



New species of the genus *Eupithecia* (Lepidoptera, Geometridae) from China. Part IX

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Abstract

In this ninth part of this series, six new species of *Eupithecia* Curtis, 1825 are described from China: *Eupithecia remissata* sp. n., *Eupithecia fericlava* sp. n., *Eupithecia florianii* sp. n., *Eupithecia concostivexa* sp. n., *Eupithecia voraria* sp. n. and *Eupithecia khama* sp. n. The species *Eupithecia solianikovi* Viidalepp, 1988 is recorded as new for China. *Eupithecia fulvidorsata* Mironov & Galsworthy, 2006 is a first record for Yunnan province and two species *Eupithecia ensifera* Mironov & Galsworthy, 2004 and *Eupithecia supercastigata* Inoue, 1958 are recorded from Sichuan province for the first time. Adults and genitalia are illustrated for all species.

Key words: taxonomy, distribution

Introduction

This is the ninth in a series of papers describing new species of Chinese *Eupithecia*. The parts I.–VI. of this series became the basis for a book on Chinese *Eupithecia* (Mironov & Galsworthy 2014), parts VII. and VIII. written after 2014 (Mironov & Šumpich 2022, Šumpich & Mironov 2022) follow up this book. A full list of literature on Chinese *Eupithecia* can be found in Mironov & Galsworthy (2014). This paper is based on the material stored in the collection of Josef Procházka († 2020) (Nižbor, Czech Republic), currently deposited in the Natural History Museum, Prague, Czech Republic.

Material and methods

The study material was collected by various collectors. All specimens were attracted at ultraviolet light as it is mentioned on the labels bellow specimens. The pinned specimens were photographed with a Canon 750D camera and a Canon MP-E65 mm lens. Genitalia preparations were photographed with a Canon EOS 200D camera mounted on an Olympus CX31 stereomicroscope. The descriptions of the genitalia and the descriptions of the wing patterns are based on the terminology in Mironov & Galsworthy (2014).

Abbreviations:

Gen. prep.—genitalia preparation;

NMPC—National Museum, Natural History Museum, Prague, Czech Republic;

New species

Eupithecia remissata sp. n.

(Figs 1, 7, 22)

Type material: Holotype, ♀, **China**, NW. Sichuan, near Maniganggo, 31°47'22" N, 99°23'27" E, 3.vii.2019, 3860 m, R. Butvila & A. Saldaitis leg. Gen. prep. J. Procházka 20056; Photo J. Šumpich 22/134 (NMPC).

Diagnosis. The presence of rows of spines in the bursa copulatrix indicates that this species belongs to the *fletcherata* species group (Bolte 1990). This species is very similar to other long-winged species in this group with an elongate discal dot, such as *E. quadripunctata*, and is probably only reliably distinguishable by the genitalia. The female genitalia are very characteristic and could not be confused with the genitalia of any other species of the genus.

Description. Adult. (Figs 1, 7). Female. Wingspan 25.0 mm; fore wing 14.0 mm. Head and notum covered with yellowish scales. Fore wing rather elongate and narrow, costal margin almost straight, apex narrowly rounded. Ground colour pale brownish ochreous; antemedial transverse line forming a right angle near costa; postmedial line oblique, touching the discal dot and broadened near costa; terminal area slightly darker; terminal line brown, interrupted by veins; discal dot black, narrow and elongate. Hind wing ovoid, dirty white with ochreous tinge; anal margin darker; discal dot small, brownish grey, rounded. Fringes on all wings chequered brown and pale brown.

Female genitalia (Fig. 22). Bursa copulatrix ovate with large membranous diverticulum. Bursa almost completely covered with numerous spines and with small spines and a row of spines near base of colliculum. Diverticulum with sharply curved row of large spines. Ductus seminalis broadened basally, attached to central part of corpus bursae (Fig. 22b). Colliculum broad, lightly sclerotized. Antrum membranous, short and broad. Tergite A8 short and broad, rectangulate. Anterior and posterior apophyses pointed at apices. Papillae anales short, broad, rounded, covered with long setae.

Male. Unknown.

Bionomy. Host plant unknown. Type material was collected by light in early July at an elevation of 3860 m.

Distribution. China. Known from Sichuan province.

Etymology. From the latin word “remissa”—“slack” in english.

Eupithecia fericlava sp. n.

