A new species of *Homalernis* Meyrick, 1908 (Lepidoptera, Tortricidae, Tortricinae) represents the first record of the tribe Schoenotenini in Japan

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Abstract. *Homalernis fluctuosa* Suzuki & Jinbo, **sp. nov.**, is described and illustrated from Honshu, Shikoku, Kyushu, Tsushima Island, Amamiooshima Island, and Okinawajima Island, Japan. This is not only the first record of the genus *Homalernis* but also of the tribe Schoenotenini from warm temperate zones in the Palaearctic region. The association of males and females of the new species was confirmed based on the mitochondrial gene cytochrome oxidase submit 1 (*COI*). We discuss the taxonomic positions of two alleged *Homalernis* species from Malaysia and the taxonomic position of *Homalernis* within Schoenotenini.

Introduction

The tribe Schoenotenini (Tortricidae: Tortricinae) consists of 34 genera and 233 species from the Oriental and Australian regions (Razowski 2008; Gilligan et al. 2018; Groenen 2022). The tribe was first established by Diakonoff (1952) as the monobasic family Schoenotenidae, based on *Schoenotenes* Meyrick, 1908 (type-species: *S. synchorda* Meyrick, 1908). Subsequently, Schoenoteninae were treated as a subfamily of the Tortricidae (Common 1958) or a tribe of the Chlidanotinae (Diakonoff 1960). Common (1965) confirmed that the former is the more appropriate placement for this taxon, and currently, Schoenotenini are regarded as a tribe of Tortricinae (e. g. Horak 1998; Razowski 2008; Gilligan et al. 2018).

Morphologically, Schoenotenini are considered a monophyletic group based on the following forewing characteristics: an M-stem vein that terminates between M_1 and M_2, an almost equal arrangement of radial veins, and often with raised scales (Common 1965; Dugdale 1966; Horak 1998; Razowski 2008). In a molecular phylogenetic analysis of the Tortricidae, Schoenotenini were placed as a clade with Epitymbiini + Archipini or Phricanthini; however, neither hypothesis was well supported (Fagua et al. 2017).

Meyrick (1908) described *Homalernis semaphora* Meyrick, 1908 from Assam (India), designating it as the type species of his new genus, which he assigned to Tortricinae. A decade later, Meyrick (1918) described a second species of the genus, *H. arystis*, also from Assam (India). Diakonoff (1939) initially placed *Homalernis* in the family Eucosmidae (currently regarded as Eucosmini of Olethreutinae). Subsequently, Diakonoff (1960) included the genus in the Schoenotenini without discussion, but he mentioned that the female genitalia closely resembled those of *Metachorista*, another member of this tribe. Common (1965) included *Homalernis* in Schoenotenini, remarking that it was closely related to the *Proselena* group of genera based on similarities of the female genitalia.

Currently, there are four described species assigned to *Homalernis*: *H. arystis* Meyrick, 1918, *H. jeriau* Razowski, 2012, *H. mankoboi* Razowski, 2012, and *H. semaphora* Meyrick, 1908 (Gilligan et al. 2018). The type species of this genus, *H. semaphora*, was described allegedly based on a single male and a single female; however, Diakonoff (1939) found that the specimen reported as male was a female. Meyrick (1918) also described *H. arystis* based on a female specimen. In contrast, Razowski (2012) described both *H. jeriau* and *H. mankoboi* based on single males each and placed these two species in *Homalernis* based on similarities in appearance and wing venation. Therefore, no species in this genus has been described from both sexes, and the placement of the two species described based on only males needs confirmation.

While examining Tortricidae collected in Japan, we found many unidentified specimens of *Homalernis*. Based on morphological examination, we concluded that this was an undescribed species. In this study, we describe this species as new; it represents the first record of the tribe Schoenotenini and the genus *Homalernis* from Japan as well as from the Palaearctic region. In addition, we discuss the validity of the species assigned to the genus *Homalernis*.

Materials and methods

Sampling and dissection

We examined specimens deposited in the following institutions:

CBM Natural History Museum and Institute, Chiba. Chiba, Chiba Prefecture, Japan.
NSMT National Museum of Nature and Science. Tsukuba, Ibaraki Prefecture, Japan.
ELKU Entomological Laboratory, Kyushu University. Fukuoka, Fukuoka Prefecture, Japan.

