

Parateleiopsis feregrisea (Lepidoptera : Gelechiidae), a new genus and a new species from Borneo

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A new genus in Gelechiidae, *Parateleiopsis* with the type species *P. feregrisea* sp. nov., are described and illustrated from Borneo. The taxonomic position of the new genus within the tribe Litini of the family Gelechiidae is discussed.

The new genus *Parateleiopsis* based on the *P. feregrisea* sp. nov. is described herein. The latter is one of the smallest among known gelechiid moths, having distinctive small adults with forewing of 2.7–3.2 mm long. The fore- and hindwings are extremely narrow: the wing indices (ratio of length to width at the middle) in the new species are 5.4 and 11.5 for fore- and hindwing, respectively, while in the known representatives of subfamilies in Gelechiidae they are 3.7–5.7 and 2.8–9.8, respectively.

The new taxa are described based on specimens collected from the Island of Borneo. In the descriptions the genital terminology follows Klots (1970) with changes of Ponomarenko (2005). The holotype 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).

cury lamp, in the state of Sabah, Malaysia, near the town of Keningau at an altitude of 950 m a.s.l. by the second author in 2018. The male and female genitalia were prepared following traditional techniques described in Falkovitsh and Stekolnikov (1978). Genitalia of both sexes were stained with Chlorazol black, dissected and examined under a Nikon SMZ-10 stereomicroscope. Subsequently, they were mounted in Euparal following the technique described by Robinson (1976) for taking photographs. The genitalia slides are identified using initials of the first author (MP), who prepared the slides. Photographs of adults were taken with a Nikon D300 camera equipped with 50 mm macro lens. Photographs of the genitalia slides were taken using an Olympus SZX16 with a DP74 Nikon digital camera, and an Olympus BX53 microscope with DeltaPix camera. In the descriptions of the species the colour standards of Saccardo (1894) are followed.

Material and methods

Parateleiopsis gen. nov.

The specimens were collected using 250 W mer-

<http://zoobank.org/References/82D89F9E-F12D-4663-BA57-C6ED8AB00339>

TYPE SPECIES: *Parateleiopsis feregrisea* sp. nov.