(Figs 2, 8, 23)

Type material: Holotype, ♀, **China**, NW. Yunnan, Nu Jiang valley, Road Lushui/Gulang, 26°68,16" N, 98°47,40" E, 13.v.2018, 2000 m, R. Butvila & A. Saldaitis leg. Gen. prep. J. Procházka 20168; Photo/Gen. prep. J. Šumpich 22/138 (NMPC).

Diagnosis. This species belongs to the *proterva* species group (Inoue 1979; Mironov & Galsworthy 2014) on the basis of the structure of the female genitalia, in particular the characteristic attachment of the ductus seminalis at the spineless anterior end of the bursa. The worn nature of the holotype offers little external help in distinguishing the species from other members of the group, except for the concave termen of the hindwing, which is similar to that in *E. clavifera*. The female genitalia are very characteristic and rather similar to those of *Eupithecia signigera* Butler, 1879. However, the bursa copulatrix is larger and broader, the disposition of the spines differs and there is a heavily sclerotized rounded projection in the posterior part of the bursa.

Description. Adult. (Figs 2, 8). Female. Wingspan 16.0 mm (without fringe), fore wing 9.0 mm (without fringe). Head and notum covered with speckled yellowish-brown scales. Fore wing with convex costal margin in basal part and narrowly rounded apex. Ground colour pale brownish grey; basal part covered with blackish scales; transverse lines not clearly visible; discal dot blackish, ovoid. Hind wing with shallowly concave termen in the middle and narrowly rounded apex; pale grey, transverse lines not visible; discal dot dark, ovoid. Fringe on all wings worn off.

Female genitalia (Fig. 23). Bursa copulatrix large, sacciform, about half covered with small spines, all on one side and with a row of narrow and pointed spines along posterior margin. Posterior part of bursa sclerotized with

short, broad and rounded sclerotized projection. Ductus seminalis broad, curved, sharply narrowed and becoming very narrow; attached to anterior end of corpus bursae. Colliculum not expressed. Antrum relatively narrow, elongate, sclerotized centrally. Tergite A8 narrow and elongate, shovel-like. Anterior and posterior apophyses narrow. Papillae anales short, rounded.

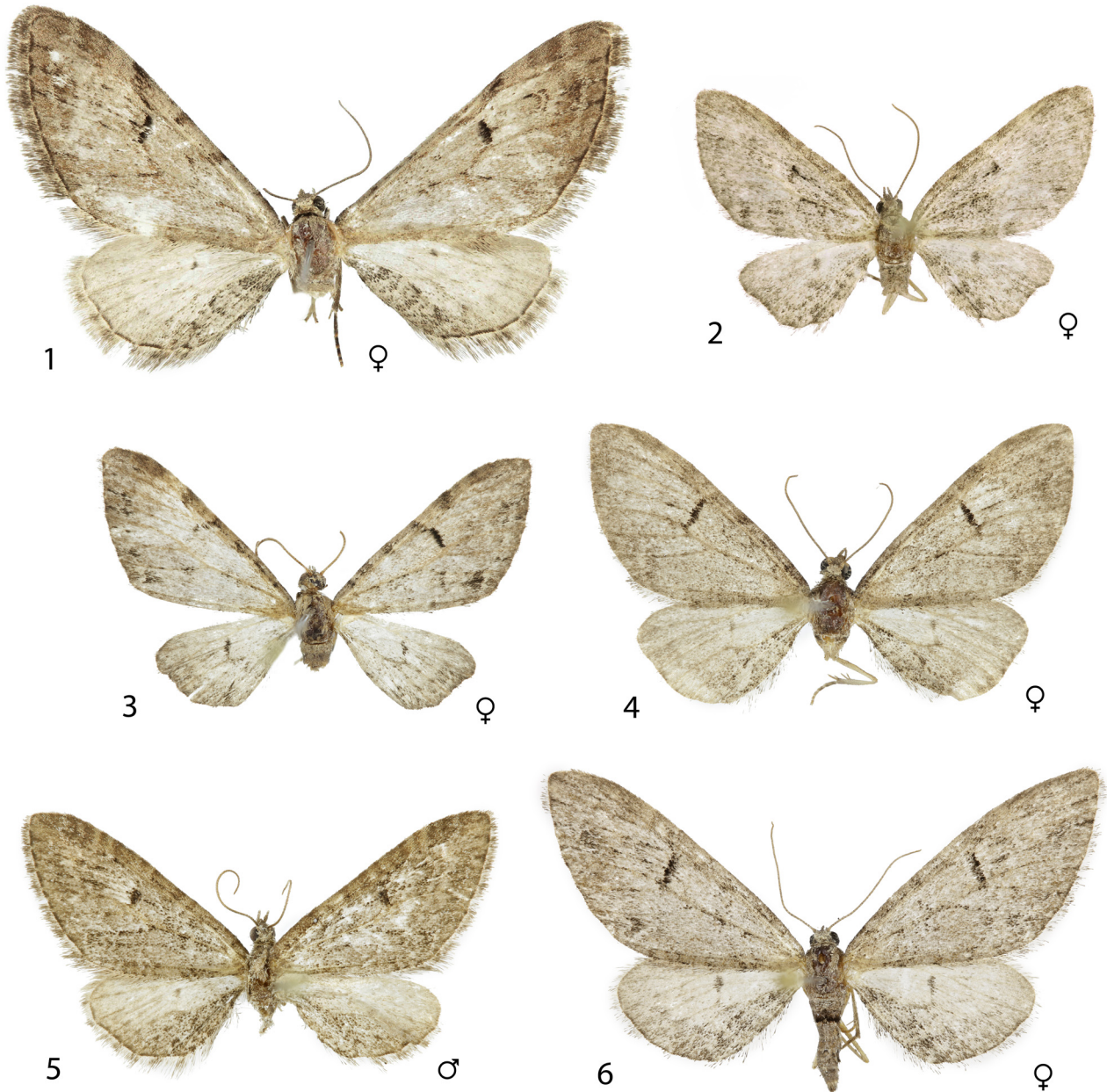
Male. Unknown.

