverse light beige or



Figs 36–43. *Sabaha* spp., male genitalia, basal abdominal segments. 36–39 – *S. semiatrata* sp. n., holotype: 36 – ventral view; 37 – aedeagus, lateral view; 38 – sacculi, lateral view; 39 – uncus, gnathos and culcitula, lateral view. 40–43 – *S. maculosa* sp. n., holotype: 40 – ventral view; 41 – aedeagus, lateral view; 42 – uncus, gnathos and culcitula, lateral view; 43 – 1st and 2nd tergites and 2nd sternite. Scale bar 0.5 mm.

beige stripe; fringe dark grey, often with brownish scales on the outer edge. Hindwing and fringe dark grey, often with a brownish tinge, greyish brown yellow. Legs beige or grey often with intense brown, blackish-brown or blackish shading; hind tibiae with dense light beige or beige brush of hair-like scales.

**Male genitalia** (Figs 32, 33). Uncus broad, hood-like, conically narrowed distally, with flat apex. Culcitula of gnathos divided into two ovoid parts by deep median constriction. Median sclerite of gnathos with convex ventrally more or less triangular proximal part and narrow finger-like distal part. Cucullus slightly widened at base and more or less equally in width along distal 2/3, with lanceolate apical part curved medially. Saccus narrow, S-shaped in distal third, inflated before claw-like apical part. Lobes of juxta elongated and wide basally, with pointed apex. Aedeagus tubular, more or less oval basally with two small tooth-like apodemes ventrally, with large rounded lobe on left side in distal half before elongated flat plate in apical part. Vinculum with narrow lateral arms and broad semi-oval saccus.

**Female genitalia** (Figs 57–59). Ovipositor very long, papillae anales relatively short and sclerotized. Apophyses posteriores 11 times longer than apophyses anteriores. Membranous fold covered anterior part of 8th sternite and ostium with two narrow elongated areas of honeycomb-like sculpture on the inner surface. 8th sternite with band-like sclerotization along deeply hollowed anterior margin. Vaginal sinus broadly rounded, sclerotized. Vaginal part of ductus bursae wide and cylindric, membranous ventrally and sclerotized on lateral and partly dorsal sides; rest part of ductus smoothly dilated towards corpus bursae and inseparable from latter. Corpus bursae relatively small, membranous with signum in broadened anterior part; signum as small gutter-like plate with triangular lobe. Ductus seminalis arises from ductus bursae beyond its vaginal part.

DISTRIBUTION. Sabah, East Malaysia.

ETYMOLOGY. The species name is derived from the Latin word *gemellus*, meaning double, which is corresponding to the two forms of wing coloration in new species.

***Sabaha pilosa* Ponomarenko, M. Omelko et N. Omelko, sp. n.**

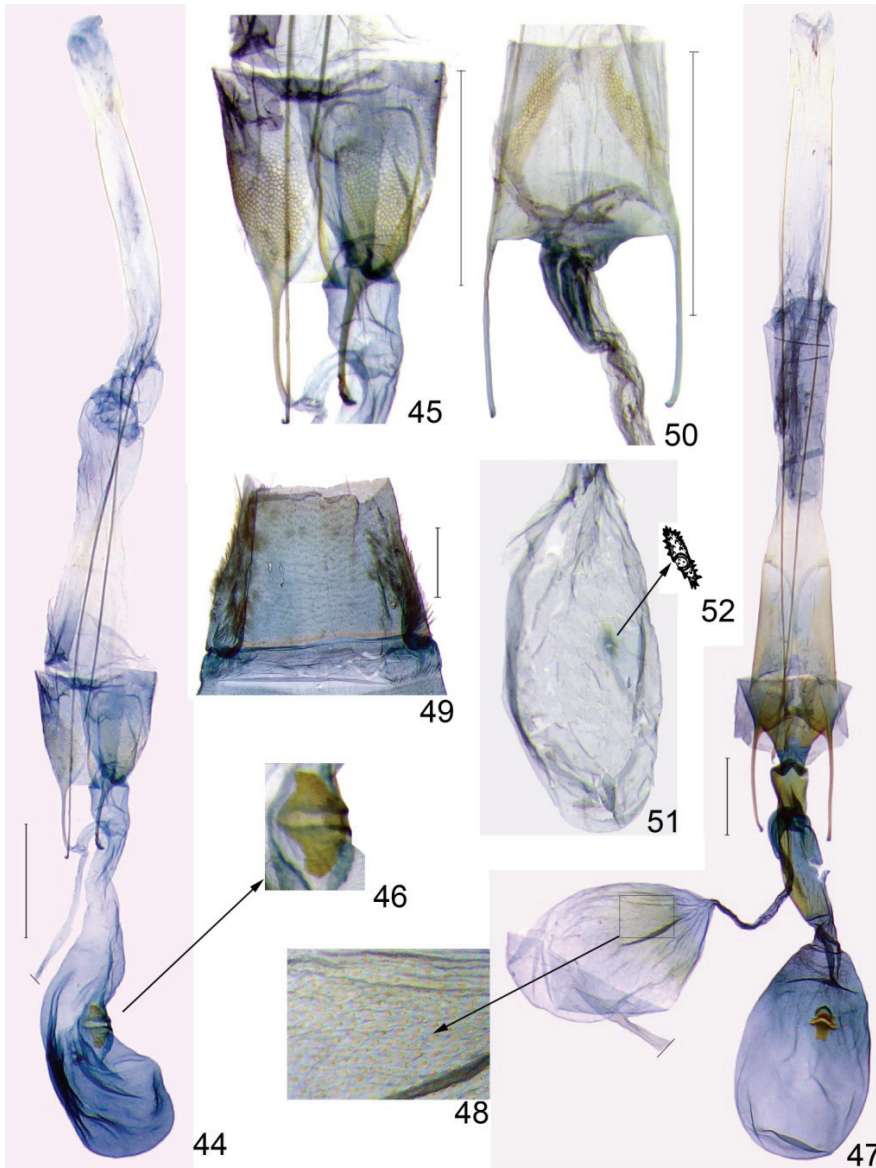
<https://zoobank.org/NomenclaturalActs/98891275-8F37-42F6-AB4F-9A75833C8052>

