



<http://dx.doi.org/10.11646/zootaxa.3869.2.3>

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## Japanese species of the genus *Proutia* Tutt, 1899 (Lepidoptera: Psychidae)

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### Abstract

Two new species of the genus *Proutia* are described from Japan based on both sexes. *Proutia maculatella* **sp. nov.** is distinctive in having maculated forewing upperside. *Proutia nigra*, **sp. nov.** has unicolorous blackish brown forewing upperside and similar to the European species, *P. betulina*, but differs from the latter in the longer processes of the male valvae and shorter female antennae.

**Key words:** Tineoidea, bagworm, Psychini, *Bruandia*, *Bruandella* **nom. nov.**, *nigra*, *maculatella*, new species, Japan

### Introduction

The genus *Proutia* Tutt, 1899 belongs to the tribe Psychini of the subfamily Psychinae, and includes a few species known from the Palaearctic Region (Sauter & Hättenschwiler 1991). Sobczyk (2011) enumerated the following seven species of the genus: *betulina* (Zeller, 1839), the type species of the genus, widely distributed from Europe to Turkestan; *breviserrata* Sieder, 1963 from Austria and Bulgaria; *norvegica* (Heylaerts, 1882) and *rotunda* Suomalainen, 1990 from Central to Northern Europe; *bogutica* (Solyanikov, 2000) from Kazakhstan; *nigripunctata* Dierl, 1955 from Nepal and *chinensis* Hättenschwiler et Chao, 1990 from Eastern China. The generic name *Anaprouitia* Lewin, 1949 based on *Fumea norvegica* Heylaerts, 1882 is a junior synonym of *Proutia* (**syn. nov.**), as the type species belongs to *Proutia* according to Palmqvist (2008), although Sobczyk (2011) treated it as the replacement name of *Bruandia* Tutt, 1900.

The genus *Proutia* superficially closely resembles the genera *Psyche* Schrank, 1801 and *Bruandella* **nom. nov.** (new replacement name for *Bruandia* Tutt, 1900, junior homonym of *Bruandia* Desmarest, 1857). The three genera are extremely similar to each other based on adult morphological characters of both sexes. However, *Proutia* is clearly distinguished from the two other genera based on the dorsally naked (not covered with scales) pectinations of the male flagellomeres. Moreover, *Proutia* almost always has the intercalary cell in the male forewing discoidal cell as in *Bruandella* (cell absent in *Psyche*).

There are differences among these three genera in the male genitalia. The anellus (valva penis) of the male genitalia of *Proutia* (*betulina*) and *Bruandella* (*comitella*) bears fine setulae, while in *Psyche* (*casta* and *crasiorella*) the anellus bears minute spinules (Dierl 1964; pers. obs.). The vesica of the phallus bears the cornuti consisting of a group of spinules in *Psyche*, but in the two other genera it does not bear spinules (Dierl 1964; pers. obs.). If we consider that the scaled antennal pectination, the absence of the intercalary cell, the presence of spinules on the anellus and vesica of male genitalia are apomorphic states, thence *Psyche* is most advanced genus in the Psychini, and *Proutia* is the most plesiomorphic as it has naked pectinations, the presence of the intercalary cell, finely setulose anellus, and the vesica free from spinules.

If *Proutia* is most plesiomorphic in the Psychini, this genus is probably paraphyletic. This assumption is supported by the heterogeneity of the genus, such as *P. nigripunctata* has the accessory cell in forewing discoidal cell, an unequivocally primitive character in the Psychidae but absent in other known Psychini species, *Proutia chinensis* is said to be lacking the intercalary cell, and the new species, *Proutia maculatella* described in this paper has a quite unique appearance of its wing shape and vestiture.

Although *P. maculatella* described in this paper has reticulated forewings, other members of the genus have uniformly dark wings and extremely similar to *P. betulina*. They are externally distinguished from each other by minor characters, such as the number of flagellomeres in both sexes, relative length of pectination to flagellomere, the position of the base of the epiphysis in the foretibia, apical serration of wing scales in the male, and colour of the corethrogyne in the female (Hättenschwiler & Chao 1990).

In Japan *Proutia* is well represented by several species from Hokkaido to Kyushu. Most of them except for *P. maculatella* have uniformly blackish brown wings, and barely separable from each other by wing shape, serration of scales and emergence season of adults. In this paper we describe two of them, the most distinctive *P. maculatella* having more or less semitransparent wings and maculated upperside of forewings and appearing in early spring from March to early April in lowlands of Kyushu, and one of the uniformly blackish brown species, *P. nigra* having more or less pointed forewings and appearing in late April to early May in lowlands of Kyushu.

## Material and methods

**Material.** Males: Dried wing-spread specimens were used to describe external characters. Wing venation was observed on slide-mounted wings cleared to remove scales. Approximate size of scales on parts of upperside of wings was measured from the slide mounted wings or wing-spread specimens, and consequently the numerical value is not strictly accurate. On the other hand, slide mounted scales taken mostly from the distal 2/3 of wings were accurately measured and the result are shown in the text. Photographs of wings were taken from slide mounted wings that were cut from fresh specimens. Antennae, legs and male genitalia were observed in glycerol after being treated in hot KOH solution for 10 minutes. Females: Living females and those preserved in ethanol were used for description of coloration of body and the vestiture including corethrogyne. The antennae, head and legs were observed based on KOH-treated specimens. Female pupal head exuviae were taken from the female preserved in 70–80% ethanol.