Bionomy. Host plant unknown. The holotype was collected by light in mid-May at an elevation of 2000 m.

Distribution. China. Known only from Yunnan province.

Etymology. The name “*fericlava*” is an anagram of the species name “*clavifera*”.

Note. The single type specimen is worn.



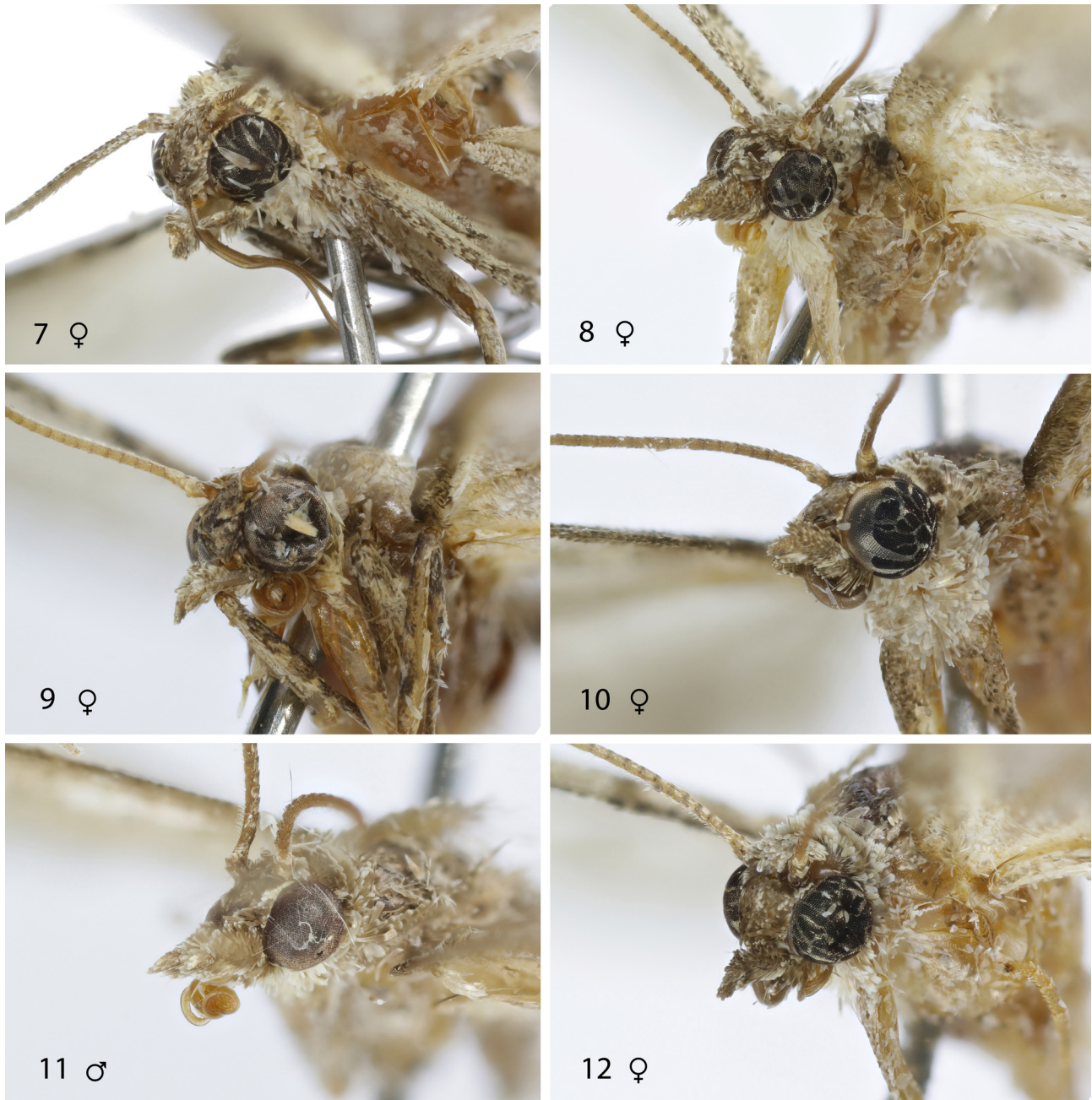
FIGURES 1–6. *Eupithecia* adults, China (scale bar = 10 mm). 1. *E. remissata* **sp. n.** Holotype; 2. *E. fericlava* **sp. n.** Holotype; 3. *E. florianii* **sp. n.** Holotype; 4. *E. concostivexa* **sp. n.** Holotype; 5. *E. voraria* **sp. n.** Holotype; 6. *E. khama* **sp. n.** Holotype.

