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Lectotype Designation of *Fumea niphonica* Hori, 1926 (Lepidoptera: Psychidae)

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Abstract. The lectotype of *Fumea niphonica* Hori, 1926 is designated and this species is transferred to the genus *Bruandella*, new combination. The male is described based on the syntype series and additional specimens from the type locality.

Key words: *Anaproutia*, *Bruandella*, *Bruandia*, Japan, *Proutia*, Psychinae, syntype.

Introduction

A Japanese psychid species, *Fumea niphonica* Hori, 1926 was described by Hori (1926) based on many specimens of all developmental stages collected at the "type locality near Fukuoka" in "June, 1924". He also included larvae and larval cases collected at Gifu, Honshu in April, 1925 in the original description. The scientific name of this species was spelled as "*Eumea niphonica*, n. sp." in the text, but "*Fumea niphonica*, n. sp." was used on plate 3 in the original description. Hori (1926) compared his species with European *Fumea casta* (Pallas, 1767) (currently *Psyche casta*). Moreover, "*Eumea*" is not a valid genus name of the Psychidae. Sobczyk (2011) treats "*Eumea*" of Hori as an incorrect subsequent spelling of *Fumea* Haworth, 1812 (he erroneously cited *niphonica* as "*nipponica*", and incorrectly treats *niphonica* as a junior subjective synonym of *Psyche casta*.). Therefore, "*Eumea*" is undoubtedly a printing mistake of *Fumea* Haworth, 1812, thence the original combination of the binomen of this species is *Fumea niphonica*. In this paper, we designate the lectotype and paralectotypes of *Fumea niphonica* Hori, 1926 and provide descriptions of morphology, particularly of the genitalia of the adult male. We also include a detailed description and illustrations of the larval case, mainly based on Sugimoto (2009), what may help to identify the larvae and pupation cases collected in the field.

Type material used by Hori

Hori (1926) described and illustrated the egg, larva, pupae and adults of both sexes and larval cases based on "numerous bred examples" from the type locality near Fukuoka, Kyushu collected in June, 1924. The name of the detailed locality where Hori collected the type materials was not stated in the original description, but the late Prof. Teiso Esaki of Kyushu University, the supervisor of Hori, informed TS that the material of Hori was collected on the campus of Kyushu University in "Hakozaki-machi", that was included in Fukuoka-shi in 1940. Therefore, the type locality of *Fumea niphonica* is the Kyushu University Campus in Hakozaki, Fukuoka-shi, Kyushu. However, the main campus of Kyushu University has moved from Hakozaki to its new campus, Ito, located about 20 km west of Hakozaki. At present, the old Hakozaki campus is mostly a vacant lot, and the habitat of this psychid has completely disappeared. Hori (1926) mentioned that he examined larvae and larval cases collected at Gifu, Honshu and they were identical to those of Fukuoka. He also mentioned that "the types are in the collection of the author", but he mentioned neither number of specimens of the type series nor the holotype designation. Mr. Hiroshi Hori, the author of this species, once belonged to the Entomological

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Laboratory of Kyushu University, Fukuoka, Japan, so it is conceivable that he left at least part of the type-material of this species in the laboratory. Hiroshi Hori (1899–1974) is deceased, and we could not trace the fate of his private collection, and unfortunately is probably lost.

We examined the psychid collection of the Entomological Laboratory of Kyushu University through the courtesy of Prof. T. Hirowatari and Assoc. Prof. S. Kamitani of the laboratory in 2017. We found many male specimens of a psychid species referable to *Fumea niphonica*, but there was no indication of the scientific name of this species, but one male specimen (collected after the original publication of the species) included a label with the Japanese name of this species, "Himeminoga", in Japanese katakana-characters. We could not find any specimens of the adult female or immature stages in the drawer including the males.

