

## Chinese *Tabidia*, 1880 (Lepidoptera: Crambidae, Spilomelinae), with description of one new species

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Three species of the genus *Tabidia* Snellen are recorded from China, along with a key to their identification. Among them, *T. obvia* **sp. n.** is described as new and *T. strigiferalis* Hampson and *T. candidalis* (Warren) are redescribed, including descriptions of both male and female genitalia of *T. candidalis* for the first time. The differences between *T. obvia* **sp. n.** and *T. strigiferalis* are diagnosed. Images of adults and genitalia are provided.

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### 1. Introduction

*Tabidia* was defined by Snellen with *Tabidia insanalis* Snellen, 1880 as the type species. It consists of nine species mostly occurring in the Oriental and Australian regions. *Tabidia strigiferalis* Hampson, 1900 has been recorded from both the Palaearctic and Oriental regions. *Tabidia strigiferalis* and *T. candidalis* (Warren, 1896) have been recorded from China (Snellen 1883, Warren 1896, Hampson 1896, 1898, Caradja 1925, Caradja & Meyrick 1933, Klima 1939, Lu & Guan 1953, Park 1983, Kirpichnikova 1999, Song 2003, Bae et al. 2008).

The original descriptions of the two known species from China are incomplete. For example, in the original descriptions the antenna, labial palp, maxillary palp, patagium and tegula were not described, and the abdomen was barely described. After examining many specimens, including the type of *T. candidalis*, we redescribe

the two known species and describe one new species from China. Moreover, male and female genitalia of *T. candidalis* are described and illustrated for the first time and those of *T. strigiferalis* are described in detail in English for the first time.

### 2. Material and methods

Specimens of adults from China were collected by light trap. Methods of genitalia dissection follow Li and Zheng (1996). Digital images of adults and genitalia were captured with Olympus and Canon digital cameras. Terminology mainly follows Maes (1995) and Kristensen (2003).

The specimens examined are deposited in the Insect Collection, College of Life Sciences, Nankai University, Tianjin (NKUM), College of Plant Protection, Southwest University, Chongqing (SWUCPP), China, and the Natural History Museum, London, UK (BMNH). The holotype

