

Four New Species of Gelechiid Moths of the Genus *Photodotis* Meyrick, 1911 (Lepidoptera, Gelechiidae) from Borneo

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Abstract—Four new Gelechiidae species of the genus *Photodotis* Meyrick, 1911 are described from the Malaysian part of Borneo: *Ph. crockeri* sp. n., *Ph. decolorata* sp. n., *Ph. aliena* sp. n., and *Ph. imperfecta* sp. n. The name of the genus *Palintropa* Meyrick, 1913 is considered a junior synonym of that of the genus *Photodotis* Meyrick, **syn. n.** A new combination is also established: *Photodotis hippica* (Meyrick, 1913), comb. n. ex *Palintropa*.

Keywords: Gelechiidae, *Photodotis*, new species, new synonym, new combination Malaysia, Borneo

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In the present study we continue describing the gelechiid moths of the genus *Photodotis* Meyrick, 1911 of the Indo-Malayan Region. Earlier we described three new species from Central Laos (M. Omelko and N. Omelko 2018). Four more species are described based on the collections from Borneo. The name of the genus *Palintropa* Meyrick, 1913 is established to be a junior synonym of that of the genus *Photodotis* Meyrick. The type species of the genus *Palintropa*, *P. hippica* Meyrick, 1913 described from Sri Lanka (Meyrick, 1913), demonstrates the same generic characters as *Photodotis prochalina* Meyrick, 1911 (Meyrick, 1911; Janse, 1958, 1963), the type species of the genus *Photodotis* Meyrick. In the male genitalia, these are a peculiar shape of the uncus with an arcuately curved neck and a rounded distal lobe, the transverse position of the hook-shaped gnathos, and asymmetrical valvae with the basal processes transformed into additional branches and with small lobiform cuculli and large sacculi. In the structure of the male genitalia, *Palintropa hippica* is closely related to *Photodotis daedalea* M. Omelko et N. Omelko, 2018 from Laos (M. Omelko and N. Omelko, 2018).

The material was collected in 2018 from the Malaysian part of Borneo (Sabah state) in the Crocker Range National Park within the territory of the resort hotel Manis Manis Rooftop of Borneo Resort situated at a height of 950 m a.s.l. The moths were caught at light of mercury gas-discharge lamps on the forest areas adjacent to the hotel.

The holotypes and paratypes of the new species are deposited in the scientific collection of V.L. Komarov Gornotayozhnaya Station, a department of the Federal Science Center of Biodiversity of the Far Eastern Branch of the Russian Academy of Sciences.

PHOTODOTIS Meyrick, 1911

Photodotis Meyrick, 1911, Ann. Transv. Mus., 2 : 229. Type-species: *Photodotis prochalina* Meyrick, 1911, ibidem, by monotypy.

Palintropa Meyrick, 1913, Journ. Bombay Nat. Hist. Soc., 22 : 160 (type-species: *Palintropa hippica* Meyrick, 1913, ibidem, by original designation), **syn. n.**

Photodotus Janse, 1917, Check-list S. Afr. Lepid. Heterocera: 179, ix (index), erroneous subsequent spelling.

Photodotis crockeri

M. Omelko et N. Omelko, sp. n.

Material. Holotype, male: Borneo, Malaysia, Sabah state, Crocker Range National Park, Manis Manis Rooftop of Borneo Resort, 22.III.2018 (Omelko M). Paratypes: 5 ♂, 9 ♀, same locality, 02–22.III.2018 (Omelko M).