### *Proutia maculatella* Saigusa et Sugimoto, sp. nov.

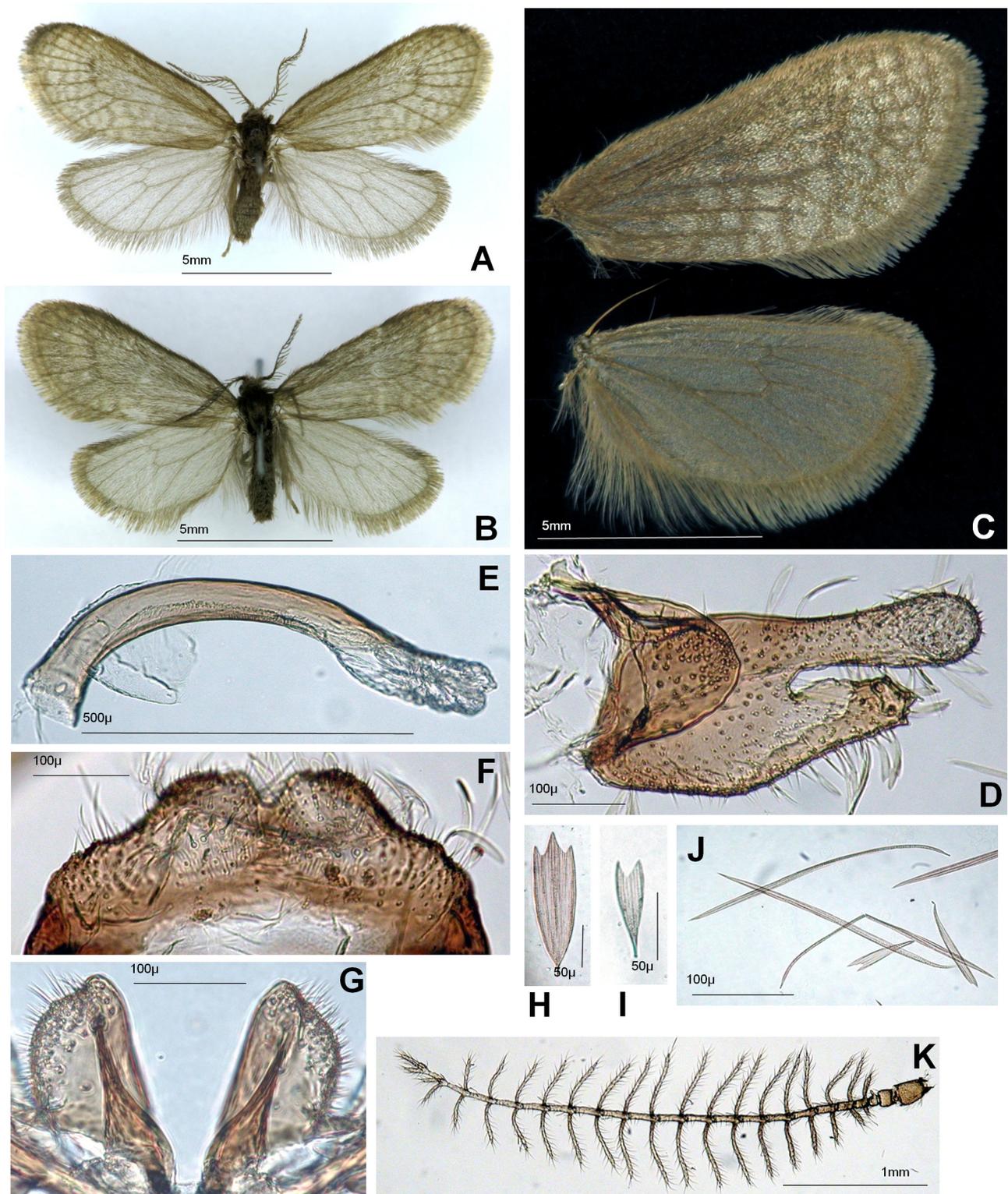
(Figs. 1, 2, 3A, 4A)

*Proutia* sp.: Saigusa, 1992: 3–169, 2 figs.

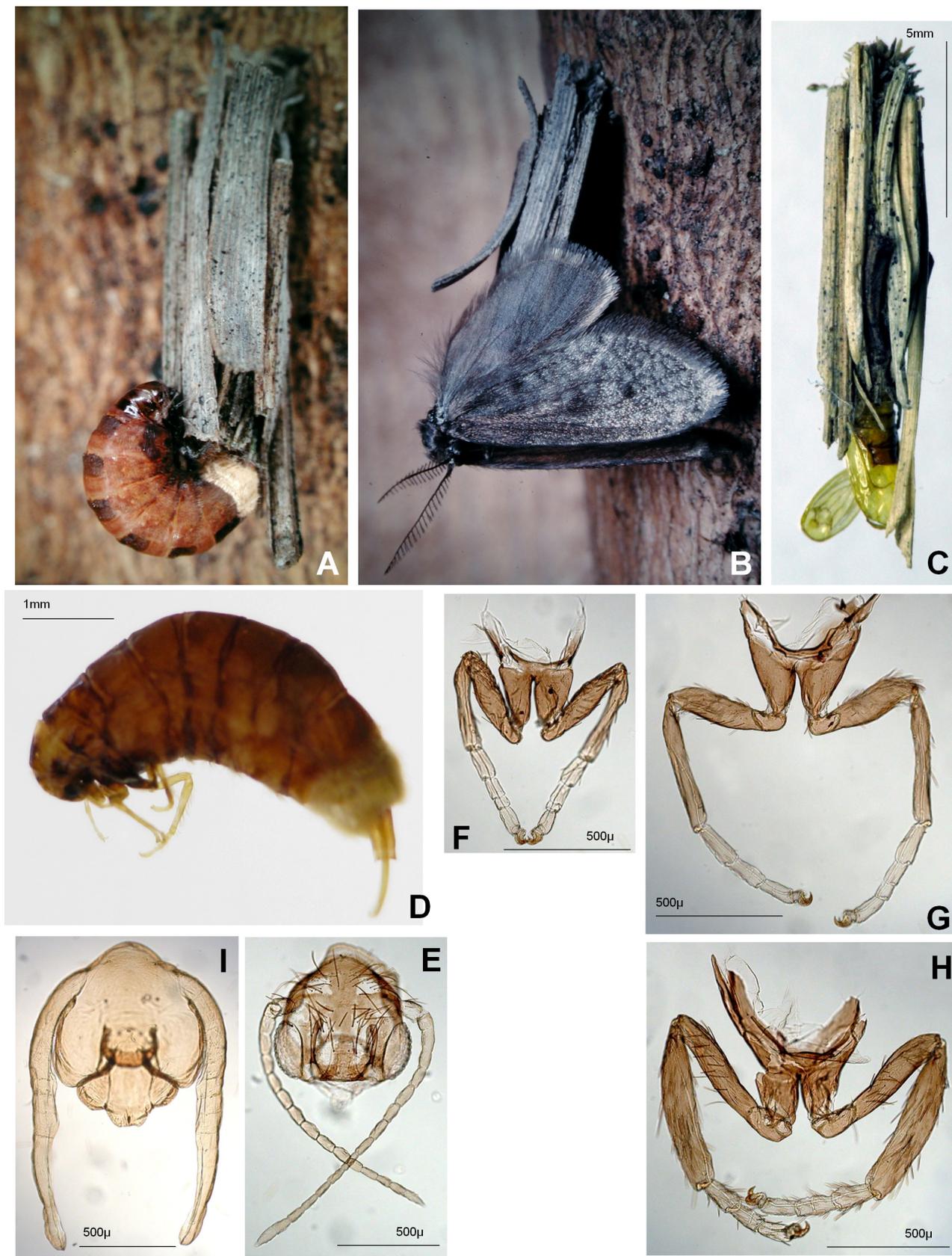
*Proutia* sp.: Saigusa and Sugimoto, 2013: 146–147, pl. 3–14, figs 1, 2.