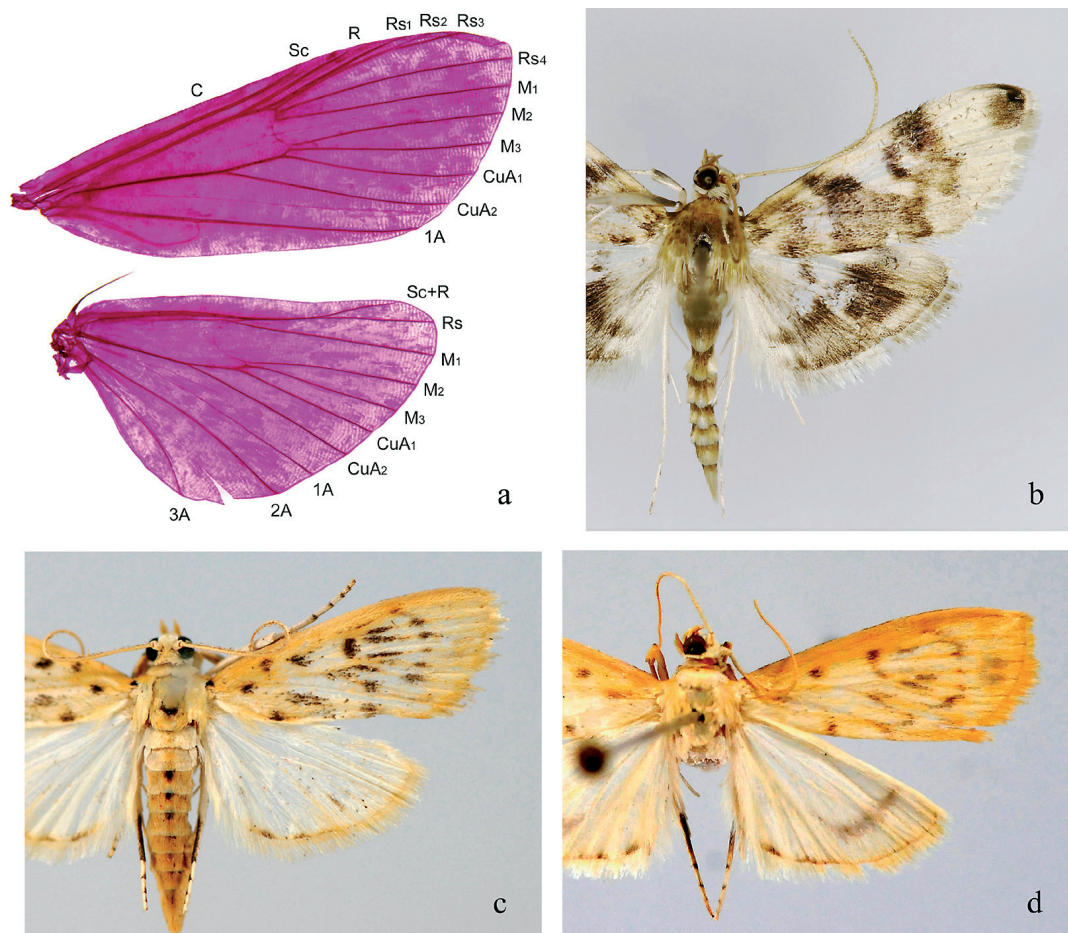


Fig. 1. Wing venation and adults of *Tabidia* spp. – a. Wing venation of *T. strigiferalis* Hampson. – b. *T. candidalis* (Warren) male. – c. *T. strigiferalis* Hampson male. – d. *T. obvia* sp. n. male.

and eight paratypes of the new species are deposited in NKUM, and other paratypes are deposited in SWUCPP, China.

### 3. Taxonomy

#### 3.1. *Tabidia* Snellen, 1880

*Tabidia* Snellen, 1880, *Tijds. Ent.* 23: 219.

Type species: *Tabidia insanalis* Snellen 1880

**Generic characters.** Frons rounded. Labial palp upturned and curved, 3<sup>rd</sup> segment long, acuminate. Maxillary palp minute, filiform. Male antenna ciliate ventrally. Forewing with CuA<sub>1</sub>, M<sub>3</sub> and M<sub>2</sub> separately from posterior angle of

discal cell, Rs<sub>4</sub> straight and well separated from Rs<sub>2+3</sub>, Rs<sub>1</sub> approximate to Rs<sub>2+3</sub>. Hindwing with CuA<sub>1</sub>, M<sub>3</sub> and M<sub>2</sub> from posterior angle of discal cell, M<sub>1</sub> and Rs from anterior angle of discal cell (Fig. 1a).

**Distribution.** China, Korea, Russia (Far East), India, Sri Lanka, Malaysia, Indonesia, Australia, New Guinea.

**Remarks.** In Hampson's (1896) generic description he states that the male forewing has a dorsally located group of recumbent large scales from the base of the median nervure. We found it occurs in *T. insanalis* Snellen, *T. aculealis* Walker and *T. craterodes* Meyrick, but in *T. candidalis* (Warren), *T. fuscifusalis* Hampson, *T. strigiferalis* Hampson, and *T. obvia* sp. n. described herein, the male forewings have no groups of large



Fig. 2. Genitalia of *Tabidia candidalis* (Warren). – a. Male, slide 23157, BMNH Pyr., London. – b. Female, slide HGQ12095.



scales. The point at which  $CuA_2$  of the forewing arises differs in the genus. It is close to the base of the discal cell in the type species, near two-thirds of the discal cell in *T. aculealis*, and near three-fourths of the distal cell in *T. strigiferalis* and *T. obvia* sp. n. (Fig. 1a).

### 3.2. *Tabidia candidalis* (Warren, 1896)

Fig. 1b, Figs. 2a–b

*Aripana* ? *candidalis* Warren, 1896, *Ann. Mag. Nat. Hist.* (ser. 6) 18: 169.

*Tabidia candidalis* Hampson, 1898, *Proc. Zool. Soc. Lond.* 1898: 624.