Images of adults were obtained using a SONY α7R IV digital camera fitted with a CANON MP-E 65 mm macro lens. To examine the male and female genitalia, the abdomens of the specimens were removed and boiled in a 10% KOH solution for approximately 10 min. After washing with 70% ethanol, the genitalia were dissected in 70% ethanol, stained with Chlorazol Black E solution, and mounted in Euparal on glass slides. The specimens were dissected and examined under a Nikon SMZ1000 binocular microscope. Images of the genitalia were obtained using a CANON 90D digital camera attached to a Nikon ECLIPSE Ci stereoscopic microscope and processed using Adobe Photoshop 2023 and Illustrator 2023 software. To examine wing veins, wings were removed, descaled using tissue papers and tweezers, stained with acetocarmine solution for 24 h, and mounted in Euparal on glass slides. Wing veins were drawn with Adobe Illustrator 2023 based on the images obtained using a CANON 90D digital camera connected to a Nikon ECLIPSE Ci stereoscopic microscope.

Terminology

The terminology used is primarily that of Razowski (2008). Additional terms related to the male genitalia are shown in Fig. 2D.

DNA extraction, PCR amplification, and sequencing

Six adult specimens of *Homalernis fluctuosa* Suzuki and Jinbo, sp. nov. were selected for DNA analysis (Table 1). DNA was extracted from the abdomen of each moth using a DNeasy Blood and Tissue Kit (Qiagen, Netherlands), following the manufacturer's protocol.

To obtain partial sequences of the mitochondrial cytochrome oxidase subunit 1 (COI) gene (standard DNA barcode region), the sequences were amplified using the primers LCO1490 (GGTCAACAAAT-CATAAAGATATTGG) and HCO2198 (TAAACTTCAGGGTGACCAAAAAATCA) (Folmer et al. 1994). The PCR reaction mixture consisted of 5 μL of KOD One® PCR Master Mix -Blue- (TOYOBO, Japan), 0.3 μL (10 pmol/μL) of each of the forward and reverse primers, and 1.0 μL of template DNA, with Milli-Q water added to a final volume of 10 μL. PCR amplification was performed as follows: an initial denaturing at 98 °C for 10 s, followed by 35 cycles at 98 °C for 10 s, 50 °C for 5 s, and 68 °C for 5 s. The amplified products were purified using ExoSAP-IT™ Express (Thermo Fisher Scientific Inc., USA) and sequenced using Pre-mixed Sanger sequencing services (Azenta, USA).

Pairwise distances based on the K2P method were calculated using MEGA X software (Kumar et al. 2018) to quantify the genetic distance between males and females and intraspecific variation.

Table 1. Sample information of *Homalernis fluctuosa* used for DNA analyses.

Location	Collection date	BOLD BIN#	GenBank accession number	#bp	Sex
Hiroshima Pref., Akioota-Chou, Yokogou	12. vi. 2022	AFM6059	PP131391	658	Male
Hiroshima Pref., Akioota-Chou, Yokogou	12. vi. 2022	AFM6059	PP131390	658	Female
Fukuoka Pref., Umi-Machi, Yakikomegahara	15. v. 2022	AFM6059	PP131389	658	Female
Fukuoka Pref., Fukuoka-Shi, Sawara ku Mt. Sefurisan	14. v. 2021	AFM6059	PP131388	658	Female
Nagasaki Pref., Tsushima-Shi, Izuharamachi, Kamizaka Park	6. vi. 2021	AFM6059	PP131387	658	Female
Okinawa Pref., Higashi-Son., Takae	7. x. 2021	AFM6059	PP131386	658	Female

Results

Taxonomy

Genus *Homalernis* Meyrick, 1908

Homalernis Meyrick, 1908: 620. Type species: *Homalernis semaphora* Meyrick, 1908, by monotypy.

Diagnosis. *Homalernis* is characterised by the following features: hindwing veins R_s and M_1 widely separate, M_3 and CuA_1 short stalked at the base (Fig. 4B); male genitalia with a deeply bifid uncus and a valva with both the costa and sacculus extended into projections (Fig. 2A, C) and female genitalia with a pair of wedge-shaped signa in the corpus bursae (Fig. 3A, B).

Homalernis is similar to *Diactenis* Meyrick, 1907 in wing venation with all veins free in the forewing, the M-stem well-developed; and the hindwing with a very slender median cell (Fig. 4A). The two genera also share a bifid uncus in the male genitalia. The female genitalia of *Diactenis* are easily distinguished by the absence of a distinct signum in the corpus bursae. The female genitalia

of *Homalernis* shares with *Syncratus* Common, 1965 a twisted ductus bursae and a pair of similar signa, although the signum is a round plate with a blade-like process in *Syncratus*. *Metachorista* Meyrick, 1938 shares with *Homalernis* a valva with the costa and sacculus ending in distal projections in the male genitalia; and a similar shaped signum in the female genitalia, However, *Metachorista* has a hindwing with R_s and M_1 stalked; prominent hami in the male genitalia; and only a single signum in the female genitalia.