***Eupithecia florianii* sp. n.**

(Figs 3, 9, 24)

Type material: Holotype, ♀, **China**, W. Yunnan, Salween valley mt., 2000 m, Luzhangzhen vill., 30 km Nord Liukuzhen, 25°58'15" N, 98°47'40" E, 16.xi.2017, A. Floriani leg. Gen. prep. J. Procházka 20169; Photo J. Šumpich 22/126 (NMPC).

Diagnosis. We cannot attribute this species to any group. The holotype is worn, but the elongate discal dot and the narrow hind wings with a concave termen give it a distinctive appearance. The female genitalia are rather similar to those of *Eupithecia amicula* Mironov & Galsworthy, 2004, but can be distinguished by the position and shape of the spines in the bursa copulatrix and also by the shape of the eighth tergite. The genitalia are very distinctive and could not be confused with genitalia of any other Asian species of the genus.



FIGURES 7–12. Heads of *Eupithecia* species, China, holotypes. 7. *E. remissata* sp. n.; 8. *E. fericlava* sp. n.; 9. *E. florianii* sp. n.; 10. *E. concostivexa* sp. n.; 11. *E. voraria* sp. n.; 12. *E. khama* sp. n.

Description. Adult. (Figs 3, 9). Female. Wingspan 17.5 mm, fore wing 10.0 mm. Head and notum covered with ochreous scales. Fore wing elongate, costal margin almost straight, apex narrowly rounded. Ground colour pale brownish grey; transverse lines not visible, except for traces of five dark costal blotches; discal dot black, narrow and elongate. Hind wing paler, with shallowly concave termen in the middle and narrowly rounded apex; terminal area darker than rest of wing; discal dot narrow and elongate. Fringe missing on all wings.

Female genitalia (Fig. 24). Bursa copulatrix with a large, membranous, spineless diverticulum near base. The other basal part has a row of large, stout spines and a sclerotized area; posterior ½ of corpus bursae covered with numerous small spines. Ductus bursae short, membranous, narrowed posteriorly. Colliculum not expressed. Antrum narrow, elongate, membranous. Tergite A8 rectangular, narrow and elongate. Anterior and posterior apophyses relatively narrow, elongate. Papillae anales rather short, narrow, apically rounded.