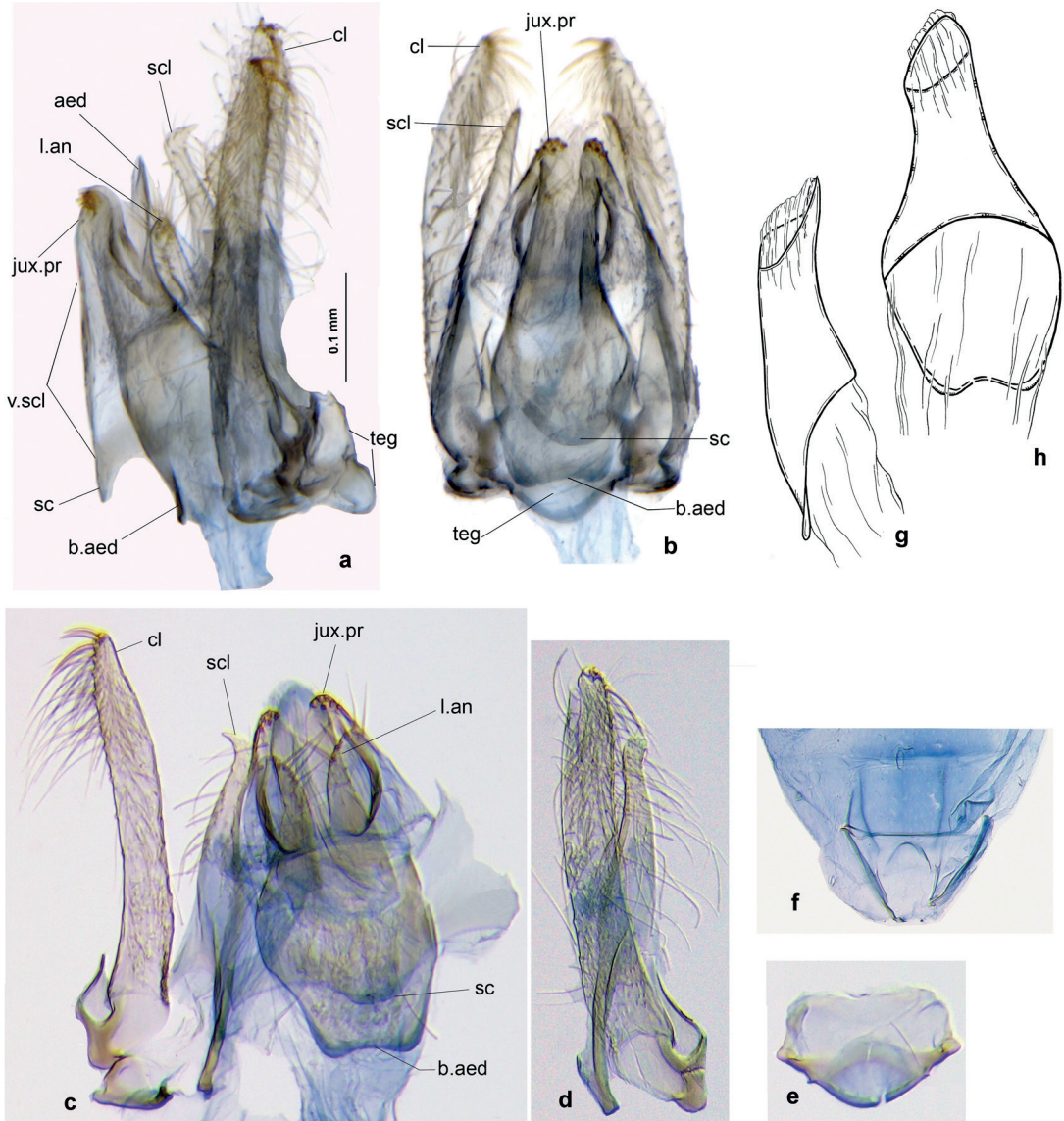


Fig. 1. *Parateleipsis feregrisea* **sp. nov.** (from the paratype). — **a**: male genitalia, lateral view; — **b**: male genitalia, ventral view; — **c**: cucullus, sacculus and phallic complex of the genitalia, tegumen removed, view from medial side; — **d**: cucullus and sacculus; — **e**: tegumen, view from medial side; — **f**: 2nd abdominal sternite, female; — **g**: aedeagus, lateral view; — **h**: aedeagus, dorsal view. aed = aedeagus, b.aed = base of aedeagus, cl = cucullus, jux.pr = process of juxta, l.an = lobe of anellus, sc = saccus, scl = sacculus, teg = tegumen, v.scl = ventral sclerite.

ETYMOLOGY. The generic name is derived from the combination of the Greek “*telei-*” with the prefix “*par-*” (= nearby) referring to similarities in the morphology of the valva between species of the new genus and those of *Teleipsis* Sattler.

DIAGNOSIS. Genitalia of males (Fig. 1) in the new genus are characterized by a shortened, reduced tegumen, absence of uncus and gnathos, valva divided into finger-like cucullus and saccu-

lus, vinculum and juxta fused into single ventral sclerite enveloping the aedeagus ventro-laterally. The female genitalia have papillae anales with digitate apices (Fig. 2e), ostium surrounded by a honeycomb vaginal sinus, and a signum that is sclerotized ring with a flat ventral plate (Fig. 2d, f and g). The new genus has a combination of characters including size and genitalia of both