**Material examined.** Type. ♀, INDIA: Khasis, X.1895, leg. native collector. Other specimens: INDIA: Khasis, 1 ♂, II.1894, 1 ♂, XII.1895, 2 ♂♂, III.1897, leg. native collector. CHINA: 2 ♂♂, Tianmu Mountain (30°19'N, 119°26'E), Zhejiang Province, 400 m, 31.VII, 1.VIII.2011, leg. Xicui Du & Xiaobing Fu; 1 ♂, Tianmu Mountain (30°19'N, 119°26'E), Zhejiang Province, 1,500 m, 26.VII.2011, leg. Xicui Du & Xiaobing Fu; 29 ♂♂, 1 ♀, Jiulong Mountain (28°21'N, 118°52'E), Zhejiang Province, 4.–7.VIII.2011, leg. Xiaobing Fu; 4 ♂♂, Qing-

liangfeng (30°07'N, 118°54'E), Zhejiang Province, 300 m, 18.–20.V.2012, leg. Xiaobing Fu; 1 ♂, Nanling (24°45'N, 112°51'E), Guangdong Province, 1,070 m, 23.VIII.2010, leg. Xicui Du.

**Redescription.** Adult (Fig. 1b): Wingspan 15.0–18.0 mm. Body white. Antenna yellowish-white except scape tinged with fuscous laterally. Male antenna with ventral cilia slightly longer than the diameter of flagellomere. Labial palp white except 2<sup>nd</sup> segment tinged with fuscous distally. Maxillary palp slim, white. Patagium, tegula and thorax white, except tegula tinged with black and metathorax black dorsally. Forewing white, basal area interruptedly tinged with greyish-fuscous; antemedial line blackish, slightly excurved, its outer margin with a black blotch along upper half; discoidal stigma elongate, black; postmedial line fuscous, followed on costa by a large black blotch, acutely excurved and forming a projecting beak between  $M_2$  and  $CuA_1$ ; lower third of median area fulvous; with a round blackish apical spot; cilia white, with a blackish basal line at apex. Hindwing white, with outer third interruptedly blackish, white ground-colour forming a small sinus in middle; discoidal stigma blackish, indistinct in some specimens; cilia white, with yellowish base and darker dividing

line. Legs white, slightly dark on inner side of fore femur and on distal fore tibia. Abdomen white, four basal segments tinged with greyish-black dorsally; in the type specimen, basal two segments of dorsal abdomen tinged with a few greyish-black, 3–5 segments greyish-black, anal segment with basal half greyish-black.

Male genitalia (Fig. 2a). Uncus rod-like, slightly inflated laterally. Valva tongue-shaped, with dense fine hairs, terminally with thicker hairs. Costa broad, gradually narrowed towards apex. Saccus distinctly narrower than costa. Saccus oval, contracted posteriorly, with a small projection on anterior margin. Juxta oval. Phallus cylindrical.

Female genitalia (Fig. 2b). Apophysis anterioris about 1.5 times length of apophysis posterioris, expanded and acutely projected at about basal 1/3. Ductus bursae long and thin. Corpus bursae small, oval.

*Distribution.* China (Zhejiang, Guangdong), India.

*Biology.* Life history and juvenile stages unknown.

*Remarks.* Warren (1896) described this species from Khasis in India based on one female specimen. It has been listed in some works (Hampson 1898, Caradja 1925, Caradja & Meyrick 1933, Klima 1939, Lu & Guan 1953), but has not been further morphologically studied since Warren's treatment. It was recorded from Guangdong in China by Caradja (1925) and Caradja & Meyrick (1933), with no further information. The first author examined the type specimen in BMNH, and collected additional specimens from Zhejiang and Guangdong provinces in China.

### 3.3. *Tabidia strigiferalis* Hampson, 1900

Fig. 1c, Figs. 3a–b

*Tabidia strigiferalis* Hampson, 1900, *Tr. Ent. Soc. Lond.* 48: 386, pl. III, f. 30.