Redescription. Adult (Fig. 1). Head coarsely and densely covered with scales. Parietal portion to frons densely covered with thick scales. Antennae approximately 1/2 length of forewing, with short sensory setae, scape basally covered with scales covering frons. Labial palpus approximately 1.5 times length of eye diameter, second palpomere broadening towards tip, apex covered with coarse hair-like scales. Forewing costa slightly curved basally, slightly concave medially and gently curved toward apex, apex roundish pointed and projected, termen strongly oblique, lightly curved, dorsum straight, except for curved basal part; patches of raised scales tufts at end of cell. Hindwing: slender and long, rather sparsely scaled except along veins, especially on underside, approximately 3 times as long as wide; costa curved basally, slightly concave medially, and straight and slightly oblique in outer half, apex rounded, termen rather straight and oblique below apex, dorsum rounded.

Venation (Fig. 4): Forewing: discal cell approximately 3/5 length of forewing, narrow at base and widening distally, slightly curved to dorsum, all veins separate except distal half of 1A+2A, R_1 to R_4, R_5 to M_2 nearly equidistant; M_3 and CuA_1 slightly curved basally, CuA_1 from angle of cell, CuA_2 from 3/5 of cell, 1A+2A with basal fork. Hindwing: cell approximately 2/5 length of hindwing, slender and elongated, slightly broadened from base to middle, apical half tapering distally; R_s and M_1 separate and remote at base, M_1 to M_3 equidistant, M_3 and CuA_1 stalked at base, from apex of cell, CuA_2 from distal 1/8 of cell, slightly sinuate to termen.

Male genitalia (Fig. 2A–F): Uncus long and narrow, bifurcated apically and slightly fused basally. Hami absent. Socius somewhat slender and long, hairy. Gnathos sclerotised, lateral parts broad, with five raised and pointed spines with non-bifurcated apices. Valva membranous; costa strongly sclerotised, dorsoposterior projection elongated to approximately 0.5 times length of valva, with dense and strong setae; sacculus sclerotised, saccular projection elongated to approximately 0.3 times length of distal edge of valva, sparsely covered with fine hairs. Transtilla slightly thick, concave dorsomedially. Vinculum ending in sharp point. Phallus slender and tubular, cornuti several tiny thorns.

Figure 1. *Homalernis fluctuosa,* sp. nov. **A.** Holotype, male; **B.** Paratype, female (Fukuoka Prefecture, Soeda-machi, Mt Hikosan). DB – dorsal blotch; MF – median fascia, STF – subterminal fascia; SAF – subapical fascia; PAF – preapical facia. Scale bars: 5 mm.