**Diagnosis.** Male: Large for the genus *Proutia*, with more or less semi-transparent apically rounded wings, forewing upperside greyish brown with indistinct greyish yellow speckles scattering on distal 1/2, and semi-transparent pale grey hindwing covered with hair-like upper scales. Female: Antenna long, more than 1.5 times head width; abdominal membrane light reddish brown.

**Description.** **Male** (Fig.1). Wing expanse 14.8–17.2 mm. Coloration of vestiture. Head clothed with greyish brown hair-like scales. Dorsal surface of antennal shaft covered with greyish brown scales, mixed with greyish yellow ones on apical part and posterior surface of each flagellomere. Thoracic nota clothed with brown hair-like scales; abdomen clothed above with greyish brown hair-like scales, somewhat darker on anterior part. Legs covered with pale brown scales, mixed with yellowish grey ones on apical parts of tarsomeres. Forewing upperside. In well-reticulated specimens (Figs. 1A, 1C), costal area and anterior 1/2 of discoidal cell brown, remaining area pale greyish yellow and reticulated with dark brown vein stripes and narrow transverse stripes; 3–4 transverse stripes present beyond discoidal cell, and width of stripes slightly wider than dark vein stripes; reticulation indistinct on basal 1/2 of wing. In darker specimens (Fig. 1B), transverse stripes wider, as wide as or wider than yellowish speckles between stripes. Fringe uniformly brown. Hindwing upperside semitransparent brownish grey, vein lines brown; fringe brown, apical part of fringe on termen posterior to space 2 yellowish white. ?Antenna (Fig. 1K) slightly shorter than 1/2 length of forewing including fringe (0.40–0.45); flagellum bipectinated and consisting of 20–22 (M. 21.1) flagellomeres; pectination on 9th to 10th flagellomeres longest, 317–450  $\mu$  (M. 390  $\mu$ ) long, 2.1–2.8 (M. 2.42) times as long as flagellomere; pectinations gradually elongated from basal flagellomeres to flagellomere 8, almost keeping maximum length until 10th, then gradually shortened towards antennal tip. Fore tibia with epiphysis, 0.36–0.57 (M. 0.51) times as long as fore tibia, arising from 0.34–0.46 (M. 0.41) length of tibia from base.



**FIGURE 1.** *Proutia maculatella* sp. nov. A: male with well-reticulated forewings; B: male with obscurely maculated forewings; C: slide-mounted male wings; D: male genital right valva; E: male phallus; F: dorsal aspect of male genital dorsum; G: dorsal aspect of male genital anellus; H: upper scale of male forewing upperside; I: lower scale of male forewing upperside; J: upper scales (long ones) and two lower scales of male hindwing upperside; K: male left antenna, macerated.



**FIGURE 2.** *Proutia maculatella* sp. nov. A: female grasping lower end of its case in alive; B: copulation, female is concealed under male wings; C: male larval case with pupal exuviae. D: female preserved in 80% ethanol, somewhat faded in colour; E: female head, macerated; F: female forelegs, macerated; G: female midlegs, macerated; H: female hindlegs, macerated; I: head capsule of female pupa.

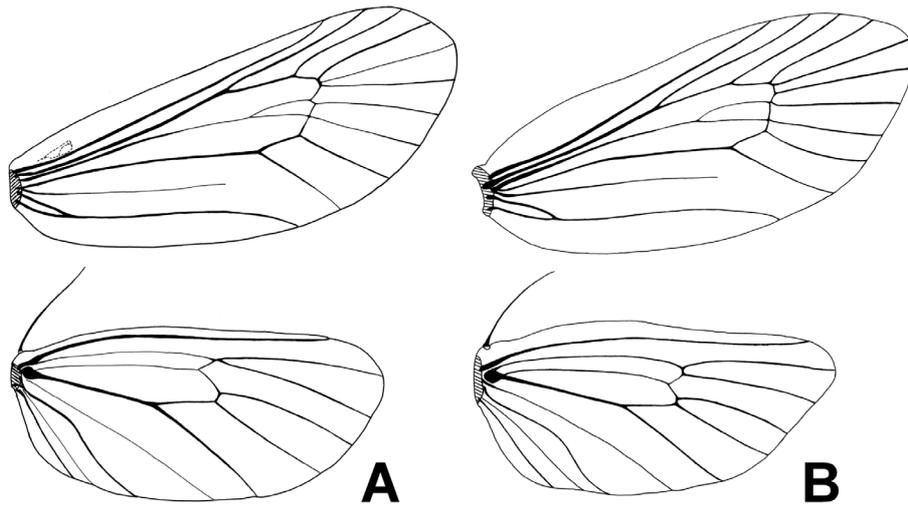


FIGURE 3. Wing venation of *Proutia* spp. males. A: *Proutia maculatella* sp. nov.; B: *Proutia nigra* sp. nov.