A hand-written label, "Fukuoka./ 24.VI.1924. / H. Hori." is attached to each of the eight male specimens, and one specimen has a similar label except for the date, "18.VI.1924.". In addition, this box also contains nine males each having a printed label, "[Kyûshû]/ Fukuoka/ 30.V.1931/ Teiso Esaki/ Hiroshi Hori", with the last line, "Hiroshi Hori", hand-written. Another male has a similar label except the date, "21.V.1931". There are also three males in the box: two males have the hand-written label, "Fukuoka/ 13.VI. 1929/ Esaki. Hori." and the other male has the label, "Fukuoka/ 17.VI.1929/ Teiso Esaki". One of the "13.VI." specimens is accompanied with two ichneumonids, probably parasites, and the "17.VI." specimen with one ichneumonid.

The original description of *Fumea niphonica* was published in 1926, therefore the specimens collected in 1929 and 1931 are not syntypes of the species. The specimens collected in 1924 have no label indicating either the scientific name or the Japanese name of this species. We consider that the specimens with collecting data "1924" are at least part of the syntypes of this species, because they are preserved in the Kyushu University collection and their labels were hand written probably by H. Hori. Based on the above-mentioned assumption we consider that the specimens collected in 1924 are part of the syntype series. Thence, we designate here one of the specimens collected in 1924 as the lectotype of *Fumea niphonica* (Fig 1A, B), and other eight specimens as paralectotypes.

Current name of *Fumea niphonica*

As already discussed in Saigusa & Sugimoto (2013), *Fumea niphonica* (as *Bruandia niphonica*) has the forked M stem in the forewing discoidal cell (Figs 1 D, 2), so that this species is not congeneric with *Fumea casta* (Pallas) (currently *Psyche casta*) that has simple M- stem in the cell. The anellus (vallum penis) of the male genitalia of *Fumea niphonica* bears only fine setulae and is devoid of the denticles that are present in the male genitalia of the genus *Psyche* (*P. casta* and *P. crasiorella* (Bruand, 1850)). Based on these venational and male genitalic characters, *Fumea niphonica* belongs to the genus *Bruandia* Tutt, 1900 with the type species, *Psyche reticulatella* Bruand, 1853 in the tribe Psychini. Unfortunately, *Bruandia* Tutt is a junior homonym of *Bruandia* Desmarest, 1857. Sobczyk (2011) used *Anaproutia* Lewin, 1949 as a valid name of *Bruandia* Tutt, because he considered that the type species of *Anaproutia*, *Fumea norvegica* Heylaert, 1882 is conspecific with *reticulatella* Bruand, 1853. However, according to Palmqvist (2008) the Psychini species referable to *norvegica* from Norway does not have scales on the dorsal surface of the male antennal pectinations, so that *norvegica* is not conspecific with *reticulatella* but belongs to the genus *Proutia* Tutt. Under such circumstances, Saigusa & Sugimoto (2014) proposed *Bruandella* Saigusa & Sugimoto as a new replacement name for *Bruandia* Tutt, 1900. Arnscheid & Weidlich (2017) synonymized *Bruandella* with *Proutia*, but their concept of the genus *Proutia* must be rejected as they included species with scaled antennal pectinations in *Proutia*.

According to Saigusa & Sugimoto (2013), *Fumea niphonica* has scaled pectinations on the male antennae and the forked M-stem in the male forewing discoidal cell, so that the species is newly combined with the genus *Bruandella* in this paper as follows.

As stated above, there are difficult problems in the classification of the Psychini, not only in the morphological differences but also nomenclatural issues. Morphological differences among genera of Psychini are rather slight, and some venational characters show individual variation in one species. In this paper we follow current classification, but in future this tribe may