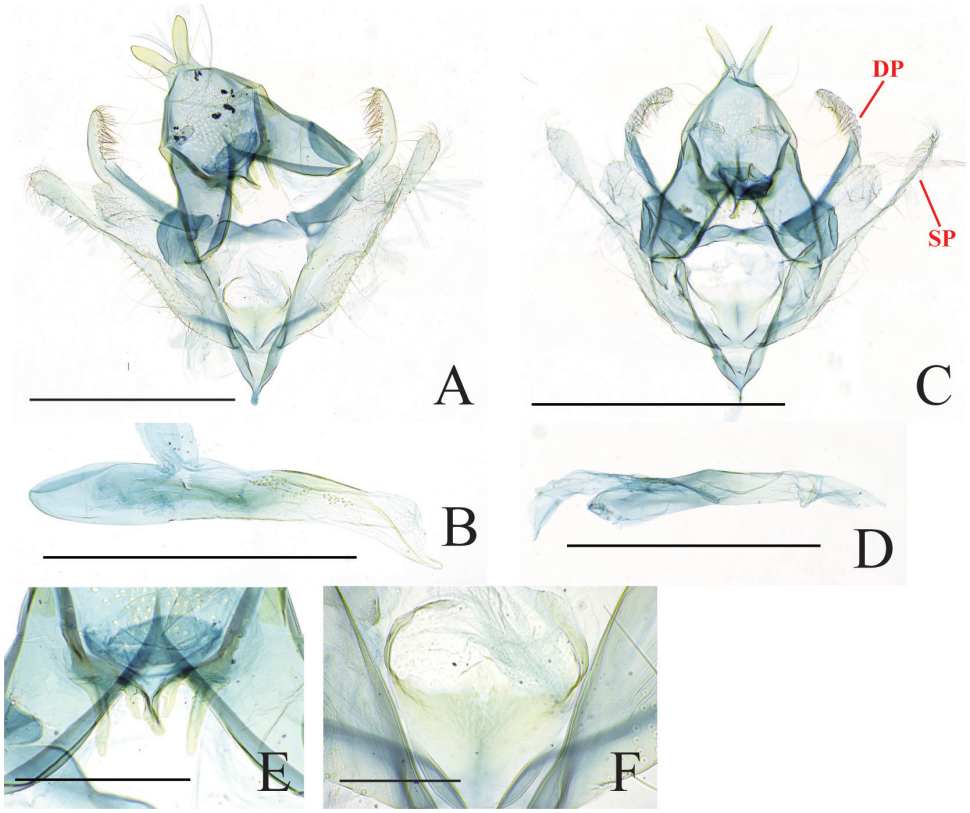

Figure 2. Male genitalia of *Homalernis fluctuosa,* sp. nov. **A.** Holotype, genitalia slide no. Shinya Suzuki 2022-80; **B.** Phallus of holotype, genitalia slide No. Shinya Suzuki 2022-80; **C.** Paratype (Chiba Prefecture, Kimitsu-shi, Okisawa, Goudai Camp), genitalia slide No. Shinya Suzuki 2022-129; **D.** Phallus of paratype (Chiba Prefecture, Kimitsu-shi, Okisawa, Goudai Camp), genitalia slide No. Shinya Suzuki 2022-129; **E.** Gnathos of holotype, genitalia slide No. Shinya Suzuki 2022-80; **F.** Juxta of holotype, genitalia slide No. Shinya Suzuki 2022-80. DP – dorsoposterior projection; SP – saccular projection. Scale bars: 0.5 mm (**A–D**); 0.1 mm (**E, F**).

Female genitalia (Fig. 3A, B): Papilla analis long and slender. Apophysis posterioris and apophysis anterioris short, approximately 1.6–1.8 times longer than Papilla analis. Ductus bursae very long and narrow, posterior 1/3 straight, anterior 2/3 twisted, with a slightly sclerotised ring near ductus seminalis. Corpus bursae ovate and large, with a pair of signa, basal round plates with a flatten blade-shaped projection inwardly.

Distribution. India, Japan (new record), ?Malaysia.

Homalernis fluctuosa Suzuki & Jinbo, sp. nov.

https://zoobank.org/F7AA82A5-F254-49A6-98F5-8CC9D37BC8D2

Japanese name: Sazanami-tatege-hamaki

Type material. ***Holotype*** Japan • ♂; Honshu, Hiroshima Pref., Akioota-chou, Yokogou; alt. 989 m; 34.5968°N, 132.1773°E; 12. vi. 2022; S. Yagi leg.; genitalia slide No. Shinya Suzuki 2022-80; ELKU.

Paratypes Japan • Honshu: 1♂4♀; Chiba Pref., Kimitsu-shi, Kiwadabata, Fudagou Camp; 10. x. 2012; O. Saito leg.; CBM • 2♀; Chiba Pref., Kimitsu-shi, Kiwadabata, Fudagou Camp; 5. vi. 2013; O. Saito leg.; CBM • 1♀; 25. ix. 2013; same locality and collector; CBM •1♂; 6. vi. 2015; same locality and collector; CBM • 1♀; Chiba Pref., Kimitsu-shi, Orikisawa, Ainosawa; 25. vi. 2014; O. Saito leg.; CBM • 1♂1♀; Chiba Pref., Kimitsu-shi, Okisawa, Goudai Camp; 2. x. 2013; O. Saito leg.; genitalia slide No. Shinya Suzuki 2022-129; CBM • 4♀; Ishikawa Pref., Shika-machi, Kyuubun; 29. v. 2016; A. Tomisawa leg.; ELKU • 1♀; Gifu Pref., Toki-shi, Izumichou, Ootomi; alt. 280 m; 6. vi. 2010; A. Miyano leg.; ELKU • 1♀; Shizuoka Pref., Nakakawane-chou, Orokubo; 17. vi. 1995; U. Jinbo leg.; NSMT • 1♂1♀; Aichi Pref., Shinshiro-shi, Tsugeno; 12. vi. 1988; T. Mano leg.; ELKU • 1♂; Aichi Pref., Shitara-chou, Kada, Hotokezaka pass; 15. vi. 1991; T. Mano leg.; ELKU • 1♂; Aichi Pref., Toyokawa-shi, Zaizenji temple; 4. vi. 1994; T. Mano leg.; ELKU • 1♀; Aichi Pref., Otowa-chou, Nagasawa; alt. 120 m; 28. v. 2001; T. Mano leg.; ELKU • 8♀; Aichi Pref., Toyota-shi, Nishihirose; 8. vi. 1996; T. Mano leg.; ELKU • 2♀; Mie Pref., Inabe-chou, Ichinohara; 1. vi. 1986; T. Mano leg.; ELKU • 1♀; Mie Pref., Seki-machi, Washiyama; 11. vi. 1991; T. Mano leg.; ELKU • 1♀; Mie Pref., Matsusaka-shi, Iitakachou, Haze; 4. vi. 2022; H. Arashima leg.; genitalia slide No. Shinya Suzuki 2022-130; ELKU • 1♀; Mie Pref., Misugi-mura, Hirakura; 8. vi. 1991; T. Mano leg.; ELKU • 2♀; Mie Pref., Ueno-shi, Otoki pass; 15. vi. 1996; T. Mano leg.; ELKU • 1♀; Mie Pref., Ueno-shi, Araki; alt. 220 m; 14. v. 1998; T. Mano leg.; ELKU • 1♀; Mie Pref., Ueno-shi, Hijiki; alt. 340 m; 23. v. 1997; T. Mano leg.; ELKU • 1♀; Mie Pref., Hokusei-machi, Obaraishiki, Oozo; alt. 560 m; 12. vi. 1997; T. Mano leg.; ELKU • 1♀; Mie Pref., Miyagawa-mura, Oodaigahara; 23. vi. 2007; T. Mano leg.; ELKU • 1♀; Tottori Pref., Tottori-shi, Oochidani Park; alt. 40 m; 35.4996°N, 134.2448°E; 7. vi. 2014; Y. Matsui leg.; ELKU • 1♀; Tottori Pref., Tottori-shi, Sourokubara; alt. 40 m; 35.4544°N, 134.1059°E; 17. v. 2020; Y. Matsui leg.; ELKU • 2♀; same label as holotype; genitalia slide No. Shinya Suzuki 2022-80; ELKU.