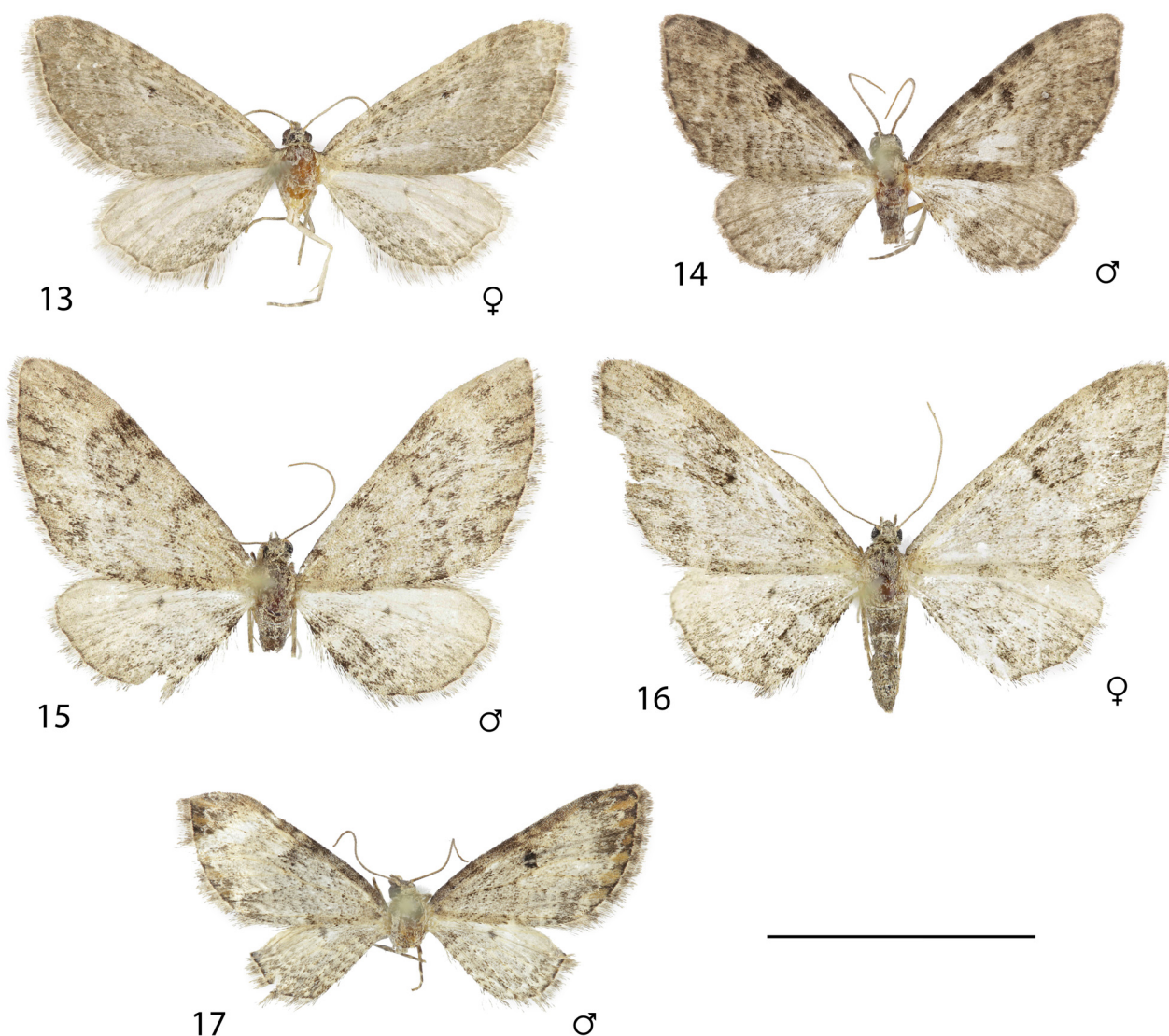
Male. Unknown.

Bionomy. Host plant unknown. The holotype was collected by light in mid-November at an elevation of 2000 m.

Distribution. China. Known from Yunnan province.

Etymology. This species is named in honour of the Italian lepidopterologist Alessandro Floriani (Milan, Italy) who collected the holotype of this species and many other Chinese moths.

Note. The single type specimen is very worn.



FIGURES 13–17. *Eupithecia* adults, China (scale bar = 10 mm). 13. *E. solianikovi* Viidalepp, 1988; 14. *E. supercastigata* Inoue, 1958; 15. *E. ensifera* Mironov & Galsworthy, 2004, male; 16. *E. ensifera* Mironov & Galsworthy, 2004, female; 17. *E. fulvidorsata* Mironov & Galsworthy, 2006.

***Eupithecia concostivexa* sp. n.**

(Figs 4, 10, 25)

Type material: Holotype, ♀, **China**, W. Sichuan, SW slopes of Erlang Shan Mt., 30 km from Luding, 29°49.39" N, 102°15.08" E, 21.x.2019, 1920 m, A. Saldaitis leg. Gen. prep. J. Procházka 20172; Photo J. Šumpich 22/139 (NMPC).