Figs 20, 21, 34, 35

TYPE MATERIAL. Holotype: ♂, **Borneo**: E Malaysia, state of Sabah, 24 km N Tawau, 02.IX 1995, gen. slide 214 MP (M. Omelko leg.). Paratypes: 2 ♂, same locality, 18, 29. VIII 1995, gen. slides 213 MP (M. Omelko leg.).

DIAGNOSIS. New species as a whole is similar to all congeners in male genitalia, but it can be distinguished by cucullus with clavate distal part and culcitula of gnathos larger than uncus. New species differs from all related species by hair-like raised scales on the forewing, due to which wing looks velvety.

DESCRIPTION. **Adult** (Figs 20, 21). Forewing length 5.2–5.8 mm. Head brown or blackish-brown. Antenna brown or blackish-brown, scapus wide with protruding elongated scales along edges, flagellum with slightly widened basal segments and short cilia on the underside. Labial palpus with blackish first segment; second segment dark beige with brown or blackish-brown basal part, wide and with brush of elongated scales ventrally; third segment shorter than second one, wide, blackish-brown or blackish, on upper edge with brush of elongated scales whitish at apex. Thorax blackish or blackish-brown, patagia brown or blackish-brown. Forewing brownish with intense blackish darkening or blackish with scattered blackish scales on brownish distal part. Thorax and forewing with hair-like blackish raised scales, giving the latter velvety appearance (Fig. 21). Fringe blackish or blackish-brown. Hindwing brownish with dark-grey or brownish-grey fringe. Legs dark grey with intense black shading and dark grey brush on hind tibiae, or legs dark beige with brownish shading and dark beige brush on hind tibiae.



Figs 44–52. *Sabaha* spp., female genitalia, 7th abdominal segment. 44–46 – *S. parva* sp. n., paratype: 44 – ventral view; 45 – 8th sternite; 46 – signum. 47–49 – *S. insolita* sp. n., holotype: 47 – ventral view; 48 – fragment of inner side of bulla seminalis with small spines; 49 – 7th sternite. 50–52 – *S. maculosa* sp. n., paratype: 50 – anterior part of 8th sternite, antrum and proximal part of ductus bursae; 51 – corpus bursae; 52 – signum. Scale bar 0.5 mm.

**Male genitalia** (Figs 34, 35). Uncus broad, hood-like, with trapezoid concave on posterior margin. Culcitula of gnathos with deep median constriction dividing it into two parts, each with ventral finger-like projection directed caudally. Median sclerite of gnathos flat, elongated and with conic apex curved dorsally. Cucullus with relatively long narrow neck, slightly longer than 3/5 of total cucullus length, small clavate distal part, and elongated pointed apex. Sacculus narrow, knee-like curved at middle, broadened at base and in distal half and smoothly narrowed towards beak-shaped apex directed laterally. Lobes of juxta large, triangular, rounded distally. Aedeagus tubular, arcuate, its widened basal part possesses two strongly sclerotized and elongated apodemes on ventral side, and large dorsal poleaxe-shaped lobe in distal part before rounded apex. Vinculum with band-like lateral arms and semi-oval wide saccus.