Shikoku: 1♀; Kohchi Pref., Ochi-chou, Mt. Yokokurayama; 31. v. 2013; Y. Manabe leg.; ELKU.

Kyushu: 1♀; Fukuoka Pref., Kitakyushu-shi, Yahata, Orio; 13. v. 1962; T. Kawamura leg.; ELKU • 1♀; Fukuoka Pref., Soeda-machi, Mt. Hikosan; 18. vi. 1962; H. Kuroko leg.; ELKU • 1♀; Fukuoka Pref., Soeda-machi, Mt. Hikosan; alt. 679 m; 33.4823°N, 130.9090°E; 29. v. 2014; S. Yagi leg., genitalia slide No. SY1595; ELKU • 1♀; same locality and collector; 5. vi. 2014; ELKU • 1♀; same locality; 20. vi. 2020; S. Tomura leg.; ELKU • 1♀; same locality and collector; 12. vi. 2021; ELKU • 1♀; same locality; 12. vi. 2021; K. Sasaki leg.; ELKU • 1♀; same locality; 19–20. v. 2023; K. Eda, K. Yazaki, T. Akiba, K. Suzuki, K. Sasaki, T. Fukuzono, I. Kawashima, J. H. Park leg.; ELKU • 1♀; Fukuoka Pref., Umi-machi, Yakikomegahara; alt. 340 m; 33.5320°N, 130.5229°E; 15. v. 2022; S. Tomura leg.; ELKU • 1♀; Fukuoka Pref., Fukuoka-shi, Sawara ku Mt. Sefurisan; alt. 980 m; 33.4341°N, 130.3665°E; 14. v. 2021; S. Tomura leg.; ELKU.

Tsushima Island: 2♀; Nagasaki Pref., Tsushima-shi, Izuharamachi, Kamizaka Park; 34.2422°N, 129.2857°E; alt. 385m; 6. vi. 2021; S. Tomura leg.; ELKU.

Yakushima Island: 3♀; Kagoshima Pref., Yakushima-shi, Nakama, Koyouji; 30.2896°N, 130. 4767°E; 20. v. 2023; F. Ishiwata leg.; ELKU.

Amamiooshima Island: 1♀; Kagoshima Pref., Sumiyou-chou, Santarou pass; 12. vii. 2010; T. Mano leg.; ELKU.

Okinawajima Island: 1♀; Okinawa Pref., Kunigami-son, Ada; alt. 295 m; 21. vi. 2022; Y. Uehara and S. Yoshioka leg.; ELKU • 1♀; Okinawa Pref., Higashi-son, Takae; alt. 237 m; 26.7016°N, 128.2424°E; 7. x. 2021; M. Kimura leg.; ELKU.