Description. Moth (Fig. 1, *a–c*). Length of fore wing 6.0–7.5 mm. Head beige, pale sand-colored, or pale gray, interspersed laterally with blackish fuscous scales having pale sand-colored apices. Antennal scape blackish, with wide white band before the middle and with white apex; in basal half of flagellum, segments blackish basally and pale sand-colored or beige distally; apical half of flagellum blackish, with 2 blackish segments alternating with 1 segment blackish basally and whitish distally. Basal segment of labial palp very short, fuscous; 2nd segment wide, ventrally with beard of long-stalked scales, fuscous with brownish strokes; 3rd segment, except for apical part, dorsally covered with long-stalked scales, distally smoothly widened, smoky or beige with blackish fuscous transverse bands before and behind the middle. Patagia, thorax, and tegulae uniformly pale sand-colored or beige, or with brownish or fuscous darkening. General background of fore wing beige or dark sand-colored, or with fuscous darkening. Basal part of wing with 3 small indistinct fuscous spots. Middle part of wing with large diamond-shaped fuscous or dark fuscous costal spot with blackish fuscous vague margination. Costal margin of wing fuscous or dark fuscous distally to diamond-shaped spot. Tufts of raised scales present under diamond-shaped spot, closer to posterior margin of wing and before outer band. Outer band vague, beige. Distal part of wing brownish with costal triangular brownish fuscous spot and with 2 longitudinal fuscous strokes. Apical part of wing with narrow fuscous or blackish fuscous line along costal margin. Covering scales of apical wing fringe brownish fuscous with brownish bases, underlying scales beige basally and blackish with whitish apices distally. Fringe at posterior margin of wing dark smoky or blackish fuscous. Hind wing and fringe dark smoky with brownish tint. Legs pale sand-colored on inner side, blackish fus-

cous or blackish in outer part (hind femur uniformly beige or blackish fuscous ventrally); middle tibia with pale sand-colored or sand-colored bands in basal part and before the middle; hind tibia dorsally with dense brush of hair-like pale sand-colored or beige scales; tarsal segments with pale sand-colored or beige apices.

Male genitalia (Fig. 2, *a, b*). Uncus with long arcuately curved neck and oviform distal lobe. Gnathos large, hook-shaped, in transverse position, curved from left to right. Cucullus of right valva in shape of large oblong lobe with ledge before digitate distal part; its inner surface covered with long setae adjoining wall. Sacculus of right valva pear-shaped, with distal part in shape of large curved beak-like process. Basal process of right valva arcuately curved, saber-shaped. Cucullus of left valva very narrow, lamellar. Sacculus of left valva wider than cucullus, lamellar, digitate, weakly curved arcuately, with tooth-like process in basal part. Basal process of left valva in shape of small oblong lobe with rounded apex, covered with sparse setae. Aedeagus arcuately curved, funnel-like widened basally, with small hook-shaped process before apical part appearing as oblong lobe. Vinculum with long narrow arms and small conical cranial process.

Female genitalia (Fig. 2, *c, d*). Ovipositor short. Anal papillae sclerotized, lanceolate in lateral view. Apophyses short; posterior apophyses reaching the middle of segment VIII; anterior apophyses 2/5 as long as posterior ones. Genital opening on abdominal sternite VIII situated before its middle, opens into small funnel to left of median line. Antrum long, well-developed, weakly sclerotized, wider than ostial funnel, narrowed toward long and narrow ductus of bursa copulatrix; ductus smoothly passing into oblong bursa copulatrix. Transverse circle of spiniform signa situated closer to base of bursa copulatrix.

Comparative notes. *Photodotis crockeri* is closely related to *Ph. daedalea* M. Omelko et N. Omelko described from Laos (M. Omelko and N. Omelko, 2018) and to *Ph. hippica* (Meyrick, 1913) **comb. n.** known from Sri Lanka (Meyrick, 1913). It differs from the very similar habitually moths of *Ph. daedalea* in a larger size and in a darker (dark sand-colored, frequently with a fuscous darkening) background of the fore wings. The male genitalia of the new species differ from those of *Ph. daedalea* (Fig. 2, *e, f*) and *Ph. hippica* (after Clarke, 1969) in a wide cucullus and in the shape of



Fig. 1. *Photodotis* Meyrick: (a–c) *Ph. crockeri* sp. n., (d) *Ph. decolorata* sp. n., (e) *Ph. aliena* sp. n., (f, g) *Ph. imperfect* sp. n. [(a, b, d, e, f, g) general view, (c) head and labial palp].