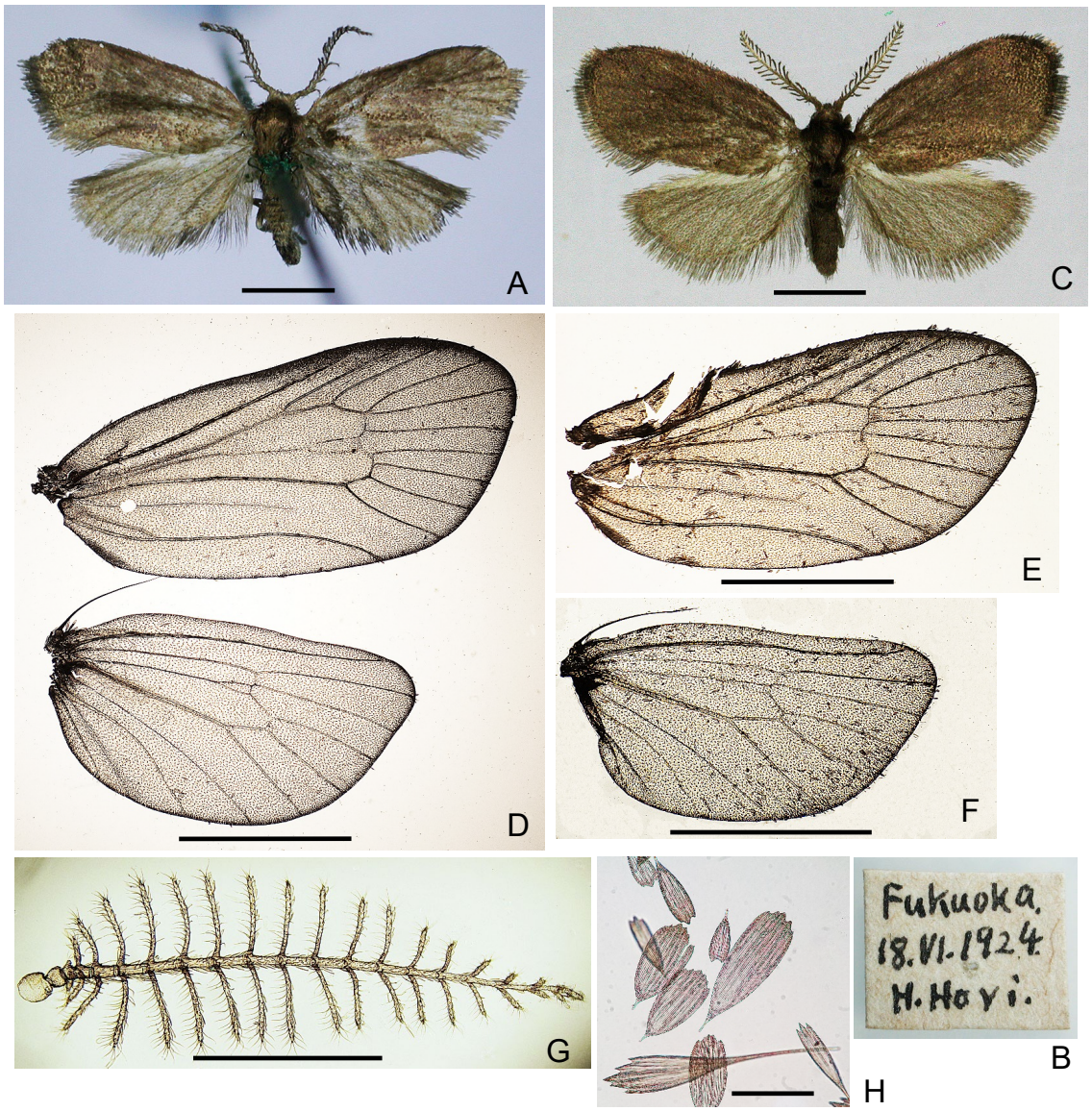

FIGURE 1. Male of *Bruandella niphonica* (Hori) from Hakozaki, Fukuoka (type locality). A, lectotype; B, ditto, original label; C, male (10.vi.1970, T. Saigusa col.); D, wing venation with bifurcate M in both wings (10.v.1931, Teiso Esaki col.); E, forewing venation with simple M-stem (10.v.1931, Teiso Esaki col.); F, hindwing venation with simple M-stem (3.iv.1970, T. Saigusa col.); G, antenna (paralectotype); H, scales of forewing upperside (same data as D). Scale bars: A, C–F = 2.0 mm; G = 1 mm; H = 100 µm.

need to be clearly divided into only two genera *Psyche*, having scaled antennal pectinations and *Proutia* with naked ones.