Diagnosis. *Homalernis fluctuosa*, sp. nov., is most similar to *H. arystis* in characteristics of the forewings and female genitalia. The two species can be distinguished based on the following: in *H. fluctuosa*, the apical third of the forewing has three distinct narrow fasciae, and the hindwing is approximately 3/4 the length of the forewing, whereas in *H. arystis*, the apical third of the forewings has scattered dark scales and the hindwing is approximately 2/3 the length of the forewing. In addition, the pair of signa of the female genitalia of *H. fluctuosa* is narrower and less sclerotised than those in *H. arystis*.

Description. Adult (Fig. 1). Head: Vertex and frons white. Antenna white. Length of labial palpus approximately 1.5 times eye diameter, white on outer surface, brownish ochre on inner surface.

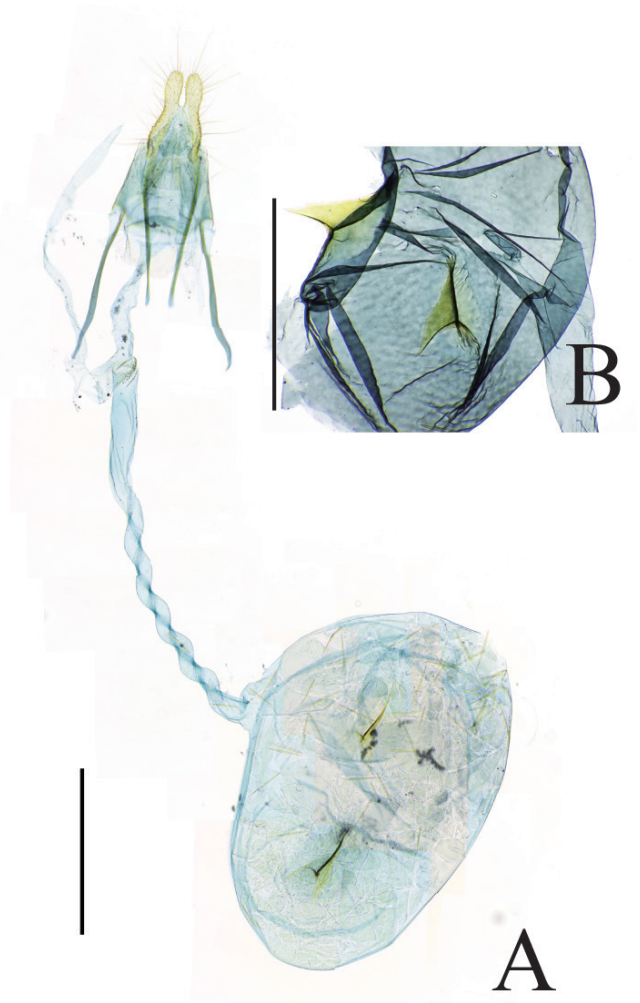

Figure 3. Female genitalia of *Homalernis fluctuosa,* sp. nov. **A.** Paratype (Mie Prefecture, Matsusaka-shi, Iitakachou, Haze), genitalia slide No. Shinya Suzuki 2022-130; **B.** Signum of paratype (Fukuoka Pref., Soeda-machi, Mt. Hikosan), genitalia slide No. SY1595. Scale bars: 0.5 mm (**A**); 0.1 mm (**B**).

Thorax: Dorsum brownish white; tegula white. Forewing length 6 mm in holotype, 4–7 mm in paratypes (n = 62). Forewing; ground colour greyish white, with scattered pale brown scales, small dark brown spots along wing margin; blackish-brown dorsal blotch (DB) at 1/3 of dorsum in females, linear in males, subtriangular with round corners in females; black spot at 1/3 from base between dorsal blotch and costa; median fascia reduced to a series of pale brown spots, mixed with black scales in costal, central and dorsal portions, extending from just beyond middle of costa to 3/5 of tornus, costal portion broad, central portion extend along outer edge of cell, all scales not raised; subterminal fascia distinct, extending from 1/4 of costa to 1/4 of dorsum, gently convex, with black scales at middle, and costal and dorsal edges; subapical fascia thin, sometimes indistinct, extending from 6/7 of costa to middle of termen, nearly straight; preapical fascia wider than subapical fascia, extending from before apex to 1/3 of termen, nearly straight, costal and dorsal edges with black scales; cilia concolorous

with ground colour, gradually becoming longer from apex to distal part of dorsum. Hindwing 4/5 length of forewing, with base to basal 2/3 slightly concave toward distal area of costa, basal 2/3 of costa to apex slightly curved, apex strongly curved and pointed, termen somewhat strongly curved, dorsum strongly curved; ground colour very pale ochre, rather sparsely scaled except along veins; cilia ochrous white, dorsal cilia becoming longer towards base of hindwing.