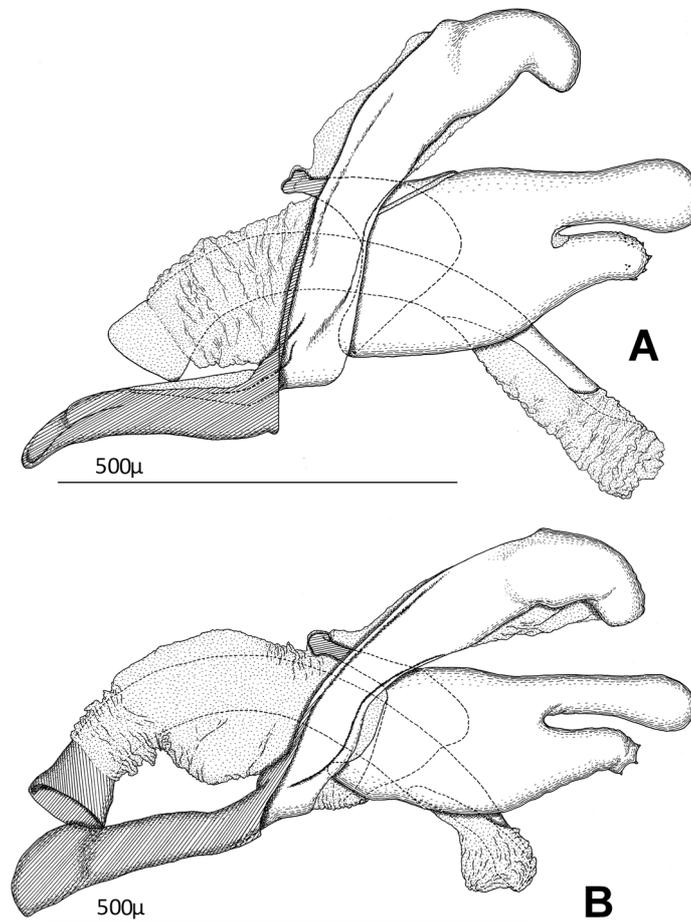


FIGURE 4. Lateral aspect of male genitalia of *Proutia* spp. A: *Proutia maculatella* sp. nov.; B: *Proutia nigra* sp. nov.

Forewing 6.6–7.6 mm (M. 7.0 mm) in length excluding fringe, 2.30–2.52 (M. 2.41) times as long as wide, with termen distinctly rounded; forewing length including fringe 7.4–8.7 mm (M. 8.31 mm); discoidal cell 0.68–0.74 (M. 0.71) times as long as forewing. Hindwing 5.2–5.9 mm (M. 5.5 mm) long excluding fringe, 2.00–2.16 (M. 2.08) times as long as wide, with termen rounded; discoidal cell 0.54–0.59 (M. 0.57) times as long as hindwing. Forewing venation (Fig. 3A): Accessory cell absent; intercalary cell present; forking point of vein M in discoidal cell at level of origin of vein CuA2 or at middle between origins of veins R1 and R2; bases of all veins from cell

separated from each other. Hindwing venation (Fig. 3A): Veins Rs and M1 usually separated, but occasionally connate or short-stalked; vein M in discoidal cell simple.

Wing vestiture. Forewing upperside covered with hair-like upper scales (Fig. 1H) (approximately 250–500  $\mu$  long, 10–20  $\mu$  wide) and apically bidentate lower scales (Fig. 1I) (approximately 40–70  $\mu$  long, 10–15  $\mu$  wide) on basal 1/3, apically bidentate upper scales (approximately 130–150  $\mu$  long, 30–40  $\mu$  wide) and bidentate lower scales (approximately 40–60  $\mu$  long, 20  $\mu$  wide) on apical 1/2 of discoidal cell, and mostly tridentate (occasionally bi- or quadridentate) upper scales (approximately 180–200  $\mu$  long, 45–50  $\mu$  wide, 15–20  $\mu$  long of dentation) and bidentate lower scales (approximately 40–50  $\mu$  long, 15–20  $\mu$  wide) on apical 1/3 of wing. Measurement of slide-mounted scales taken mainly from distal 2/3 of upperside of forewing as follows (larger upper scales and smaller lower scales were measured). Upper scales 145–180  $\mu$  long (M 150  $\mu$ ), 48–54  $\mu$  wide (M 44.5  $\mu$ ), with serrations 20–30  $\mu$  (M 24  $\mu$ ); lower scales 60–85  $\mu$  (M 66  $\mu$ ) long, 15–25  $\mu$  wide (M 19.7  $\mu$ ), with serrations 10–15  $\mu$  (M 11.8  $\mu$ ). Fringe consisting of long slender scales, scales very narrow on basal 2/3, widened subapically, and ending in pointed tip, with 2–3 small dentations on both lateral margins towards apex. Hindwing rather sparsely clothed with hair-like upper scales (approximately 220–290  $\mu$  long, 7–10  $\mu$  wide) and usually short bidentate (occasionally simple distally) lower scales (approximately 50–60  $\mu$  long, 7–10  $\mu$  wide) on almost whole surface; fringe of hindwing similar to forewing, but inner margin to basal part of outer margin almost hair-like. Hindwing with semi-transparent appearance owing to covering of hair-like upper scales.

Male genitalia (Fig. 1D–G, 4A): Similar to those of *P. betulina* except as follows: ampulla (dorsal process) of valva (Fig. 1D) longer and stouter, harpe (ventral process of valva) larger, saccus shorter, in lateral aspect dorsal part of ring (element of tegumen) (Fig. 5A) wider; (compare illustrations of *betulina* in Kozhantshikov (1956) and dissected genitalia of one *betulina* specimen from Berlin). Relative length of ampulla to dorsal margin of valva (including ampulla and excluding transtilla) 0.48–0.52; ampulla 2.4–2.6 times as long as narrowest width; distal margin of dorsum (Fig. 1F) weakly produced to pair of short, apically round projections; phallus (Fig. E) moderately curved without denticles on vesica; anellus (Fig. 1G, valvae penis) bearing only fine setulae.