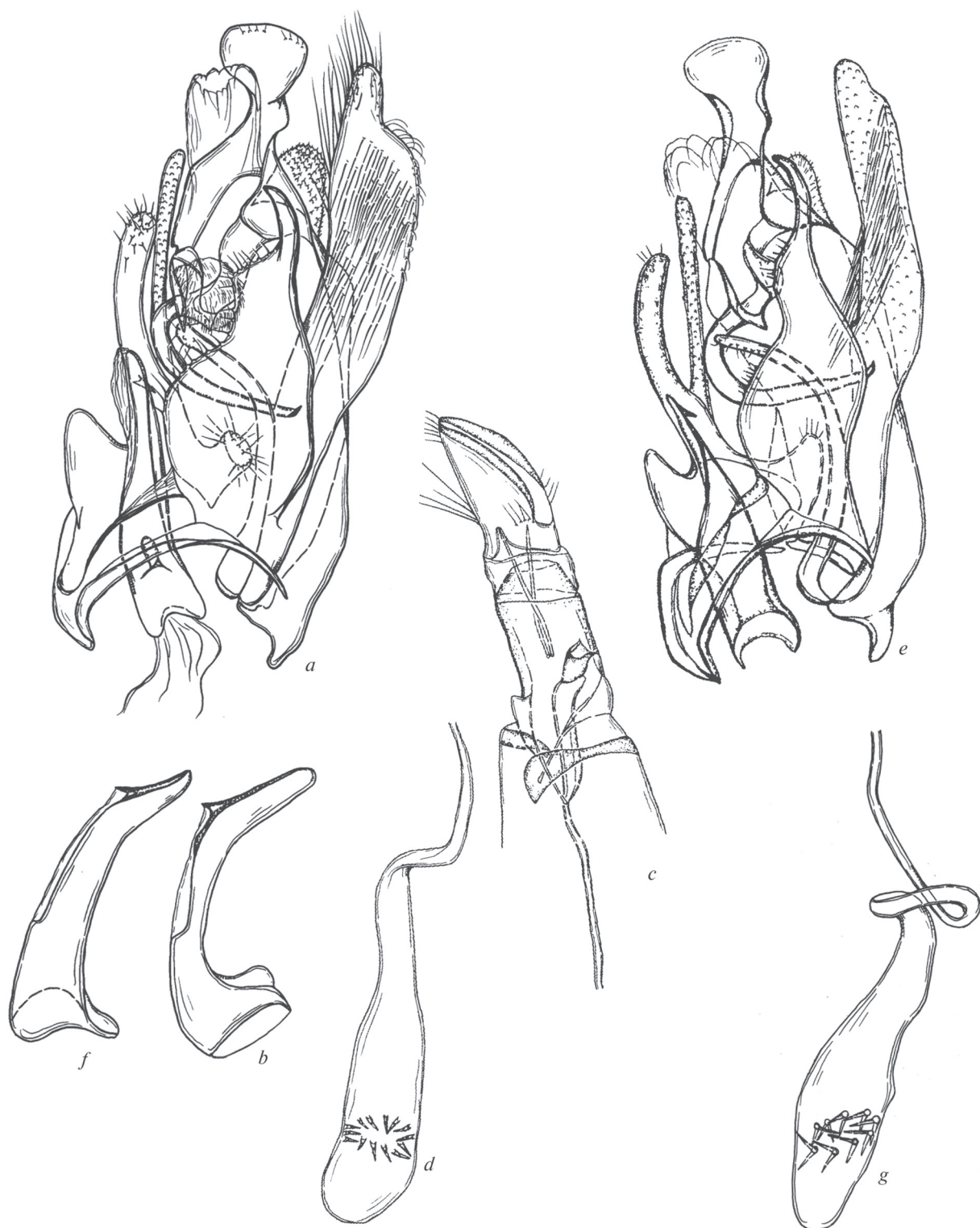


Fig. 2. *Photodotis* Meyrick, genitalia: (a–d) *Ph. crockeri* sp. n. [(a, b) male, general view and aedeagus; (c, d) female]; (e–g) *Ph. daedalea* M. Omelko et N. Omelko [(e, f) male, general view and aedeagus; (g) female, bursa copulatrix] (after M. Omelko, N. Omelko and orig.).

the distal part of the sacculus of the right valva; the shape of its aedeagus is closest to that of *Ph. hippica*. The female genitalia of the new species clearly differ from those of *Ph. daedalea* (Fig. 2, g) in non-bifurcate spiniform signa of the bursa copulatrix.