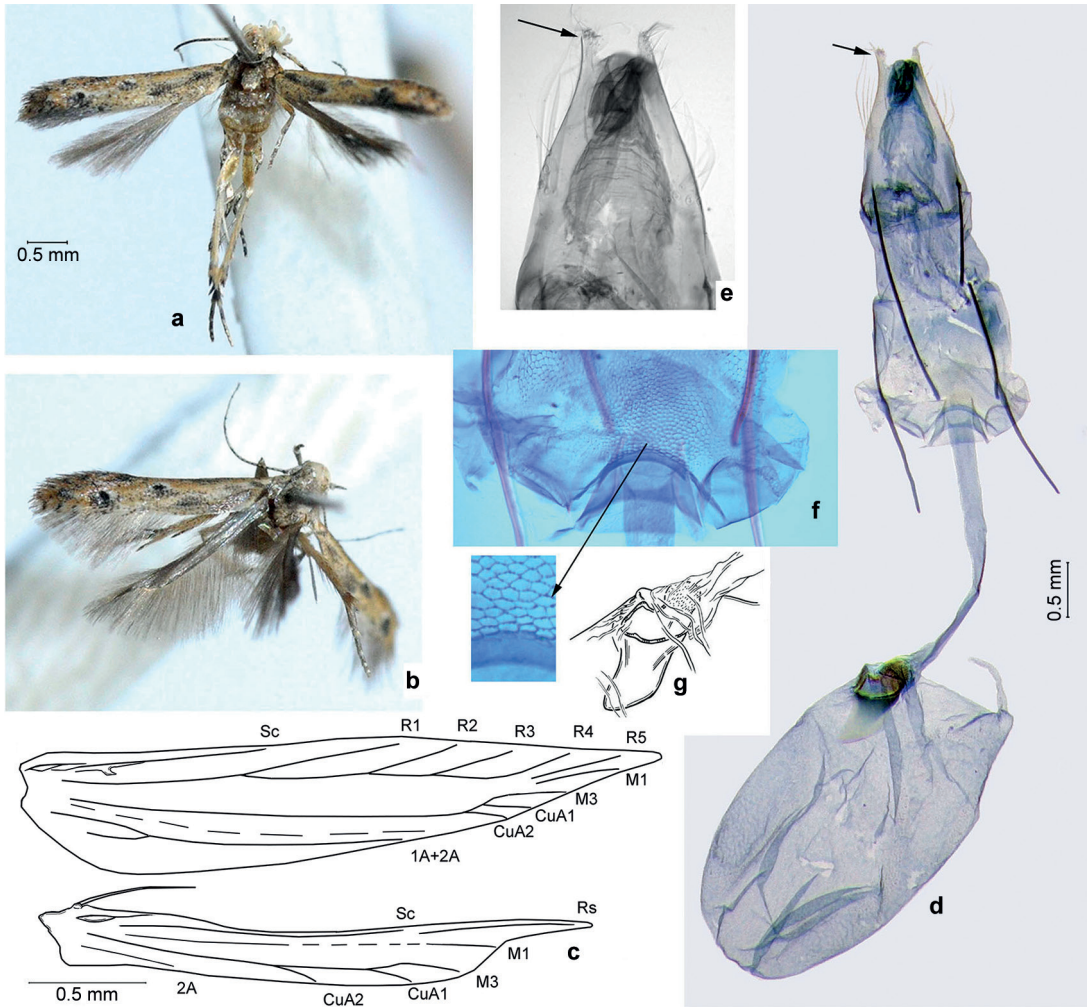


Fig. 2. *Parateleipsis feregrisea* sp. nov. — **a**: adult male (from the holotype); — **b**: adult female (from the paratype); — **c**: wing venation in male; — **d–g**: female genitalia (from the paratype), (**d**) ventral view with digital apex indicated by an arrow, (**e**) papilla anales with digital apex indicated by an arrow, (**f**) vaginal sinus and vaginal part of ductus bursae, (**g**) signum. 1A, 2A = anal veins; M1, M3 = medial veins; R1–R5, Rs = radial veins; Sc = subcostal vein; CuA1 and CuA2 = anterior branches of cubitus.

sexes that are not found in any other known genus of Gelechiidae.

Parateleipsis feregrisea sp. nov.

MATERIAL EXAMINED. **Holotype:** ♂, Malaysia, Borneo, State of Sabah, 9 km NNW of Keningau, 22 March 2018 (M. Omelko leg.); genitalia slide 150, MP, Euparal. **Paratypes:** 4♂, 4♀, same locality, 13–26 March 2018 (M. Omelko leg.); genitalia slides 151 (♂), 152 (♀), 162 (♂), 163 (♂), 164 (♀), MP, Euparal.

ETYMOLOGY. The species name is derived from the Latin “*fere*” (= near) and “*grisea*” (= grey), and refers to the ground colour of forewings in the new species.

DIAGNOSIS. The new species differs from all other Gelechiidae by the following characters in male genitalia: pentagon-shaped tegumen with a weakly concave posterior margin and convex anterior one, valva divided into finger-like cucullus and sacculus, ventral sclerite (fused vinculum and juxta) with a pair of processes, bearing small thorns apically, aedeagus stout surrounded by anellus with lateral lobes rounded apically; and by the following characters in female genitalia: papillae anales with digital apices, honeycomb vaginal sinus surrounding ostium, signum as ring with a flat ventral plate.