According to Saigusa & Sugimoto (2013), the distribution and biology of this species are as follows. This species is widely distributed in Japan (Hokkaido, Honshu, Kyushu) and Korea, and occurs in lowland to low mountain areas. It is univoltine and adults appear in late May to June (early July in Hokkaido); the larval period is from early July to early May of the following year, probably the larvae hibernate as intermediate instars. The larvae are found on tree trunks, including *Pinus thunbergi*, old wooden walls, piles and stone monuments covered with terrestrial algae, mosses and lichens. The pupation cases are fixed on pine needles and the surface of habitats at 30–40 degrees against the stratum. The larvae usually feed on algae, mosses and lichens. Saigusa (1958) reported that the larvae of this species feed on pupae and the wax covering of the scale insect, *Ericerus pela*

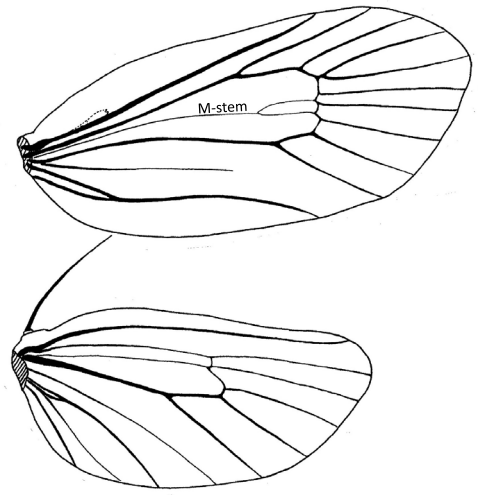

FIGURE 2. Wing venation of *Bruandella niphonica* (Hori). Male from type locality (redrawn from Saigusa & Sugimoto, 2013). Scale bar: 2 mm.

(Chavannes, 1848).

***Bruandella niphonica* (Hori, 1926), comb. nov.**

Fumea niphonica Hori, 1926. A new Psychid from Japan. *Kontyû*, 1 (1): 28-30, pl. 3 figs. 1-20 (*Eumea*). Type locality: Locality near Fukuoka, Kishiu [Kyushu] (*Eumea* is a printing mistake of *Fumea*).

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Bruandia niphonica: Sugimoto, 2009. A comparative study of larval cases of Japanese Psychidae (Lepidoptera) (1). *Kontyû* (*new series*) 12(1): 12-13. fig. 23 (larval case).

Saigusa & Sugimoto, 2013. Psychidae. In Hirowatari, T. *et al*. (eds.) *The Standard of Moths in Japan III*: 145-146, pl. 3-13, figs 29, 30.

Materials (only from type locality). Syntype series: **LECTOTYPE** ♂ (here designated) (Fig. 1A), Fukuoka. / 18.VI.1924. / H. Hori. (hand-written) (Fig. 1B); [LECTOTYPE] / *Fumea niphonica* Hori, 1926 / design. T. Saigusa / and M. Sugimoto, 2022. **PARALECTOTYPES**, 7♂♂, Fukuoka. / 18.VI.1924. / H. Hori. (hand-written); [PARALECTOTYPE] / *Fumea niphonica* Hori, 1926 / design. T. Saigusa / and M. Sugimoto, 2022. PARALECTOTYPE 1♂, Fukuoka. / 5.VI.1924. / H. Hori. (hand-written); [PARALECTOTYPE] / *Fumea niphonica* Hori, 1926 / design. T. Saigusa/and M. Sugimoto, 2022.

Other materials collected at the type locality (Fukuoka) and in 1929-1931: 9 ♂♂, [Kyûshû] / Fukuoka / 30.V.1931 / Teiso Esaki; Hiroshi Hori ["Hiroshi Hori" written in Katakana characters; 1♂ with an additional label "Himeminoga" written in Katakana characters]; 1♂, same labels except, 21.V.1931; 2♂♂, Fukuoka / 13.VI. 1929 / Esaki. Hori; 1♂, Fukuoka / 17.VI.1929 / Teiso Esaki. The above old specimens are from the collection of the Entomological Laboratory of Kyushu University.