Diagnosis. This species also belongs to the *proterva* species group (Inoue 1979; Mironov & Galsworthy 2014) on the basis of the structure of female genitalia. The worn state of the unique holotype does not allow a clear external diagnosis, though the very elongate discal dot is noteworthy. The female genitalia are rather similar to those of the Taiwanese *E. hashimotoi* Inoue, 1988, but the colliculum is broader, the antrum membranous and the shape of the eighth tergite is different.

Description. Adult. (Figs 4, 10). Female. Wingspan 19.5 mm (without fringe), fore wing 11.0 mm (without fringe). Head and notum covered with greyish scales. Fore wing with slightly bowed costal margin. Ground colour pale brownish grey; transverse lines not visible; discal dot black, narrow and elongate. Hind wing with shallowly concave termen in the middle, anal area darker than rest of wing; discal dot small, ovoid. Fringes on all wings missing.

Female genitalia (Fig. 25). Bursa copulatrix rather ovoid, about ½ densely covered with small spines along one side from base of ductus seminalis to colliculum. Ductus bursae not expressed. Ductus seminalis broadened near base, attached to corpus bursae near anterior part. Colliculum collar-like, short and broad. Antrum membranous, relatively short and broad. Tergite A8 square. Anterior and posterior apophyses rather short and narrow. Papillae anales large, ovoid.

Male. Unknown.

Bionomy. Host plant unknown. The holotype was collected by light in the third decade of October at an elevation of 1920 m.

Distribution. China. Known only from Sichuan province.

Etymology. The name "*concostivexa*" is an anagram of the species name "*costiconvexa*".

Note. The single type specimen is very worn.

***Eupithecia voraria* sp. n.**

(Figs 5, 11, 18)

Type material: Holotype, ♂, **China**, Yunnan, Tse-Kou, 2000 m, 28°02' N, 98°54' E, 5.-10.vi.2011, J. Klír leg. Gen. prep. J. Procházka 20189; Photo J. Šumpich 22/127 (NMPC).

Diagnosis. Fore wings with more or less clear brownish transverse lines, and species rather similar externally to *Eupithecia eremiata* Šumpich & Mironov, 2022, but hind wings lighter. The male genitalia are rather similar to those of *Eupithecia molestissima* Vojnits, 1981. However, the sternite A8 is narrower and longer than in this species. The wings are also narrower and lighter than in *Eupithecia molestissima* Vojnits, 1981 (Mironov & Galsworthy 2014, Plate 6, fig. 155).

Description. Adult. (Figs 5, 11). Male. Wingspan 19.0 mm, fore wing 10.5 mm. Head and notum covered with greyish scales. Fore wing narrow, elongate; costal margin slightly curved; apex narrowly rounded. Ground colour ochreous brownish; transverse lines faintly marked; terminal line dark brown, interrupted by veins; discal dot dark brown, ovoid. Hind wing ovoid, pale brownish, darker along anal margin. Fringes on all wings chequered whitish brown and brown.

Male genitalia (Fig. 18). Valve narrow, with small, blunt ventral process weakly curved dorsal margin and tapered apex; sacculus sclerotized. Papillae on the anterior arms of the labides large, broad, clavate. Vinculum rather short and narrow. Aedeagus broadened to anterior end. Vesica armed with one slim, long horn-like cornutus, one shorter horn-like cornutus, an elongate plate-like cornutus and numerous minute spicules. Sternite A8 peg-like, tapered to posterior end, with two short apical horns and elongate basal lobes; basal hollow deep.