Female unknown.

DISTRIBUTION. Sabah, East Malaysia.

ETYMOLOGY. The species name is derived from the Latin word *pilosus*, meaning covered with hair, or hairy, which is corresponding to forewing of new species covered by raised hair-like scales.

***Sabaha semiatrata* Ponomarenko, M. Omelko et N. Omelko, sp. n.**

<https://zoobank.org/NomenclaturalActs/5FFEF377-3835-4159-A5E1-7E717F995D89>

Figs 19, 36–39

TYPE MATERIAL. Holotype: ♂, **Borneo**: E Malaysia, state of Sabah, 24 km N Tawau, 27.VIII 1995, gen. slide 215 MP (M. Omelko leg.).

DIAGNOSIS. New species generally is similar to all congeners in the male genitalia, especially to *S. pilosa* by shape of uncus, culcitula of gnathos and distal part of aedeagus and to *S. maculosa* by pattern of forewing. New species can be distinguished by cucullus with relatively large widened distal part and culcitula of the gnathos with single finger-like projection in the male genitalia.

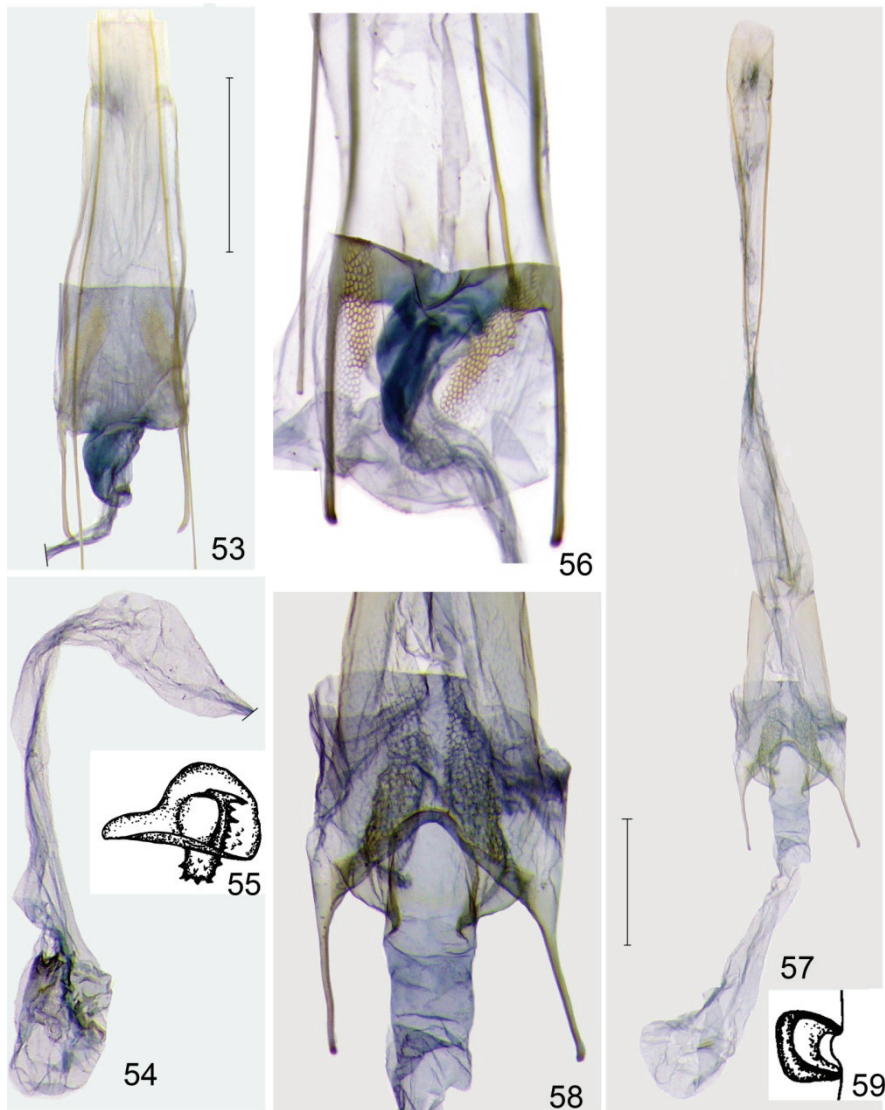
DESCRIPTION. **Adult** (Fig. 19). Forewing length 5.5 mm. Head beige-grey with brown shading. Scapus wide, with elongated scales along anterior margin, dark beige with blackish brown shading. Flagellum with widened basal segments covered with elongated blackish-brown scales; rest segments dark beige with intense blackish-brown shading. First segment of labial palpus blackish brown; second segment mostly dark beige with brown shading and brown basal part, wide, with brush of elongated scales ventrally; third segment dark beige with intense blackish-brown shading and tuft of blackish scales on upper edge before apex. Forewing groundcolour beige with slight brown shading and small tufts of raised brown scales, fringe brownish. Hindwing brownish, fringe dark greyish. Legs dark beige with brown shading, intense on the tarsi.