Other materials collected at the type locality (Hakozaki, Fukuoka) in 1957-1972: 2♂♂, [Kyushu] / Hakozaki / Fukuoka / 3.vi.1957 / T. Saigusa; 1♂, same data except 4.vi.1957; 3♂, same data except 6.vi.1957; 1♂, same data except 5.vi.1957; 2♂, same data except 30.v.1960; 1♂, same data except 6.vi.1970; 3♂, same data except 9.vi.1970; 2♂, same data except 11.vi.1972. All from Saigusa's collection.

Description of male mainly based on above-mentioned specimens
(Figs 1 – 3)

Lengths. Wing expanse including fringe 9.0–13.5 mm (usually 11.5–12.0 mm).

Coloration of vestiture. Head clothed with greyish brown hair-like scales. Dorsal surface of antennal shaft covered with light greyish brown scales mixing greyish yellow scales on distal part of flagellomere; pectinations clothed with

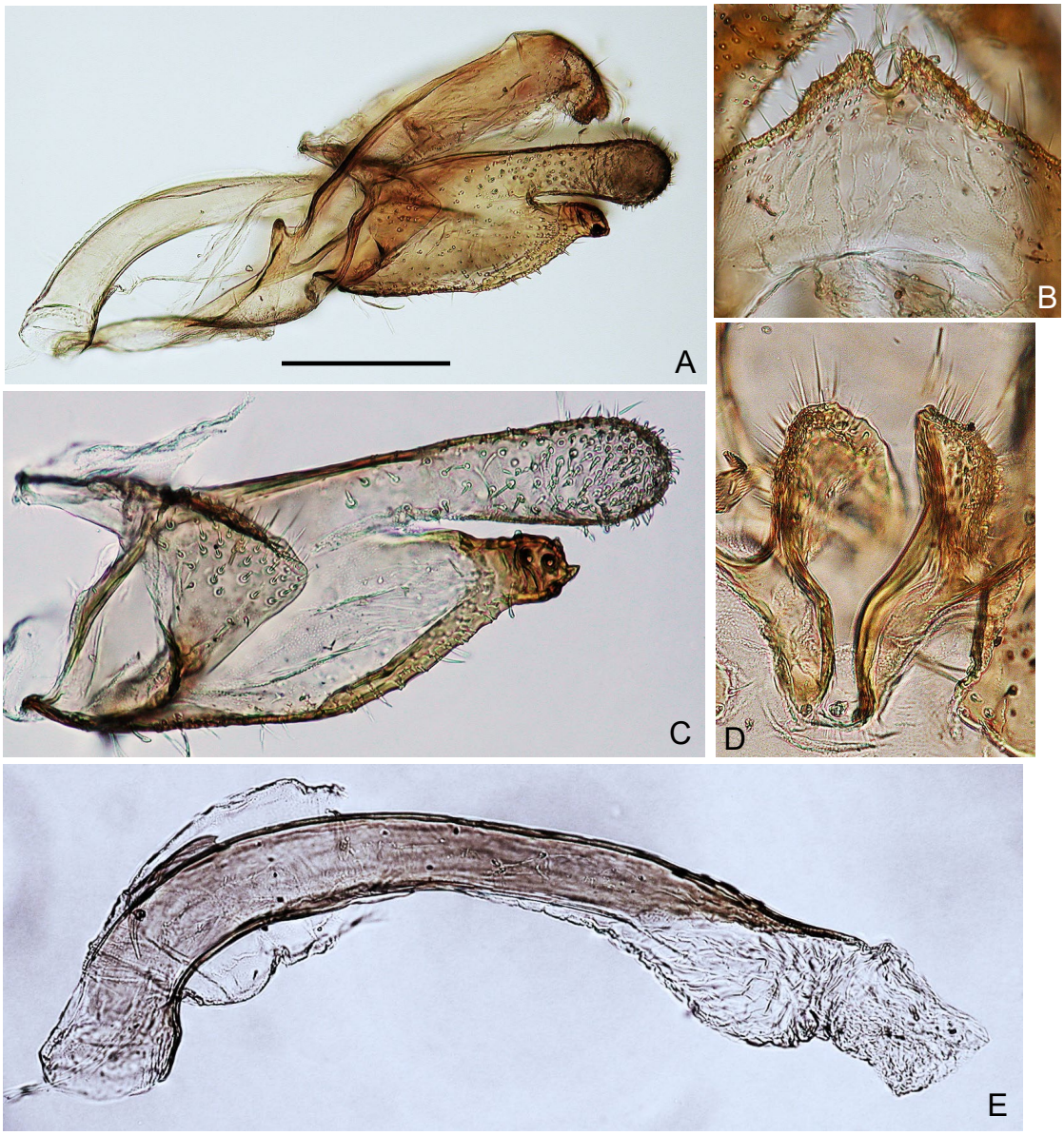

FIGURE 3. Male genitalia of *Bruandella niphonica* (Hori) (from type locality, 30.v.1931, Teiso Esaki & Hiroshi Hori col.). A, whole genitalia, lateral aspect; B, dorsum of ring, dorsal aspect; C, right valva with anellus (vallum penis), inner aspect; D, anellus, posterolateral aspect; E, phallus, lateral aspect. Scale bar: A = 200 µm.