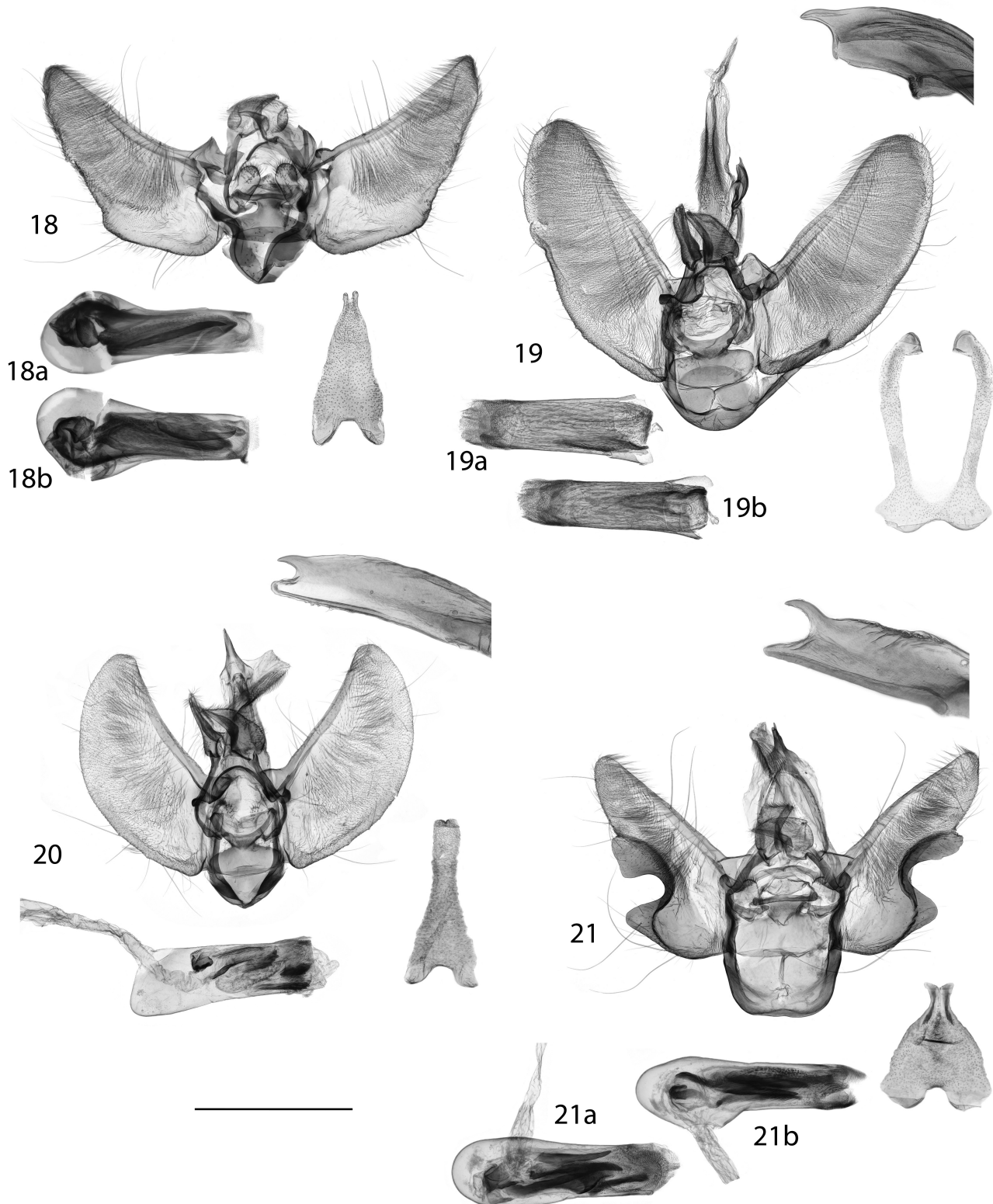
Female. Unknown.

Bionomy. Host plant unknown. The holotype was collected by light in the first third of June at an elevation of 2000 m.