Venation (Fig. 4): Forewing; with basal fork of 1A+2A to middle, other veins separate, basal 2/5 of CuA_2 and basal 3/4 of CuP trace only, M stem clearly present, to between M_1 and M_2. Hindwing; M_3 and CuA_1 shortly stalked at base, 1A and 2A with basal fork to 1/4, other veins separate.

Abdomen: Pale brown.

Male genitalia (Fig. 2A–F): Uncus deeply bifurcate into two long, narrow, distally rounded lobes. Socius narrow, posterior part sparsely covered with hairs. Gnathos sclerotised, lateral part broad basally, narrowing towards median part, with five short median spines, apices of median spines pointed. Valva membranous, approximately 3/4 times width of tegumen, sparsely hairy; costa sclerotised, dorsoposterior projection approximately 0.5 times length of valva, with dense strong setae; sacculus sclerotised, saccular projection approximately 0.3 times length of valva, with sparse bristles at edges. Juxta sclerotised, median part with triangular process dorsally, a pair of narrow lobes dorsolaterally. Vinculum long, median part elongated into narrow point. Phallus slightly sclerotised and thin, distal 1/2 and coecum penis somewhat more sclerotised, cornuti tiny thorns.

Female genitalia (Fig. 3A, B): Papilla analis slender and long, inner edge sinuate. Apophysis posterioris approximately 1.2 length of apophysis anterioris. Ductus bursae approximately 2.5 times length of apophysis anterioris, anterior 2/3 twisted, with slightly sclerotized ring near ductus seminalis. Ductus seminalis from posterior 3/4 of ductus bursae. Corpus bursae large and oblong, with a pair of signa, basal round plates with a flattened trigonal cone projection inwardly, longer side acute and shorter side angular.

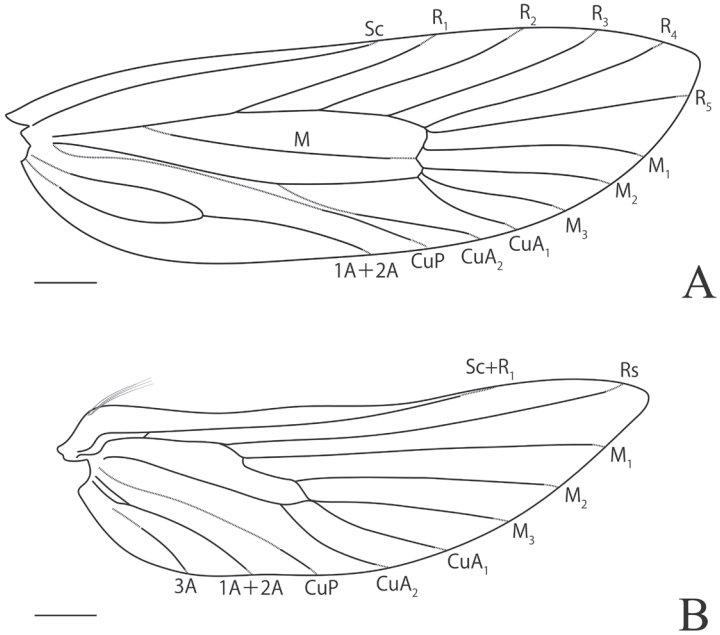

Figure 4. Venation of *Homalernis fluctuosa,* sp. nov. **A.** Forewing; **B.** Hindwing. Scale bars: 0.5 mm.

DNA sequence data. The sequences data of the six examined specimens were deposited in GenBank and BOLD. For more details, see Table 1.

Distribution. Japan (Honshu [Kanto region and southwards], Shikoku, Kyushu, Tsushima Island, Amamiooshima Island, and Okinawajima Island).

Etymology. The specific name *fluctuosa* refers to the three narrow fasciae in the apical third of the forewing that appear as ripples (Latin: *flucticulus*).

Remarks. The DNA barcodes of the individual collected from Okinawajima Island were 1.56–2.38% distant from those of individuals collected in Honshu, Kyushu, and Tsushima Island (Table 2). In addition, the forewing length of individuals collected from Okinawajima Island were slightly shorter than those of individuals collected from other regions. However, in the absence of other morphological differences, we provisionally assign the specimen to *Homalernis fluctuosa*.

Table 2. Intraspecific K2P pairwise distances between DNA barcode sequences of *Homalernis fluctuosa*. GenBank accession numbers are appended to each sample.