brown scales dorsally. Thoracic nota and abdominal terga clothed with dark brown scales, somewhat paler on abdominal terga. Forewing (Fig. 1A, C) upperside including fringe uniformly blackish brown in fresh specimens, dark to greyish brown in aged specimens. Hindwing upperside including fringe slightly lighter than forewing.

Structure. Antenna (Fig. 1A, C, G) 3/5 as long as forewing excluding fringe (0.55–0.61), 0.53–0.56 x as long as forewing including fringe; flagellum bipectinate, consisting of 18–19 flagellomeres; pectinations abruptly lengthened to 5th flagellomere, keeping almost same length to 8th flagellomere, then gradually decreasing in length to distal flagellomere without pectination; pectinations on 5th–8th flagellomeres 350–400 µm long, slightly longer than 2 times length of flagellomere.

Fore tibia with epiphysis 0.65–0.78 times as long as fore tibia, arising from 0.33–0.40 length of tibia from base.

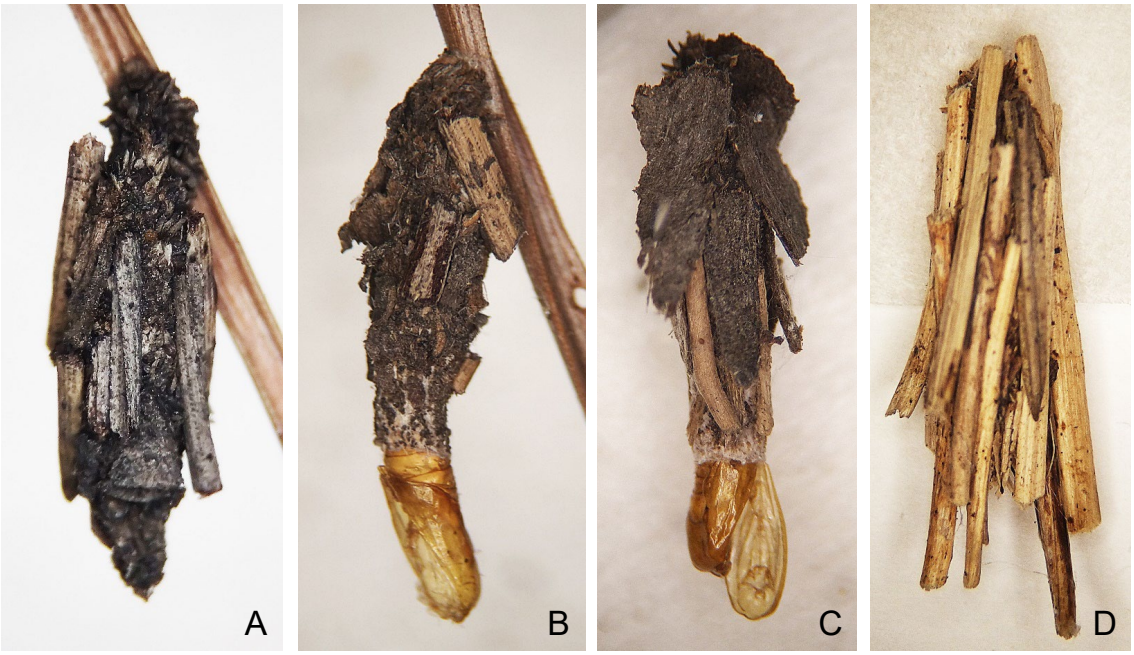

FIGURE 4. Pupation cases of Psychini. A, *Bruandella niphonica* (Hori), fixed on pine-needle; B, ditto, male case with pupal exuviae; C, ditto, from tree trunk; D, *Proutia nigra* Saigusa & Sugimoto, 2014.