*Material examined.* CHINA: 2 ♀♀, Faku (42°30'N, 123°24'E), Liaoning Province, 27.–28.VII.2006, leg. Yiping Wang; 3 ♂♂, 3 ♀♀, Faku (42°30'N, 123°24'E), Liaoning Province, 3.VIII.2006, leg. Yiping Wang; 4 ♂♂, 3 ♀♀, Ji Xian (40°02'N, 117°24'E), Tianjin, 550 m,

24.VI.2001, leg. Houhun Li *et al.*; 1 ♂, 2 ♀♀, Ji Xian (40°02'N, 117°24'E), Tianjin, 180 m, 10.VI.2004, leg. Houhun Li *et al.*; 1 ♂, Luannan County (39°30'N, 118°40'E), Hebei Province, 29 m, 5.VII.2001, leg. Yanli Du & Shulian Hao; 2 ♂♂, Zunhua (40°11'N, 117°57'E), Hebei Province, 120 m, 6.VII.2001, leg. Yanli Du & Shulian Hao; 1 ♂, Zunhua (40°11'N, 117°57'E), Hebei Province, 10.VII.2001, leg. Yanli Du & Shulian Hao; 2 ♂♂, She Xian (36°34'N, 113°40'E), Hebei Province, 700 m, 1.VIII.2000, leg. Haili Yu; 10 ♂♂, 5 ♀♀, Northwest Forestry University, (34°16'N, 108°04'E), Shaanxi Province, 3.V.–1.VI.1985, leg. Houhun Li; 1 ♀, Northwest Forestry University, (34°16'N, 108°04'E), Shaanxi Province, 27.V.1996, leg. unknown; 2 ♀♀, Northwest Agriculture University (34°16'N, 108°04'E), Shaanxi Province, 2.VI.1992, leg. unknown; 3 ♀♀, Yangling (34°16'N, 108°04'E), Shaanxi Province, 6.–31.V.1993, leg. Houhun Li; 1 ♀, Yangling (34°16'N, 108°04'E), Shaanxi Province, 450 m, 20.VI.1994, leg. Houhun Li; 4 ♀♀, Yangling (34°16'N, 108°04'E), Shaanxi Province, 450 m, 4.–14.V.1995, leg. Aisahaer; 2 ♂♂, 1 ♀, Yangling (34°16'N, 108°04'E), Shaanxi Province, 450 m, 16.–21.V.1995, leg. Duokenli; 1 ♀, ningshan, Shaanxi Province, 1,360 m, 1.VII.2007, leg. Haili Yu; 1 ♂, Wen County (32°58'N, 104°41'E), Gansu Province, 718 m, 18.VII.2005, leg. Haili Yu; 2 ♂♂, Wen County (32°58'N, 104°41'E), Gansu Province, 860 m, 9.–14.VII.2005, leg. Haili Yu; 1 ♂, 2 ♀♀, Tianshui (34°37'N, 105°42'E), Gansu Province, 1,331 m, 30.VII.2006, leg. Xinqu Wang & Xiangfeng Shi; 3 ♂♂, Tongbai County (32°21'N, 113°24'E), Henan Province, 300 m, 16.VII.2001, leg. Dandan Zhang; 1 ♀, Dengfeng (34°31'N, 113°0'E), Henan Province, 700 m, 15.VII.2002, leg. Xinqu Wang; 1 ♂, Neixiang County (33°02'N, 111°50'E), Henan Province, 1,200 m, 23.V.2006, leg. Xu Zhang & Jinmei Li; 1 ♂, Linzhou (36°04'N, 113°48'E), Henan Province, 550 m, 21.VII.2006, leg. Hui Zhen & Denghui Kuang; 1 ♂, Lushi County (34°03'N, 111°02'E), Henan Province, 1,100 m, 8.VIII.2006, leg. Hui Zhen & Denghui Kuang; 21 ♂♂, 4 ♀♀, Sixian (33°29'N, 117°54'E), Anhui Province, 15.VIII.1999, leg. Jialiang Zhang; 6 ♂♂, Huangshan (30°05'N, 118°10'E), Anhui Province, 6–7.VIII.2004, leg. Jiasheng Xu &