Etymology. The name of the species is derived from that of the Crocker Range National Park in the Malaysian part of Borneo.

Photodotis decolorata

M. Omelko et N. Omelko, sp. n.

Material. Holotype, male: Borneo, Malaysia, Sabah state, Crocker Range National Park, Manis Manis Rooftop of Borneo Resort, 16.III.2018 (Omelko M).

Description. Moth (Fig. 1, d). Length of fore wing 5.0 mm. Head ash-gray. Antennal scape ash-gray; basal half of antennal flagellum with alternate dark smoky and ash-gray segments; distal half with alternate ash-gray and blackish fuscous segments. 2nd and 3rd segments of labial palp dorsally with small crest of elongate scales; palps ash-gray, with brownish darkening on outer side. Thorax, tegulae, and fore wings ash-gray. Fore wing with vague brownish basal spot near costal margin and with weak brownish darkening along costal margin and on apical part; apex of wing with blackish fuscous line along margin; scales of fringe ash-gray in proximal half and blackish fuscous in distal half; fringe at posterior margin of wing smoky. Hind wing ash-gray, with smoky fringe. Legs ash-gray, with weak brownish darkening on outer side; middle tibia dorsally with crest of elongate scales; hind tibia dorsally with brush of hair-like scales.

Male genitalia (Fig. 3, a). Uncus with short wide neck non-curved arcuately; distal lobe of uncus small, oval. Gnathos small, hook-shaped, in transverse position, curved from right to left and downward. Cucullus of right valva on long stalk smoothly widened into rather small, triangular distal lobe rounded apically. Sacculus of right valva basally large, lobiform, with wide tooth-like process directed medially and backward; branch of sacculus narrow, long, arcuately curved, subulate toward apex. Basal process of right valva large, flat, oviform, covered with setae. Cucullus of left valva lamellar, oblong, with rounded apex. Sacculus of left valva basally lobiform, with large tooth-like process directed medially; branch of sacculus narrow, subulate, directed backward and obliquely downward. Basal process of

left valva large, lanceolate, covered with setae. Basal processes of sacculi lamellar, extending along branches of vinculum, fused medially under aedeagus. Aedeagus conical, with knee-shaped curvature distal to the middle. Cranial process of vinculum attenuate and pointed, curved upward and backward; branches long, narrow.

Comparative notes. *Photodotis decolorata* is similar to *Ph. reclinata* M. Omelko et N. Omelko, 2018 in the structure of the following sclerites: uncus, small gnathos curved from right to left, valvae, and aedeagus (M. Omelko and N. Omelko, 2018). The new species clearly differs from grayish fuscous moths of *Ph. reclinata* from Central Laos in the general ash-gray coloration. In the male genitalia of the new species, the basal process is oviform on the right valva and widely lanceolate on the left valva; in *Ph. reclinata*, the basal processes of the valvae are obovoid and narrowly lanceolate, respectively.

Etymology. The name of the species, the Latin word *decolorata* (losing color), was given to it because of the inconspicuous coloration of the moth.

Photodotis aliena M. Omelko et N. Omelko, sp. n.

Material. Holotype, male: Borneo, Malaysia, Sabah state, Crocker Range National Park, Manis Manis Rooftop of Borneo Resort, 22.III.2018 (Omelko M).

Description. Moth (Fig. 1, e). Length of fore wing 4.7 mm. Head and tegulae whitish. Antennal scape and basal part of flagellum smoky, then brownish and smoky segments alternating up to apical part of flagellum; in apical part, 2 blackish segments alternating with 2 or 3 smoky ones. Basal segment of labial palp short, fuscous; 2nd segment wide, dorsally covered with long-stalked scales, fuscous with white apex; 3rd segment fine, white with black apex. Thorax and patagia smoky. Fore wing smoky with weak yellowish fuscous tint, apically interspersed with brownish scales. Basal part of wing with black line along costal margin and with small black median spot. Middle part of wing with indistinct brownish spot near dorsal margin. Large triangular fuscous costal spot lying before outer band broken into 2 blackish fuscous strokes. Distal part of wing with narrow blackish fuscous line along costal and outer margins. Scales of fringe at apex and on outer margin of wing whitish in proximal half and blackish in distal half; scales of fringe at posterior margin of wing dark smoky