**Female** (Figs. 2D–H). Coloration. Sclerites including head, thorax, legs and abdominal terga and sterna dark brown. Head (Fig. 2E) with pair of pale areas on vertex. Meso- and metanotum with dark dorsal and sublateral markings succeeding to markings of mature larvae. Membranous areas of abdomen light reddish brown owing to coloration of epidermal cells, but cuticula colorless. Abdomen sparsely clothed with light greyish brown fine hair-like scales; corethrogyne yellowish white.

Structure. Antenna (Fig. E) rather long for *Proutia*, 0.8–1.1 mm long, 1.6–2.1 times as long as head width, flagellum usually well segmented into 12–14 flagellomeres, segmentation partly more or less incomplete in some specimens. Legs (Figs. 2F–H) with tarsi divided into 3 tarsomeres in most cases, but into 4 in some legs in a few specimens.

Distance from head to apical part of 7th abdominal segment in natural posture curving ventrally: 3.5–4.3 mm.

**Type material.** **HOLOTYPE** ♂, Kashii, Fukuoka-shi, Fukuoka Pref., Kyushu, Japan, April 16–18, 1970, T. Saigusa. Donated to the Kyushu University Museum. **PARATYPES:** 17♂ (1 ♂ macerated, right wings venation on a slide), same locality as holotype, March 31 to April 5, 1958, T. Saigusa; 4♂ (2♂ macerated, right wings venation on slides), Najima, Fukuoka-shi, Fukuoka Pref., Kyushu, March 31 & April 14, 1958, T. Saigusa; 15♂4♀ (2♂ wings only; ♀ in ethanol), same locality as holotype, April 10–16, 1970, T. Saigusa; 3♂ (macerated, right wings venation on slides) 26♀ (21♀ in ethanol, 5♀ macerated), Sakato, Kasuya-machi, Fukuoka Pref., Kyushu, April 16, 2002, M. Sugimoto & T. Saigusa.

**Other material.** 2♂, Zenkôji, Kôfu-shi, Yamanashi Pref., Honshu, April 20, 1957, T. Saigusa; 6♂, same locality, April 14, 1958, T. Saigusa; 4♂, Kôfu-shi, Yamanashi Pref., Honshu, April 10, 1958, T. Saigusa; ♂, Hanabusa, Higashiyatsushiro, Yamanashi Pref., Honshu, April 10, 1958, T. Saigusa; 1♂, Chiya-Ôgi, Okayama Pref., Honshu, April 27, 1998, T. Saigusa & M. Sugimoto; 3♂, Sanshûdai, Sobosan, Miyazaki Pref., Kyushu, May 24, 2005, T. Saigusa.

**Type-locality:** Kashii, Fukuoka-shi, Fukuoka Pref., Kyushu, Japan.

**Distribution.** Honshu, Kyushu.

**Remarks.** The male of *Proutia maculatella* **sp. nov.** is easily distinguished from the known congeners by the ample maculated or reticulated forewings and semi-transparent hindwings covered with hair-like upper scales. The female of this species is distinctive in having light reddish brown abdominal membrane, and long, well segmented antennae consisting of more than 10 flagellomeres and yellowish white corethrogyne. The female of *P. chinensis* is

reddish, but it has very short 6–7 segmented antennae (Hättenschwiler et Chao 1990). The pupal antenna (Fig. 2I) is much longer than the head width.

The habitat of this species is grasslands along farm roads, railroads, forests, etc., in lowlands to mountain areas up to 1,500 m altitude (Kanayama, Masutomi, Yamanashi Pref.). Adults appear in early spring from late March to April in lowlands of Kyushu.

The larvae certainly live near the ground and seem to hibernate as the final instar. The mature larvae fix their larval cases on stones, stakes, fences and walls of sheds, tree trunks, etc. in early spring. This species is univoltine. The larval case (Fig. 2C) of mature larvae is covered with slender, longish pieces of herbaceous plants that are arranged longitudinally and some of them slightly exceeding posteriorly beyond the posterior tip of the case. In captivity larvae feed on pieces of wilted or moist dead leaves of several kinds of herbaceous plants such as *Erigeron annuus*. The female adult (Fig. 2A) protrudes most of its body from the pupal case except for the apical part of the abdomen. Head of pupal exuviae (Fig. 2I) and sometimes that of forelegs of the female are not shed, so that the female wears the pupal head cuticle as a mask. During copulation (Fig. 2B) the male tightly holds the wings ventrally covering its mate. The eggs were laid inside the pupal exuviae in the pupal case.

### ***Proutia nigra* Saigusa et Sugimoto, sp. nov.**

(Figs. 3B, 4B, 5, 6)

**Diagnosis. Male:** Median-sized species of *Proutia*, with pointed narrow wings, forewing upperside blackish brown to dark brown, without markings. **Female:** Antenna very short, nearly as long as width of head; abdominal membrane light beige in colour.

**Description.** Male (Fig. 2): Wing expanse 10.4–1.30 mm. Coloration of vestiture. Head clothed with blackish to dark brown hair-like scales, mixed with a few greyish ones in front. Dorsal surface of antennal shaft covered with dark brown scales mixing a few greyish yellow scales on posterior margin of basal 1/2 and occasionally on apex of each flagellomere. Thoracic nota and abdominal terga clothed with dark brown more or less broad hair-like scales. Legs covered with dark brown scales, mixing somewhat paler ones at tips of tarsomeres and spurs of mid and hind legs. Forewing (Fig. 5B) upperside uniformly brownish black in fresh specimens, dark to blackish brown in aged specimens. Hindwing (Fig. 5B) upperside slightly lighter than forewing. Fringe of both wings uniformly dark brown.

Antenna (Fig. 5I) slightly shorter than forewing including fringe (0.43–0.46); flagellum bipectinated and consisting of 17–19 (M. 18 n=10) flagellomeres; pectination on 7th flagellomere longest, 350–400 μ (M. 374 μ) long, and 2.0–2.75 times as long as flagellomere; pectinations abruptly becoming longer to 7th flagellomere, then strongly decreasing in length towards distal flagellomere. Fore tibia with epiphysis 0.57–0.69 (M. 0.65) times as long as fore tibia, arising from 0.29–0.45 (M. 0.36) length of tibia from base.