**Male genitalia** (Figs 36–39). Uncus broad, hood-like, with large conic lateral lobes. Culcitula of gnathos with single finger-like projection in deepening of median constriction. Median sclerite of gnathos flattened laterally, oblong and oval. Cucullus with narrow neck, slightly longer than 1/3 of total cucullus length, and relatively wide distal part, smoothly narrowing towards finger-like apex curved medially. Sacculus narrow, twice knee-like curved, slightly dilated in distal 1/3 and with thorn-like projection before hook-shaped apex directed laterally. The juxta with two large trapezoid lobes. Aedeagus long tubular, with gutter-like apical plate and elongated semi-oval dorsal sclerotization along truncated apex. Vinculum with band-like lateral arms and triangular wide saccus.

Female unknown.

DISTRIBUTION. Sabah, East Malaysia.

ETYMOLOGY. The species name is derived from the Latin word *semi-atratus*, meaning half-dressed in black, which corresponds to the partly black and partly beige coloration of the head and thorax in the new species.



Figs 53–59. *Sabaha* spp., female genitalia. 53–56 – *S. cheemai* sp. n., paratype: 53 – 8th sternite, antrum and proximal part of ductus bursae; 54 – ductus and corpus bursae; 55 – signum; 56 – peeled back fold of 8th sternite. 57–59 – *S. gemella* sp. n., paratype: 57 – ventral view; 58 – anterior part of 8th sternite and antrum; 59 – signum. Scale bar 0.5 mm.

***Sabaha maculosa* Ponomarenko, M. Omelko et N. Omelko, sp. n.**

<https://zoobank.org/NomenclaturalActs/EA88C0CD-DDAF-4033-BFAA-4CAB085D230B>

Figs 22, 23, 40–43, 50–52

TYPE MATERIAL. Holotype: ♂, **Borneo**: E Malaysia, state of Sabah, 24 km N Tawau, 20.VIII 1995, gen. slide 216 MP (M. Omelko leg.). Paratype: 1 ♀, same locality, 21.VIII 1995, gen. slides 217 MP (M. Omelko leg.).

DIAGNOSIS. New species is similar to *S. semiatrata* sp. n. in pattern of forewing, but it can be distinguished by beige, not darkened head and thorax. New species is related to *S. parda* sp. n., *S. pilosa* sp. n. and *S. semiatrata* sp. n. by hood-like uncus with lateral more or less conic lobes, culcitula of gnathos with median finger-like projections and aedeagus with dorsal poleaxe-shaped lobe in distal part, but it differs by sacculus with strong narrowing at 3/5 of its total length and by aedeagus curved at a right angle in the male genitalia. New species is very similar to *S. cheemai* in morphology of the female genitalia, but it can be distinguished by shorter ovipositor, apophyses posteriores 6 times longer than apophyses anteriores, whereas in related species this ratio is 9,5.

DESCRIPTION. **Adult** (Figs 22, 23). Forewing length 5.7–6.5 mm. Head beige interspersed with scales darker beige in distal part. Eyes surrounded elongated beige scales with brown distal part. Scapus beige with brownish shading, wider and with elongated black scales along posterior margin in male; flagellum brown basally and with alternate brown (beige in female) and brownish segments, basal segments widened in male.