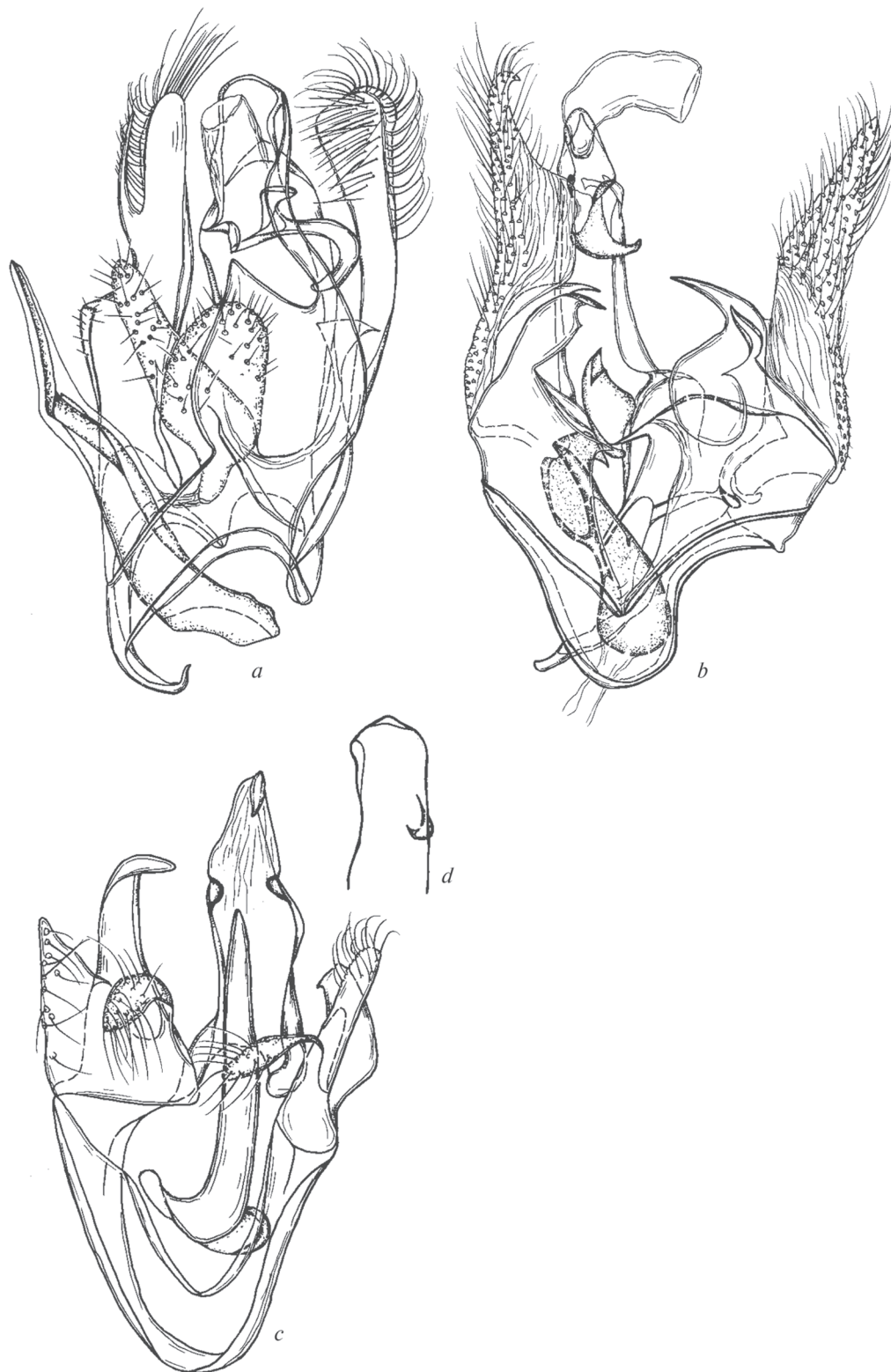


Fig. 3. *Photodotis* Meyrick, male genitalia: (a) *Ph. decolorata* sp. n., (b) *Ph. aliena* sp. n., (c, d) *Ph. imperfecta* sp. n. [(a–c) general view, (d) uncus laterally].

with whitish basal part; fringe interspersed with blackish fuscous scales. Hind wing and fringe dark sand-colored. Fore leg and middle and hind femora and tibiae sand-colored, with brownish darkening on outer side; hind tibia dorsally with brush of hair-like scales; segments of middle and hind tarsi blackish fuscous with whitish apices.