Forewing 4.2–5.2 mm (M. 4.9 mm) in length excluding fringe, 2.15–2.41 (M. 2.31) times as long as wide, with termen distinctly produced; forewing length including fringe 5.2–6.2 (M. 5.64) mm; discoidal cell 0.66–0.72 (M. 0.69) times as long as forewing. Hindwing 3.2–3.9 (M. 3.7) mm long excluding fringe, 1.94–2.22 (M. 2.08) times as long as wide, with termen distinctly produced and roundly pointed; discoidal cell 0/66–0.72 (M. 0.69) times as long as hindwing. Forewing venation (Fig. 3B): Accessory cell absent; intercalary cell present and long; forking point of vein M in discoidal cell usually at level between origins of veins R1 and R2; bases of all veins from cell separated from each other. Hindwing venation (Fig. 3B): Veins Rs and M1 usually separated, but rarely connate; vein M in discoidal cell simple.

Wing vestiture. Forewing upperside covered with broad upper scales 130–160 μ (M. 150 μ) long, 30–40 μ (M. 34 μ) wide, distal margin of most scales usually with 4 serrations, occasionally 3 or 5, length of dentation usually slightly longer than 10 μ; lower scales of upperside of forewing 55–85 μ (M. 68 μ) long, 14–23 μ (M. 20 μ) wide, distal margin of most of scales usually with 3 serrations 3–10 μ in length. Hindwing upperside covered with broad upper scales 110–180 μ (M. 152 μ) long, 15–25 μ (M. 20 μ) wide, distal margin of most scales usually with 2 serrations, occasionally simple, length of dentation 5–10 μ; lower scales of upperside of forewing 50–75 μ (M. 62 μ) long, 10–17 μ (M. 14 μ) wide, distal margin of most of scales with 2 serrations 3–8 μ in length.

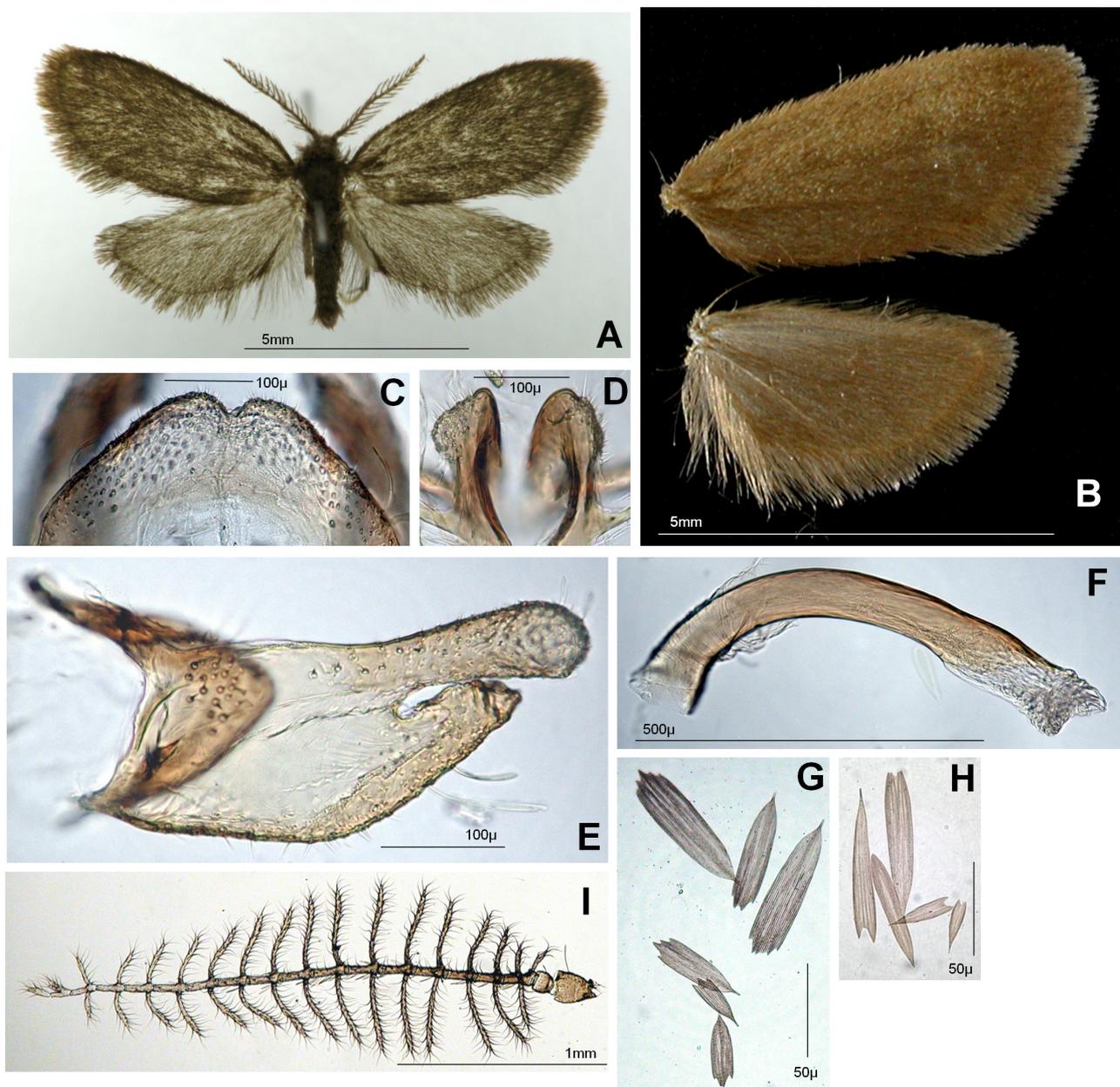
Male genitalia (Figs 5 C–F, 4B): Similar to preceding species, ampulla of valva (Fig. 5E) longer and more slender. Relative length of ampulla to dorsal margin of valva (including ampulla and excluding transtilla)

0.56–0.75; ampulla 4.2–4.3 times as long as narrowest width; distal margin of dorsum (Fig. 5C) weakly produced with shallow median notch; phallus (Fig. 5 F) rather strongly curved ventrally without denticles of vesica; anellus (Fig. 5 D) bearing only fine setulae.