DESCRIPTION. Adults of both sexes (Fig. 2a and b). Very small, forewing 2.7–3.2 mm long. Head light brownish yellow. Antennal scape light brownish-yellow intermixed with dark scales; flagellum with light brownish-yellow or yellowish-grey flagellomeres alternating with black flagellomeres. Basal segment of labial palpi brownish; second segment dark brownish-yellow on the outer and inner sides, white along upper margin and distally; third segment white with black bands near base, beyond the middle and before black apex. Forewings grey-brownish-yellow with scattered black scales; proximal part of wing with one indistinct costal spot and two spots along anal vein, joining in some specimens into black stripe; distal part of wing with indistinct costal spot and medial spot; apical part with spot in white border near dorsal margin of the wing; fringe with grey brownish-yellow scales basally in the proximal half and dark brownish scales with white tips in the distal half. Hind wing and fringe dark grey. Forewing with Sc to costal margin at about 2/5 of wing length; R1–R5 to the costal margin; M1 to dorsal margin below apex; M2 probably absent; M3 separate; CuA1 and CuA2 separate basally, to dorsal margin; 1A + 2A forked at base. Hindwing with Sc to costa beyond the middle; Rs to apex; M1 to termen, M2 probably absent, M3 to tornus; CuA1 and CuA2 from Cu stem separately, 2A short, to dorsal margin at 1/5 of wing length (Fig. 2c).

Fore femur dark brownish-yellow with brownish shade, fore tibia mainly black, but white distally, with two white oblique bands; middle femur whitish, middle tibia with intensive darkening, raised scales on outer side in proximal part, whitish ring-like collars of raised scales at the middle and distally; hind femur grey, hind tibia grey-brownish-yellow with oblique blackish bands near the base, at the middle and distally, proximal part of hind tibiae with brush of hair-like brownish-yellow or brownish yellow scales on upper and under margins.

The 2nd abdominal sternite deeply cut between well-developed apodemes, venulae sinuous, loop-shaped formation near posterior margin of unknown function (Fig. 1f).

MALE GENITALIA (Fig. 1). Uncus and gnathos absent. Tegumen extremely short and reduced, of pentagonal shape, with weakly concave poste-

rior margin and triangularly pronounced anterior margin (Fig. 1e). Valva divided into cucullus and sacculus; cucullus digitate in shape, narrowed apically and bearing strong thorns and setae at the apex; sacculus smoothly narrowing distally, with pointed and dorso-medially curved apex; the ratio of cucullus and sacculus lengths is 4/5 (Fig. 1d). Vinculum and juxta fused into ventral sclerite, enveloping aedeagus ventro-laterally, with pair of ventral processes bearing strong thorns apically (Fig. 1a); saccus broad, rounded apically. Aedeagus stout, basally with wide, sclerotized, ventral wall, which concave anteriorly, truncated in apical part and with dorsal plate elongated distally; ejaculatory duct entering along longitudinal body axis (Fig. 1g and h). Anellus semi-membranous and surrounding aedeagus, with lateral lobes bearing long setae (Fig. 1a).

FEMALE GENITALIA (Fig. 2d–g). Ovipositor short, membrane between eighth and ninth segments 2 times shorter than papillae anales, the latter sclerotized laterally, narrowing distally and with digital apices (Fig. 2d and e). Apophyses posteriores 1.5 times as long as free part of apophyses anteriores, the latter extending along lateral sides of eighth segment almost to its posterior margin. The eighth segment with honeycomb vaginal sinus surrounding ostium and with arched sclerite anteriorly (Fig. 2f). Ostium placed at the level of anterior margin of eighth segment. Antrum indistinct, vaginal part of ductus bursae placed within pyramidal sclerite (Fig. 2d and f). Ductus bursae membranous, mainly tube-like, slightly widened towards the corpus bursae, entering into latter laterally at caudal one third. Corpus bursae oval, membranous, signum as ring-like sclerite with a flat tetragonal plate with rounded corners, located ventrally near connection with ductus bursae; ductus seminalis arising from caudal part of corpus bursae (Fig. 2d and g).

DISTRIBUTION. Malaysia (Sabah).