Forewing moderately broad, 4.9–5.6 mm in length excluding fringe, 2.02–2.37 times as long as wide, with termen slightly rounded or almost straight, not produced at apex; forewing length including fringe 5.2–6.0 mm; discoidal cell 0.64–.76 times as long as forewing. Hindwing 3.8–5.0 mm long excluding fringe, 1.84–2.00 times as long as wide, with termen straight or only slightly rounded, with apex not or only slightly produced; hind wing length including fringe 4.4–4.9 mm; discal cell 0.55–0.63 times as long as hindwing.

Forewing venation (Figs 1D, E, 2): Intercalary cell present (occasionally absent as in Fig. 5 of Hori (1926) and Fig. 1E) and long; forking point of vein M in discoidal cell usually at level from vein R1 base to middle of origins of veins R1 and R2; anterior and posterior parts of discoidal cell almost symmetrical, latter slightly narrower; veins R3 and R4+5 connate or from a short stalk; base of other veins independently from discal cell. Hindwing venation (Figs. 1D, F, 2): Veins Rs and M1 usually widely separated, but rarely connate; discoidal cell with anterior part shorter and narrower than posterior part, half to 2/3 times as wide as posterior part; M in discoidal cell usually simple, sometimes short forked, terminating between bases of M1 and M3+4; posterior discocellular oblique.

Wing vestiture: Forewing upperside covered with upper scales mostly 100–200 µm long, 45–75 µm wide, distal margin of most scales with 3-5, usually 4 serrations, serrations short and not very sharp apically (Fig. 1H). Hindwing upperside covered with upper scales, mostly 100–160 µm long, 25–40 µm wide, distal margin of scales with 1–4, mostly 3 serrations. Fringe of wings mostly with 4 serrations.

Male genitalia (Fig. 3A–E): Valva (Fig. 3C). Ampulla long, nearly half as long as dorsal margin of valva (including ampulla and excluding transtilla), widened towards rounded apical part; apex of harpe reaching to 2/3 level of ampulla, with several stump spinules; distal margin of dorsum (Fig. 3B) weakly produced into pair of pointed short processes with shallow median notch between them; phallus (Fig. 3E) rather strongly curved ventrally without denticles on vesica; lateral part of anellus (=vallum penis. Fig. 3D) bearing only fine setulae, lacking denticles.

Larval case (Fig. 4A–D)**.** Length 5.8–7.5mm (M = 6.5 mm) in male, 6.7–8.2 mm (M = 7.7 mm) in female; diameter 2.2–3.8 mm (M = 2.7 mm) in male, 2.4–3.1 mm (M = 2.7 mm) in female.

Coloration and shape: Brown to dark brown, weakly swollen fusiform, crosssection circular. Anterior half of case stout, thence gradually narrowed to posterior opening; anterior opening somewhat oblique to longitudinal axis, with dorsal edge slightly expanded, eaves-like shaped; posterior opening truncate and circular, somewhat narrower than anterior opening, usually closed. Wall of case soft, spun with silk mixing minute substances. Surface material: Plant materials of various sizes, usually as long as case or shorter, rarely exceeding length of case. Minute pieces of pine needles and soft bark of young twigs of pine trees of various sizes in cases collected from *Pinus thunbergii* (Fig. 4A, B). Larvae living on rocks, wooden fences and tree trunks carry cases covered with fragments of flat pieces of plant material, mosses and lichens (Fig. 4C).

The cases of this species are easily distinguished from those of *Proutia* species (Fig. 4D) that are covered with longitudinally arranged fine fiber-like plant substances that are about case length.

Acknowledgments

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