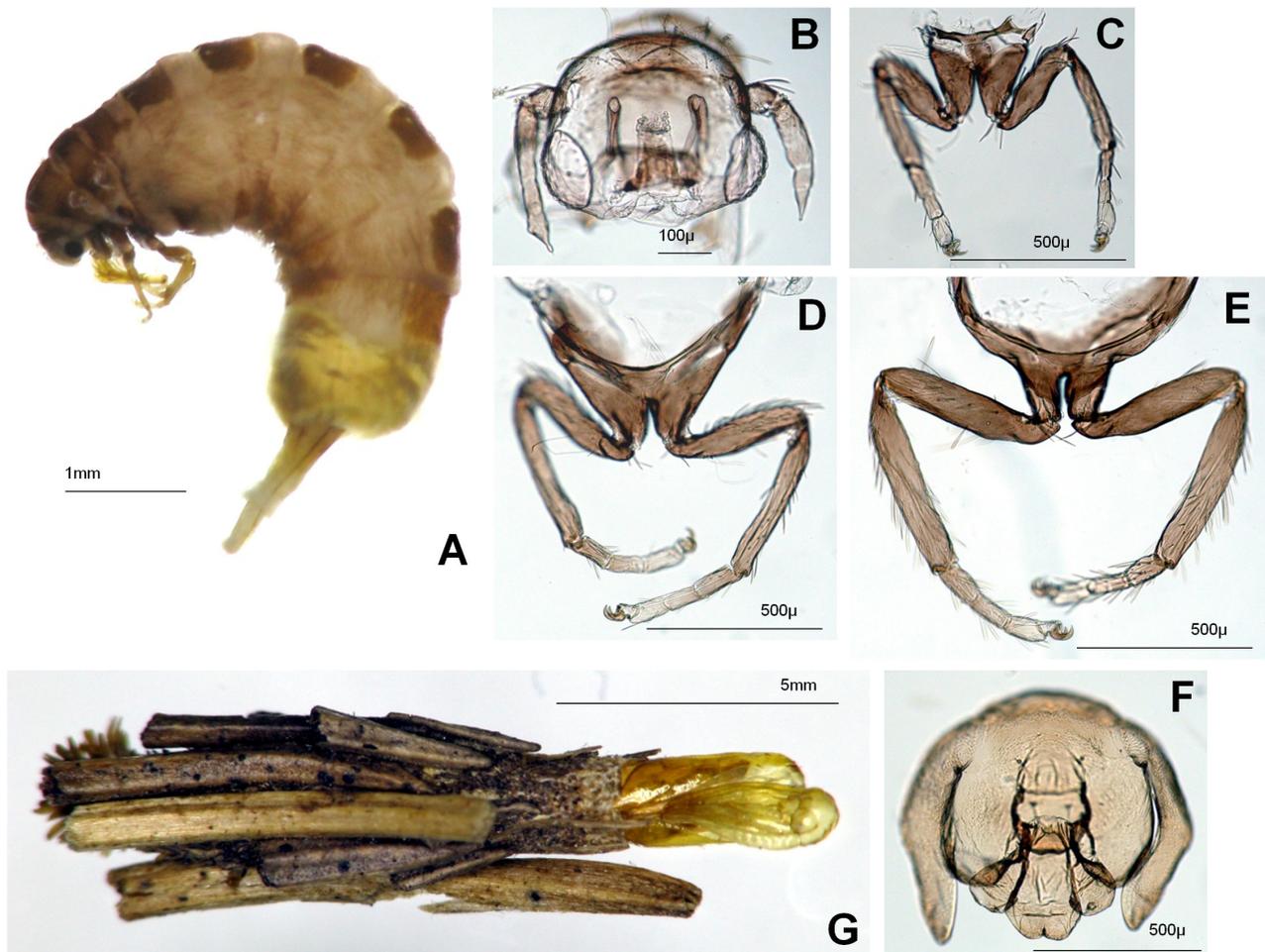
Female (Figs 6A–E). Coloration. Sclerites of head, thorax and legs light yellowish brown, abdominal terga and sterna brown, slightly lighter than *P. maculatella* sp. nov.. Meso- and metanotum with irregular darker dorsal and sublateral markings succeeding to markings of mature larvae. Membranous areas of abdomen light beige in colour, much paler than *P. maculatella* sp. nov.. Abdomen sparsely clothed with light greyish brown fine hair-like scales. Corethrogyne yellowish white.

Structure. Antenna (Fig. 6B) short, 350–580  $\mu$  long, 0.8–1.3 times as long as head width. Flagellum indistinctly divided into 4–7 flagellomeres. Legs. (Figs. 6C–E) with tarsi divided into 3 tarsomeres, occasionally mid and hind tarsi into 4 and 5 respectively; fore leg not much short as in *P. chinensis*.

Distance from head to apical part of abdominal segment 7 in natural posture curving ventrally: 3.1–4.3 mm.



**FIGURE 5.** *Proutia nigra* sp. nov. A: male; B: slide-mounted male wings; C: dorsal aspect of male genital dorsum; D: dorsal aspect of male genital anellus; E: male right genital valva; F: male phallus; G: upper (larger) and lower (smaller) scales of upperside of forewing; H: upper (larger) and lower (smaller) scales of upperside of hind wing; I: male left antenna, macerated.



**FIGURE 6.** A: *Proutia nigra* sp. nov. A: Female preserved in 80% ethanol; B: female head, macerated; C: female forelegs, macerated; D: female midlegs, macerated; E: female hindlegs, macerated; F: head capsule of female pupa; G: male larval case with pupal exuviae.