REMARKS. There are two species in the family Gelechiidae with very similar pattern of forewings, namely *Aristotelia galeotis* Meyrick, 1908 and *Psamathocrita doloma* Bradley, 1965, both not type species. The new species here described differs from those two by morphology of genital structures. According to photographs

in Clarke (1969: 286, pl. 142: figs. 3–3b), *A. galeotis* has valva widened distally and narrowed towards the base, and aedeagus moderately inflated basally. It is difficult to determine the homology of the structure placed before the valva on the photo, it can be sacculus as well as process of juxta. The ratio of the lengths of the cucullus and this process is approximately 1/2. *P. feregrisea* has valva distinctly widened towards the base and divided into cucullus digitate in shape and sacculus. The ratio of the lengths of the cucullus and sacculus is 4/5. Aedeagus in *P. feregrisea* is stout in basal part, its basal part 3 times wider than distal part.

The male and female genitalia of *P. doloma* are illustrated in Bradley (1965: 136, figs. 111–113). The male genitalia of this species were mounted on the slide with confused ventral and dorsal sides as evidenced by the basal processes of the valva (*hemitransstilla*), which are in the foreground. Basal process of valva, being apodeme of muscle m2 (abductor of valva), has typical shape and allows to identify the dorso-basal angle of the valva. Also, aedeagus, being the structure of the phallic complex, shifted ventrally and surrounded by anellus and processes of juxta that is clearly visible in the photo. Thus, the sternal part of genitalia is in the background in the photo in Bradley (1952). Therefore sternal part as well as most part of phallic complex is not accessible for comparison. However, the valva and aedeagus are visible and obtainable for comparison. Unlike *P. feregrisea*, the *P. doloma* has valva not divided into cucullus and sacculus, dilated at 2/3 distally, its maximal width in that level 2 times as wide as base; whereas cucullus in described species with parallel edges and narrowed towards apex. Aedeagus in *P. doloma* is relatively gracile, tube-like and curved ventrally; whereas aedeagus in *P. feregrisea* quite different in shape, it is stout basally, deeply cut dorsally, with basal ventral wall and dorsal elongated plate.

The female genitalia in *P. doloma* and *P. feregrisea* have honeycomb vaginal sinus surrounding ostium and its surface texture is similar in both species. However *P. doloma* differs from *P. feregrisea* by the shape of sclerotized bottom in vaginal sinus and absence of sclerite surrounding the vaginal part of ductus bursae.

Discussion

The tribe Litini in Gelechiidae currently includes more than 30 genera (Janse 1958, 1960, Hodges 1983, Huemer & Karsholt 1999, Ponomarenko 2005, Lee & Brown 2008). The morphology in this group is very diverse. Some genital structures can be developed in some genera and absent from the others. In the male genitalia, the uncus and gnathos, a pair of functionally linked structures, can be well-developed in some genera or represented by uncus only in others. The valva became transformed during evolution: in some genera cucullus is reduced, while missing from others, and sacculus is fused with vinculum and juxta to form single ventral sclerite. In more specialized taxa (*Exoteleia*, *Carpatolechia*, *Teleiopsis*), the cuculli are often rudimentary and represented by thin membranous structures, or completely absent (*Recurvaria*, *Schneidereria*, *Stenolechia*, *Parastenolechia*, *Protoparachronistis*, *Teleiodes*, *Altenia*, *Xenolechia*, *Pseudotelphusa*, *Neotelphusa*, *Furcaphora*, *Flexiptera*). In most genera the sacculi, vinculum and juxta are fused into a single ventral sclerite without boundaries between the separate parts. Their fusion in forming a ventral sclerite (sacculi + vinculum + juxta) was confirmed in the study of genital functional morphology based on the position of musculature that is more conservative than sclerites (Ponomarenko 2005). The aedeagus has a fixed position, as it is fused with the saccus more often at the base.

The taxonomic position of the newly described genus was determined mainly based on the male-genitalia morphology. The new genus possesses complex characters (vinculum, and juxta are fused into a single ventral sclerite, aedeagus fixed in sternal phallic complex), that are treated as diagnostic characters of the genera belonging to the tribe Litini (Ponomarenko 2005: 75). These include the deeply split valva into cucullus and sacculus, fused vinculum and juxta into single ventral sclerite, and aedeagus ventrally fixed in the male genitalia. The valvar morphology in a new genus is similar to that in *Teleiopsis*. However, *Parateleipsis* differs from the related taxa in the male genitalia by the degenerative tegumen and the absence of both uncus and gnathos. The female genitalia

are characterized by digitate apices of papillae anales extended distally, a honeycomb vaginal sinus surrounding the ostium, signum, which is not typical to other Litini. There is no genus in the tribe Litini that has all these characters together. However, the new taxon is tentatively placed in Litini based mainly on the similarity in the male genitalia.

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