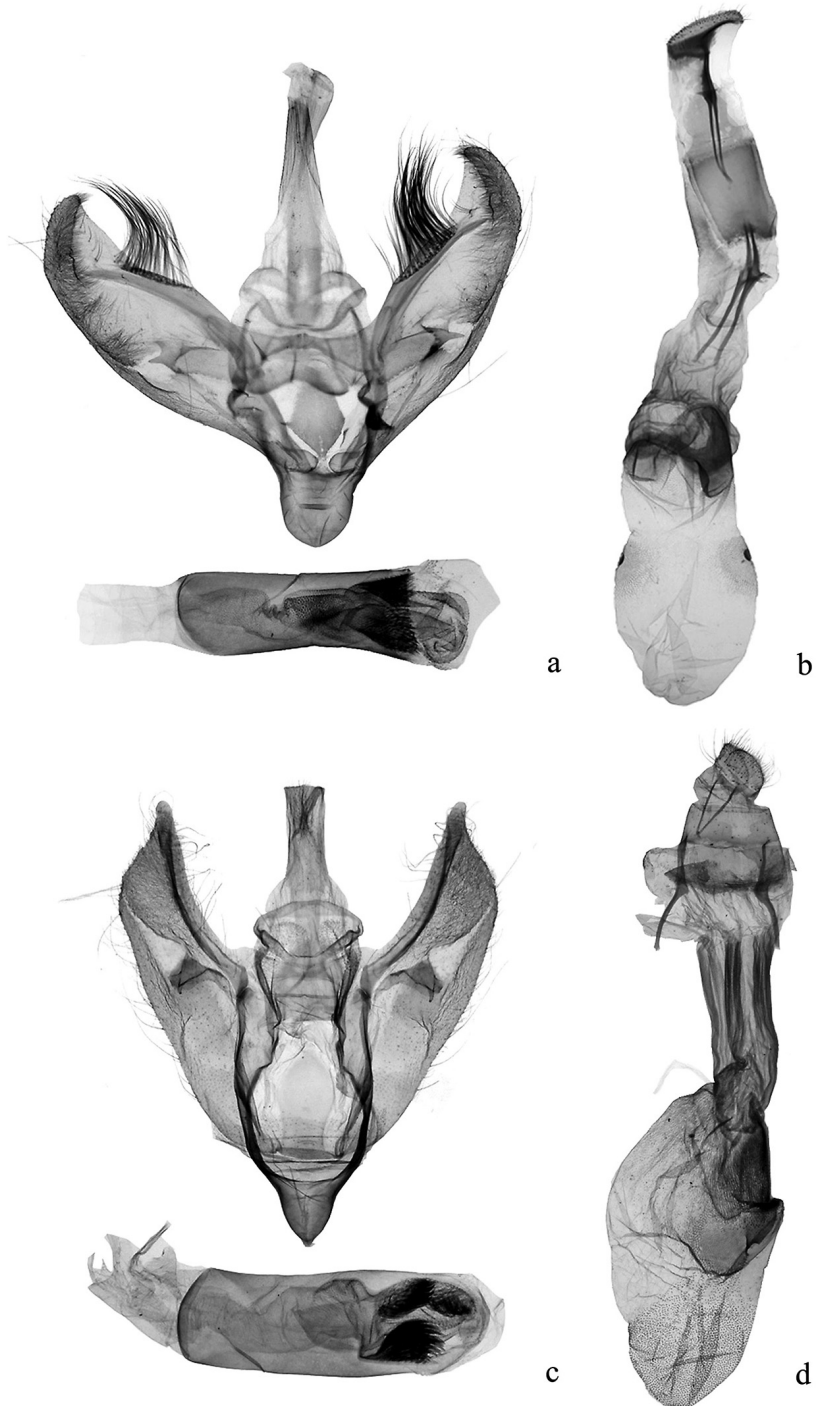


Fig. 3. Genitalia of *Tabidia* spp. – a. *T. strigiferalis* Hampson male, slide DXC05031. – b. *T. strigiferalis* Hampson female, slide DXC05032. – c. *T. obvia* sp. n. male, slide DXC07196. – d. *T. obvia* sp. n. female, slide DXC07249.