	PP131391	PP131390	PP131389	PP131388	PP131387
PP131391					
PP131390	0.15%				
PP131389	0.30%	0.46%			
PP131388	0.61%	0.77%	0.30%		
PP131387	0.30%	0.46%	0.61%	0.61%	
PP131386	1.72%	1.56%	2.05%	2.38%	2.05%

Discussion

Homalernis fluctuosa, sp. nov., is the first species of the genus for which both sexes are known. The other known species of this genus, *H. semaphora* and *H. arystis*, were described by Meyrick based only on females, and *H. jeriau* and *H. mankoboi* were described by Razowski based only on males. We place *H. fluctuosa*, sp. nov., in *Homalernis* based on a comparison of its external characteristics and genitalia with those of *H. semaphora*, the type-species. The association of males and females of *H. fluctuosa*, sp. nov., was confirmed by molecular data (i.e., barcodes), which showed a genetic distance of 0.15% between females and males from the same locality (Hiroshima Prefecture, Akioota-Chou) (Table 2). A comparison of the male genitalia among several related schoenotenine genera revealed the following putative synapomorphies of *Homalernis*: uncus narrow and deeply bifurcated with a short fused basal part; gnathos with five short, pointed spines; and valva membranous and short, with a dorsoposterior projection and saccular projection 0.3–0.5 times the length of the valva. External features and the male genitalia of *H. fluctuosa*, sp. nov., differ significantly from those of the two species described by Razowski (2012). Hence, the generic and tribal position of those two may need to be re-evaluated. Moreover, their narrow and densely scaled hindwings are not similar to any other schoenotenine; they lack any raised scales on the forewing; and they lack the sparse scaling on the hindwing, with scales concentrated on the wing veins. Their male genitalia have a distinctly petiolate uncus, a broad median gnathos arm, and a valva with only one long ventral spine-shaped process, somewhat reminiscent of Tortricini. Although wing venation may be critical for their correct placement, Razowski (2012) simply states ‘a somewhat simplified venation’. All known Schoenotenini have at least a trace of the forewing M-stem ending between M_1 and M_2, rather than between M_2 and M_3 as in all other tortricids that possess an M-stem present.

The discovery of both sexes of a species of *Homalernis* provides an opportunity to re-examine its relationships to allied genera. In previous studies, relationships of *Homalernis* have focused on wing venation and female genitalia (Diakonoff 1960; Common 1965). Diakonoff (1960) stated that the wing venation of *Homalernis* is similar to that of *Diactenis*, and that the female genitalia are similar to those of *Metachorista*. However, these morphological characteristics were not described in detail. From our study, the following characteristics were found to agree with Diakonoff's assessment: in the forewing of *Homalernis* and *Diactenis* the M-stem originates from the basal 1/3 of the median cell, whereas in *Metachorista* the M-stem originates from approximately the middle of the cell; the female genitalia of *Homalernis* and *Metachorista* share the round basal plate of their signa, whereas *Diactenis* lacks a signum. Common (1965) considered *Homalernis* closely related to *Syncratus*, based on the twisted ductus bursae and the signa represented by a pair of plates with a blade-like projection in the female genitalia. Common (1965) also stated that *Homalernis* and *Syncratus* differ in the length of the basal fork of 1A+2A in the forewing, and that veins R_s and M_1 of the hindwing extend nearly parallel and are widely separated at the base in *Homalernis*, whereas they are stalked in *Syncratus*.

Based on a comparison of the male genitalia of *Homalernis* and three genera previously considered closely related to this genus (i. e., *Diactenis*, *Metachorista*, and *Syncratus*), we conclude the following. All four genera share an elongated, tapering tip of the phallus; *Homalernis* shares a bifurcated uncus with *Diactenis*; and *Homalernis* shares elongated dorsoposterior and saccular projections reaching the distal edge of the valva with *Metachorista*. These morphological features suggest that *Homalernis* could be close to *Diactenis* and *Metachorista*. The very short stalked, apically bifurcate uncus and dorsoposterior and saccular projections, which are elongated far beyond the distal edge of the valva, are considered synapomorphies of *Homalernis*. A comprehensive phylogenetic analysis of Schoenotenini using DNA data is required to determine the details regarding the phylogeny and evolution of this tribe.

Schoenotenini are widely distributed from India to New Zealand (Horak 1998) and have been recorded in relatively high-altitude areas in the Northern Hemisphere. Several species (e.g. *Homalernis semaphora*, *H. arystis*, and *Diactenis bidentifera* Meyrick, 1928) were described from Assam (India), while *D. youngi* Razowski, 2000 was described from Taiwan. Komai and Nasu (2011) mentioned that at least one undescribed species is known from the Ryukyu Islands, Japan; however, its details remain unknown. *Homalernis* (excluding *H. jeriau* and *H. mankoboi*) is known only from India (Assam) and Japan, and *H. fluctuosa* is the most northerly species in the Schoenotenini. It seems likely that *Homalernis* and other schoenotenine species will be found in the northern Oriental and southern Palaearctic areas.

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