First segment of labial palpus beige with brownish shading or blackish; second segment wide, ventrally with brush of scales brownish or blackish-brown basally and light beige or beige distally, and with indistinct brownish fascia before apex; third segment wider and shorter in male, beige with brownish darkening, with small tuft of blackish-brown scales with white apex on upper margin in distal part. Patagia covered by beige scales with brown distal part. Thorax, tegulae and forewing groundcolour dark beige in male and beige in female with intense brownish darkening. Pattern of forewing consisting of small brownish and brown spots and tufts of raised scales. Fringe in male with brownish scales with a beige apex on costal margin, greyish brown on outer margin, brown on dorsal margin; and in female with beige and brownish scales with white apex on costal margin, blackish with white apex on outer margin, smoky with white apex on posterior margin. Hindwing brown with dark grey fringe. Legs beige with brownish shading in male and blackish-brown in female; brush on the tibiae of hind legs beige.

In male the two androconial bundles of long hair-like and oval scales placed in the deep lateral pockets on the 2nd abdominal sternite (Fig. 43).

**Male genitalia** (Figs 40–42). Uncus hood-like, with narrow lateral processes slightly curved dorsally. Culcitula of gnathos broadly ovoid with deep median constriction dividing it into two parts with a narrow finger-shaped processes directed caudally. Median sclerite of gnathos teardrop-shaped in lateral view. Cucullus with relatively narrow neck equal to half its length and lanceolate distal part with an elongated whip-like apical part, tooth-like ledge on ventral edge and rounded cut beyond it. Sacculus smoothly narrowed towards distinct interception at 2/3 of its length and with curved distal third dilated at the middle and narrowed to hook-shaped apex. Aedeagus tubular, curved at right angle at the middle, with two basal semi-oval processes and with a poleaxe-like lobe in distal half bearing a spinous process, and with lanceolate lobe at the apex. Juxta with triangular lobes. Viculum narrowing laterally with broadly rounded saccus.

**Female genitalia** (Figs 50–52). Ovipositor long, papillae anales oblong, apophyses posteriores 6 times longer than apophyses anteriores. Membranous fold covered anterior part of 8th segment with very narrow area of honeycomb-like sculpture. Vaginal sinus slightly sclerotized. Antrum asymmetric, slightly longer than half length of apophyses anteriores, with longitudinal sclerotization on convex left side; rest part of ductus smoothly dilated towards corpus bursae and inseparable from latter. Corpus bursae membranous and narrow, slightly widened towards bottom. Signum small, oval, with a spinous sculpture and a rounded notch in the middle.

DISTRIBUTION. Sabah, East Malaysia.

ETYMOLOGY. The species name is derived from the Latin word *maculosus*, meaning spotted, which is corresponding to the pattern of forewing in new species.

#### DISCUSSION

The genus *Sabaha* M. Omelko et N. Omelko certainly belongs to subfamily Gelechiinae, since it has tegumen with extended anteriolateral parts, valva deeply split on separate cucullus and sacculus, juxta joined with vinculum into single sclerite in the male genitalia, also honeycomb-like sculpture in ostial area and signum in female genitalia typical of this subfamily. Within subfamily Gelechiinae there is evolutionary trend to integration sacculi, juxta and vinculum into single sclerite. The genera from this subfamily have different extent of integration of sclerites in sternal area of genitalia. The significant evolutionary transformations in morphology of the male genitalia were revealed in the tribe Litini accompanied by changing the cuculli function, merging genital structures in sternal area into single ankylosed sclerite sacculi+juxta+vinculum, by fixation of aedeagus ventrally and reduction some phallic muscles up to total their disappearance (Ponomarenko, 2005, 2009). The genera from the tribes Gelechiini and Gnorimoschemini less specialized than those from tribe Litini: their male genitalia with well-developed cuculli and aedeagus isn't fixed and keeping free mobility. The genus *Sabaha* also possesses by listed characters. Besides, this genus less specialized than known genera from tribes Gelechiini and Gnorimoschemini, since has well developed sacculi separated from vinculum, and distinct lobes of juxta although the latter joined with vinculum. The genus *Sabaha* has well developed culcitula and fultura superior in the male genitalia same as *Gelechia* Hübner and honeycomb-like sculpture in ostial area in female genitalia same as genera from tribe Gnorimoschemini. Species from the genus *Sabaha* with signum similar to representatives from all tribes of subfamily Gelechiinae. The genus *Sabaha* along with possesses unique apomorphies such as semi-transparent area on forewings, semi-transparent area with hair-like scales on hindwings, bundles of hair-like scales on metascutum, well-developed sacculi, wide saccus which is apodeme of phallic muscles in the male genitalia; membranous fold covered anterior part of 8th sternite and bearing the areas of honeycomb-like sculpture on the inner surface in the female genitalia. Summarizing morphological characters of studied species from the genus *Sabaha*, the latter is treated as related to the genus *Gelechia* Hübner and included into the tribe Gelechiini.

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