Male genitalia (Fig. 3, *b*). Uncus small, conical. Gnathos short, claw-shaped, wide basally, in transverse position, curved from left to right. Cucullus of right valva large, triangular; its conical distal part with sharp apex. Sacculus of right valva with claw-shaped sclerotized branch. Cucullus of left valva, in contrast to that of right valva, hook-like curved toward apex. Sacculus of left valva with 2 claw-shaped branches parallel one above other. Basal processes of valvae supporting aedeagus dorsally, connected medially with large reniform sclerite which may be a derivative of these processes. Basal processes of sacculi wide, conical, extending along branches of vinculum, joined medially under aedeagus. Aedeagus rather small, bottle-shaped, with flag-shaped conical process at apex. Vinculum with narrow arcuate arms and with wide saccular cranial process.

Comparative notes. The moth of *Photodotis aliena*, as well as that of *Ph. decolorata* M. Omelko et N. Omelko, sp. n. described above, is pale, with an inconspicuous pattern on the fore wing. However, the shape of its uncus, gnathos, valvae, and aedeagus in the male genitalia do not allow us to relate this species to any of the known congeners.

Etymology. The name of the species is the Latin word *aliena* (alien to, distant).

Photodotis imperfecta

M. Omelko et N. Omelko, sp. n.

Material. Holotype, male: Borneo, Malaysia, Sabah state, Crocker Range National Park, Manis Manis Rooftop of Borneo Resort, 03.III.2018 (Omelko M).

Description. Moth (Fig. 1, *f, g*). Length of fore wing 4.5 mm. Head dark smoky. Antennal scape beige, with brown spot on inner side; flagellum with alternate dark sand-colored and fuscous segments. 2nd segment of labial palp smooth, whitish, with blackish fuscous darkening intensive in distal half; apex whitish; apical segment shorter than 2nd one, whitish with black bands

before base and before apex. Thorax and patagia dark sand-colored. Fore wing dark sand-colored with brownish and blackish darkening; blackish darkening intensive along costal margin and in distal part. Middle and apical parts of wing each with 1 indistinct yellowish rufous median spot. Scales of fringe at apex of wing and on outer margin gray in proximal half and blackish in distal half; fringe on posterior margin of wing gray with rufescent tint. Hind wing dark gray, with gray fringe. Legs dark sand-colored with intensive blackish fuscous darkening; apices of middle tibia and tarsal segments of all legs sand-colored; middle and hind tibiae dorsally with brush of sparse hair-like sand-colored scales.

Male genitalia (Fig. 3, *c, d*). Uncus flattened laterally, cuneiform toward wide, slightly pointed apex. Gnathos absent. Cucullus of right valva small, pear-shaped; its distal part in shape of short lobe, with ventral hook before rounded apex. Sacculus of right valva digitate, longer than cucullus. Cucullus of left valva oblong, curved medially toward obtuse apex. Sacculus of left valva triangular. Inner side of valvae with small lanceolate sclerite similar to valvella, covered with sparse setae. These sclerites may be derivatives of basal processes of valvae. Basal processes of sacculi lamellar, fused medially under aedeagus. Aedeagus tubular, long, weakly arc-curved, elongated toward sharp apex, with 2 basal lobiform processes. Vinculum arcuate.

Comparative notes. The shape of the cuneiform uncus, the absence of the gnathos, and the valvella-like basal processes of the valvae do not allow us to relate the new species to any of the congeners.

Etymology. The name of species is the Latin word *imperfecta* (incomplete, not possessing all the components).

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COMPLIANCE WITH ETHICAL STANDARDS

The authors declare that they have no conflict of interest. All applicable international, national, and institutional guidelines for the care and use of animals were followed. All procedures performed in studies involving animals were in

accordance with the ethical standards of the institution or practice at which the studies were conducted.

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