**Type material.** **HOLOTYPE** ♂ (with pupal case and exuviae), Innakiyama, Miyawaka-shi, Fukuoka Pref., Kyushu, Japan, May 12, 1969, T. Saigusa. Donated to the Kyushu University Museum. **PARATYPES** (most paratypes with pupal case and exuviae): 1♂, same locality as holotype, May 10, 1958, T. Saigusa; 3♂, same locality, May 3–8, 1961, T. Saigusa; 7♂ (1♂ macerated and right wing venation on a slide), same locality, May 9–14, 1967, T. Saigusa; 1♂, same data as holotype; 1♂ (only wings on a slide), same locality, May 19, 1970, T. Saigusa; 1♂ (macerated and right wings and left wings venation on slides), same locality, May 25, 1970, T. Saigusa; 1♂ (only wings on slide), May 14, 1971, T. Saigusa; 9♂ (1♂ macerated and right wing venation on slide, 1♂ (only wings on a slide), same locality, May 13–19, 1972, T. Saigusa; 3♂ (each macerated and right wings on a slide), same locality, May 22, 1999, T. Saigusa; 9♀ (in ethanol), same locality, May 3–22, 1999, T. Saigusa; 8♀ (in ethanol), same locality, May 5–8, 2000, T. Saigusa.

**Type locality:** Innakiyama (Inunakiyama), Miyawaka-shi, Fukuoka Pref., Kyushu, Japan.

**Distribution.** Kyushu.

**Remarks.** The male of *P. nigra* sp. nov. most resembles that of *P. betulina*, but differs from the latter in more strongly pointed wings, especially hindwings, and the wide tegumen and longer ampulla and harpe of the genitalia. The female of the new species differs from *betulina* in strongly shortened antennae and the yellowish white corethrogynae, that is snow-white (silver, silverweiss) in *betulina* (Meyrick 1927; Kozhantshikov 1956; Hättenschwiler 1985). The covering of larval case of *betulina* is different from that of the new species, and consists of short broad pieces of plant material, such as bark, pine-needles, grass and lichen (Hättenschwiler 1985; Hättenschwiler et Chao 1990). *Proutia nigra* sp. nov. also differs from *P. breviserrata*, *P. norvegica* and *P. rotunda* in its pointed wings. The valva of *P. breviserrata* is more slender than that of *nigra*. *Proutia norvegica* has light

brown wings. The larval case of *P. rotunda* is somewhat similar to *P. betulina*, and consequently quite different from that of *P. nigra* **sp. nov.** (Palmqvist 2008). The Chinese *P. chinensis* is similar to *P. nigra* **sp. nov.** in uniformly dark forewings, but the former has flagellomere pectinations much longer than *P. nigra* **sp. nov.** in proportion to flagellomeres, and has no distinctive intercalary cell in the forewing discoidal cell (Hättenschwiler et Chao 1990). The female of *P. chinensis* resembles *P. nigra* **sp. nov.** female in the abbreviated antennae, but it differs from *P. nigra* **sp. nov.** in extremely shorter forelegs in proportion to the mid and hind legs (Hättenschwiler et Chao 1990).

The habitat of this species was found in evergreen forests and Japanese cedar plantations (*Cryptomeria japonica*), but not in open grasslands, the main habitat of *P. maculatella* **sp. nov.** The type locality is in the low mountain zone about 400 m in altitude. The species was not found in lowlands in northern Kyushu. Adults appear in late April to mid May.

The mature larvae fix their pupation cases on fences, walls of deserted sheds, tree trunks, etc in forests in mid spring. This species seems to be univoltine, but this has not been confirmed by breeding. The larval case (Fig. 6G) is similar to that of *P. maculatella* **sp. nov.**, however its covering consists of needles of Japanese cedar and other material found on the forest floor, not of narrow pieces of herbaceous plants attached to cases of *P. maculatella* **sp. nov.** Head (Fig. 6F) and forelegs of pupal exuviae of females are not shed, so that females wear the pupal head cuticle as a mask and the forelegs can not grasp the posterior end of the pupation case.

## Acknowledgements

The authors express their cordial thanks to Dr. Bradley Sinclair (Canadian Food Inspection Agency) for his critical reading of the draft version of this paper, and to Dr. Donald R. Davis (United States National Museum) for his detailed peer review. We also thank Dr. Jean-François Landry (Agriculture and Agri-Food Canada) for his editing the paper.

## References

- Dierl, W. (1964) Cytologie, Morphologie und Anatomie der Sackspinner *Fumea casta* (Pallas) und *crassionella* (Bruand) sowie *Bruandia comitella* (Bruand) (Lepidoptera, Psychidae) mit Kreuzungsversuchen zur Klärung der Artspezifität. *Zoologische Jahrbucher Systematik*, 91, 201–270.
- Hättenschwiler, P. (1985) Psychidae. In: Heath, J. (Ed.), *The moths and butterflies of Great Britain and Ireland. Vol.2. Cossidae-Heliodinidae*. Harley Books, Essex, pp. 128–151.
- Hättenschwiler, P. & Chao, C.-L. (1990) A new Proutia species from China (Lepidoptera, Psychidae). *Nota Lepidopterologica*, 12, 262–268.
- Kozhantshikov, I.V. (1956) *Fauna SSSR, Hansekomye cheshuekrylye 3(2) Chekhlonosy-meshechnitsy (sem. Psychidae)*. Izdatelstvo Akademii Nauk SSSR, Moskva-Leningrad, 517 pp.
- Meyrick, E. (1927) *A Revised Handbook of British Lepidoptera*. Watkins and Doncaster, London, vi+914 pp.
- Palmqvist, G. (2008) Familj Psychidae - säckspinnare. In: Bengtsson, B.A & Palmqvist, G. (Eds.), *Nationalnyckeln till Sveriges flora och fauna, Lepidoptera: Micropterygidae-Psychidae*. ArtDatabanken Sveriges lantbruksuniversitet, pp. 492–557.
- Saigusa, T. (1992) The ultimate evolution in the Psychidae. *Dōbutsu-tachi no chikyū*, 78, 168–169. [in Japanese]
- Saigusa, T. & Sugimoto, M. (2013) Psychidae. In: Hirowatari, T. et al. (Eds.), *The Standard of Moths in Japan III*, Gakken Education Publishing, Tokyo, pp. 136–155. [pls 3–13, 3–14]
- Sauter, W. & Hättenschwiler, P. (1991) Zum System der palaearktischen Psychiden (Lep., Psychidae), 1. Teil: Listen der palaearktischen Arten. *Nota Lepidopterologica*, 14, 69–89.
- Sobczyk, T. (2011) *World Catalogue of Insects, 10. Psychidae (Lepidoptera)*. Apollo Books, Stenstrup, 457 pp.