Jialiang Zhang; 1 ♂, Huoshan County (31°24'N, 116°19'E), Anhui Province, 12.VIII.2004, leg. Jiasheng Xu & Jialiang Zhang; 6 ♂♂, 1 ♀, Sixian (33°29'N, 117°54'E), Anhui Province, 700 m,

15.VIII.2004, leg. Jiasheng Xu; 1 ♂, Shenlongjia (31°44'N, 110°40'E), Hubei Province, 1,200–1,400 m, 16.VII.2003, leg. Shulian Hao; 1 ♂, Shenlongjia (31°44'N, 110°40'E), Hubei Provin-

ce, 1,100 m, 18.VII.2003, leg. Shulian Hao; 1 ♀, Hechuan (29°58'N, 106°16'E), Chongqing, 3.VII.2009, leg. Xicui Du; 13 ♂♂, Simian Mountain (28°39'N, 106°24'E), Chongqing, 1,250 m, 14.–15.VIII.2011, leg. Guiqing He & Lifang Song; 3 ♂♂, Simian Mountain (28°39'N, 106°24'E), Chongqing, 1,280 m, 1.VIII.2011, leg. Guiqing He & Lifang Song; 5 ♂♂, Qianjiang (29°32'N, 108°45'E), Chongqing, 1,100 m, 25.–26.VII.2012, leg. Jun Zhang & Lijun Xun; 1 ♂, Qianjiang (29°32'N, 108°45'E), Chongqing, 870 m, 23.VII.2012, leg. Jun Zhang & Lijun Xun; 1 ♂, Lu Xian (29°09'N, 105°22'E), Sichuan Province, 24.VII.1995, leg. Yongxing Zeng; 1 ♂, Tongjiang (31°54'N, 107°14'E), Sichuan Province, 400 m, 5.IX.2012, leg. Lijun Xu; 23 ♂♂, Kuankuoshui (28°14'N, 107°10'E), Guizhou Province, 800 m, 10.–13.VIII.2010, leg. Xicui Du; 33 ♂♂, Tianmu Mountain (30°19'N, 119°26'E), Zhejiang Province, 400 m, 25.VII.–2.VIII.2011, leg. Xicui Du & Xiaobing Fu.

*Redescription.* Adult (Fig. 1c): Wingspan 18.0–24.0 mm. Body pale yellow or pale ochreous, frons white. Antenna with scape white, flagellum pale yellow or ochreous. Male antenna with ventral cilia about as long as diameter of flagellomere. Labial palp pale yellow or yellowish-white, 1<sup>st</sup> segment brown distally. Maxillary palp slim, pale yellow. Patagium, tegula and dorsal thorax pale yellow or pale ochreous. Forewing pale yellow or pale ochreous, with a basal black point; antemedial line represented by black or fuscous spots, obvious only in discal cell and on posterior margin; a black spot below discal cell near base; orbicular stigma and discoidal stigma black; a series of short black streaks along vein excurved round end of discal cell, then incurved at CuA<sub>1</sub> to anal area; postmedial line represented by a series of black or fuscous spots, excurved from costa to CuA<sub>1</sub>, then bent inward to below end of discal cell, with dark mark beyond it near tornus; some indistinct fuscous streaks in terminal interspaces; cilia pale yellow. Hindwing yellowish-white, semihyaline; subterminal line indistinct, consisting of a series of small fuscous points, slightly curved; terminal pale yellow, brown near tornus; cilia yellowish-white. Legs yellowish-white, each segment of tarsus with black ringed stripe distally; fore coxa and fore femur striped with black or fuscous on outer side,

fore tibia black distally; hind tarsus with inner side of first segment black. Abdomen pale yellow or pale ochreous dorsally, segments with black or fuscous spot basally except on 1<sup>st</sup> segment, indistinct on terminal segment in some specimens; yellowish-white ventrally, with fine black or fuscous streak forming an interrupted middle line except terminal segment with a black drop basally. Some specimens without any ventral streak on terminal two segments of abdomen.

Male genitalia (Fig. 3a). Uncus short and broad, concave medially, with thin, long hairs laterally, lip-like together with vestigial gnathos band. Valva elliptic; posterior margin of valva with basal 2/3 arched, bearing a developed bundle of long hairs at middle. Costa curved toward anterior margin distally. Distal valva with a slightly sclerotized dense hairy band. Clasper near middle of valva, flat, terminal slightly concave, forming two lateral projections. Saccus broad, bluntly rounded on anterior margin. Juxta rhombic. Phallus stout; cornutus near apex, flabelliform, densely with small spines.

Female genitalia (Fig. 3b). Apophysis anterioris nearly as long as apophysis posterioris, expanded and acutely projected at about basal 1/3. Ductus bursae short and broad, about 1/2 length of corpus bursae. Corpus bursae oval, contracted medially, sclerotized and with dense fine points posteriorly. Signum two, small, oval, surrounded by many smaller, sclerotized fine points.

*Distribution.* China (Heilongjiang, Liaoning, Tianjing, Hebei, Shaanxi, Gansu, Henan, Anhui, Hubei, Chongqing, Sichuan, Guizhou, Zhejiang, Fujian, Guangdong, Hainan), Korea, Russia.

*Biology.* Life history and juvenile stages unknown.

### 3.4. *Tabidia obvia* sp. n.

Fig. 1d, Figs. 3c–d

*Type material.* Holotype. ♂, CHINA: Wufeng Tujiazu Autonomous County (30°12'N, 116°40'E), Hubei Province, 1,100 m, 11.VII.1999, leg. Houhun Li *et al.*, genitalia slide No. DXC07196. Deposited in NKUM. Paratypes: CHINA: 6 ♂♂, Wufeng Tujiazu Autonomous County (30°12'N, 116°40'E), Hubei Province, 1,000–1,100 m, 8.–12.VII.1999, leg. Houhun Li *et al.*, [NKUM]; 1 ♂,

Xingdou Mountain (30°01'N, 109°06'E), Enshi, Hubei Province, 780 m, 31.VII.2012, leg. Jun Zhang & Xiaobing Fu, [SWUCPP]; 1 ♂, Wen County (32°58'N, 104°41'E), Gansu Province, 860 m, 9.VII.2005, leg. Haili Yu, [NKUM]; 2 ♂♂, Simian Mountain (28°39'N, 106°24'E), Chongqing, 1,000 m, 18., 21.VII.2010, leg. Xicui Du & Lifang Song, [SWUCPP]; 1 ♂, Simian Mountain (28°39'N, 106°24'E), Chongqing, 1,280 m, 11.VIII.2011, leg. Guiqing He & Lifang Song, [SWUCPP]; 1 ♂, Emei Mountain (29°36'N, 103°28'E), Sichuan Province, 550 m, 10.VII.2011, leg. Jianbo Cao, [SWUCPP]; 1 ♀, Mayanghe (28°32'N, 108°29'E), Guizhou Province, 700 m, 28.IX.2007, leg. Zhenhui, [NKUM]; 6 ♂♂, Kuankuoshui (28°14'N, 107°10'E), Guizhou Province, 800 m, 10.–13.VIII.2010, leg. Xicui Du, [SWUCPP]; 1 ♂, Kuankuoshui (28°14'N, 107°10'E), Guizhou Province, 1,500 m, 15.VIII.2010, leg. Xicui Du, [SWUCPP]; 14 ♂♂, Tianmu Mountain (30°19'N, 119°26'E), Zhejiang Province, 400 m, 25.VII.–2.VIII.2011, leg. Xicui Du & Xiaobing Fu, [SWUCPP]; 3 ♂♂, Nanling (24°45'N, 112°51'E), Guangdong Province, 1,070 m, 23.VIII.2010, leg. Xicui Du, [SWUCPP].

*Diagnosis.* This species is similar to *T. strigiferalis* Hampson in appearance, but can be distinguished by the postmedial line of the forewing with a distinct dentation pattern between  $CuA_2$  and A, the subterminal line of the hindwing uninterrupted and distinct; the posterior margin of the valva slightly concave, without bundle of long hairs, but with a finger-like projection distally; three brush-like cornuti, consisting of bundles of spines. In *T. strigiferalis* the postmedial line of the forewing lacks the dentation pattern between  $CuA_2$  and A, the subterminal line of the hindwing is interrupted and indistinct; the posterior margin of the valva is arched on basal 2/3 and has a developed bundle of long hairs at middle, but lacks the distal projection; the cornutus is flabelliform, with masses of small spines.

*Description.* Adult (Fig. 1d). Wingspan 18.0–22.0 mm. Body pale yellow or pale ochreous, frons white. Antenna with scape white, flagellum ochreous. Male antenna with ventral cilia about two-thirds as long as the diameter of flagellomere. Labial palp pale yellow or pale ochreous except 2<sup>nd</sup> segment brown or fuscous dorsally.

Maxillary palp slim, pale yellow. Patagium, tegula and thorax pale yellow or pale ochreous dorsally. Forewing pale yellow or pale ochreous; one indistinct brown spot below discal cell near base; antemedial line represented by fuscous spots, obvious only in discal cell and below anal vein; discoidal stigma a fuscous stripe; several short fuscous streaks round end of discal cell; postmedial line consisting of fuscous spots, excurved from costa to  $CuA_1$ , then sharply inward to below end of discal cell, next sharply outward, finally curved to posterior margin, forming a distinct dentation between  $CuA_2$  and A; some indistinct brown streaks in terminal interspaces; cilia pale yellow or pale ochreous. Hindwing yellowish-white, semihyaline; subterminal line uninterrupted and distinct between costa and  $CuA_1$ ; terminal pale yellow, brown between  $CuA_2$  and tornus; cilia pale yellow, yellowish-white distally. Legs yellowish-white, each segment of tarsus with fuscous ringed stripe distally; fore femur striped with pale ochreous, fore tibia grayish-brown dorsally; hind tarsus with inner side of first segment fuscous. Abdomen pale ochreous dorsally; yellowish-white ventrally, 3–6 segments with fine black or fuscous streak forming an interrupted middle line, 7<sup>th</sup> segment with small black drop basally, terminal segment with bigger black drop basally.

Male genitalia (Fig. 3c). Uncus short and broad, slightly concave medially, with thin, long hair laterally, lip-like together with vestigial gnathos band. Valva with posterior and anterior margin nearly parallel; posterior margin of valva slightly concave, forming a finger-like projection distally. Costa slightly concave. Clasper near middle of valva, flat, with one stout spine dorsally. Saccus triangular. Juxta broad, with anterior half contracted laterally, and narrowed terminally. Phallus stout; three cornuti near apex, brush-like, consisting of bundles of spines.

Female genitalia (Fig. 3d). Apophysis anterioris about 1.5 times length of apophysis posterioris, triangularly expanded at about middle. Ductus bursae short and broad, wrinkled longitudinally, about 1/2 length of corpus bursae. Corpus bursae oval, densely with fine sclerotized points and longitudinal wrinkles posteriorly, slightly sclerotized posteriorly, densely with stout spines anteriorly.

*Distribution.* China (Gansu, Hubei, Chongqing, Sichuan, Guizhou, Zhejiang, Guangdong).

*Biology.* Life history and juvenile stages unknown.

*Remarks.* Interrupted middle line on ventral abdomen is indistinct in some specimens.

*Etymology.* The specific name is derived from Latin *obvius* = obvious, in reference to the distinct subterminal line of the hindwing.

### 3.5. Key to species of *Tabidia* from China

1. Body and wings white; forewing with some black blotches, basal area tinged with greyish-fuscous, lower third of median area fulvous; hindwing with outer third interruptedly blackish *T. candidalis*
  - Body and forewings pale yellow or pale ochreous; forewing with some black or fuscous spots and streaks; hindwing yellowish-white, with an obvious or indistinct subterminal line 2
2. Subterminal line of hindwing interrupted and indistinct; posterior margin of valva with basal 2/3 arched, bearing a developed bundle of long hairs at middle; costa distally curved toward anterior margin *T. strigiferalis*
  - Subterminal line of hindwing uninterrupted and distinct; posterior margin of valva slightly concave, without bundle of long hairs; costa slightly concave *T. obvia* sp. n.

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