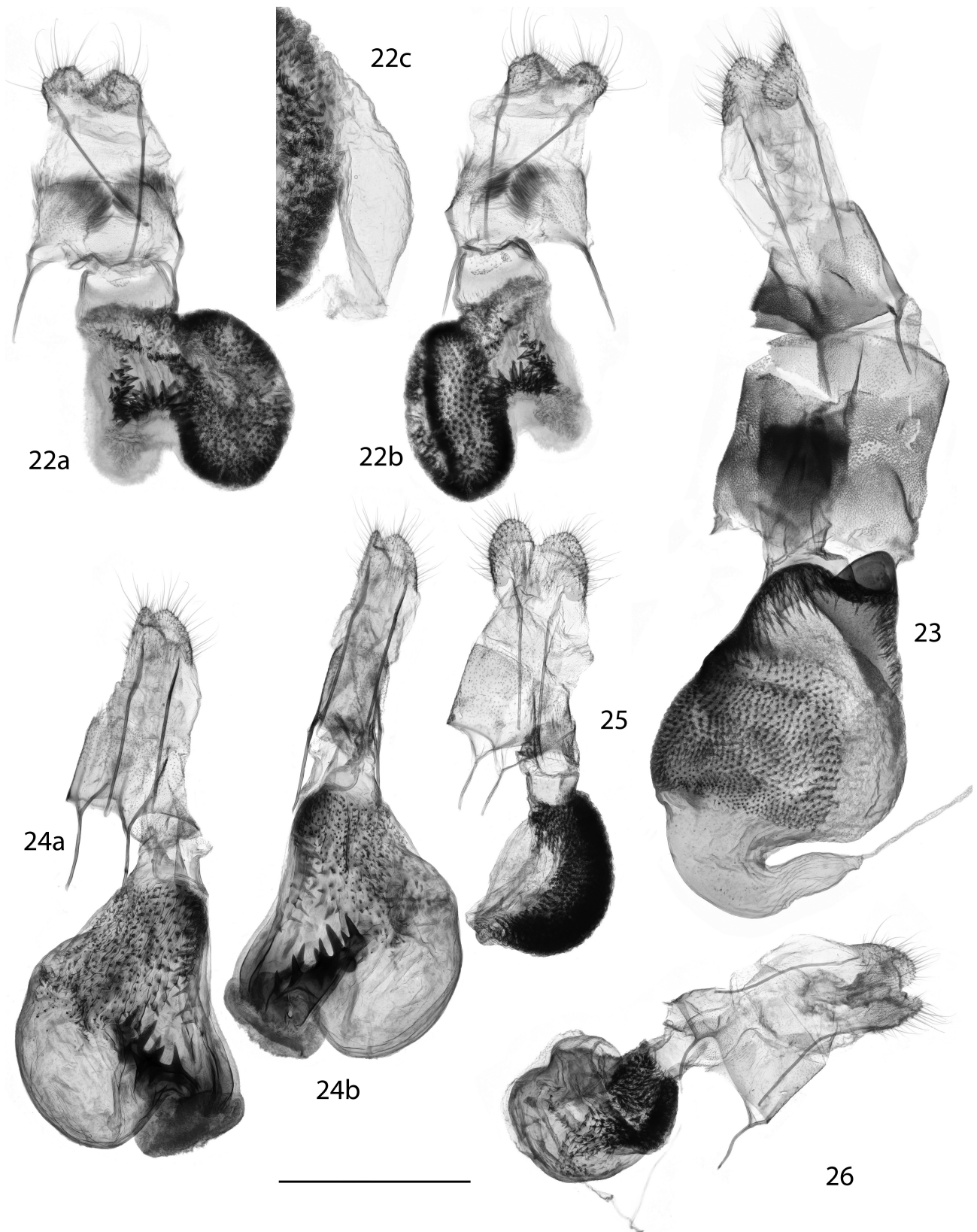
Distribution. China. Known from Yunnan province.

Etymology. From latin word “vorar”–“devour” in english.

Note. Uncus, anal tube and tegumen are absent in the genitalia slide.



FIGURES 18–21. Male genitalia of *Eupithecia* species (scale bar = 1mm). 18. *E. voraria* sp. n. Holotype; 19. *E. supercastigata* Inoue, 1958; 20. *E. ensifera* Mironov & Galsworthy, 2004; 21. *E. fulvidorsata* Mironov & Galsworthy, 2006; a—lateral view; b—view from the opposite side.



FIGURES 22–26. Female genitalia of *Eupithecia* species (scale bar = 1mm). 22. *E. remissata* sp. n.; 23. *E. fericlava* sp. n.; 24. *E. florianii* sp. n.; 25. *E. concostivexa* sp. n.; 26. *E. khama* sp. n.; a—frontal view; b—view from a different angle; c—output of ductus seminalis of the same genitalia preparation.

***Eupithecia khama* sp. n.**

(Figs 6, 12, 26)

Type material: Holotype, ♀, **China**, NW Sichuan, near Maninganggo, 31°47'22" N, 99°23'27" E, 30.6.2019, 3860 m, R. Butvila & A. Saldaitis leg. Photo/Gen. prep. J. Šumpich 22/137 (NMPC).

Diagnosis. This species similar externally to *Eupithecia quadripunctata* Warren, 1888 and *Eupithecia fatigata* Vojnits & de Laever, 1978 according to narrow, elongate wings with elongate and narrow discal dots. *Eupithecia khama* sp. n. might belong to the *fletcherata* species group (Bolte 1990) on the basis of the presence of a row of spines in the bursa copulatrix. The female genitalia can be distinguished from those of other species by the combination of shape of bursa, position of spines, shape of ductus seminalis and the large papillae anales.

Description. Adult. (Figs 6, 12). Female. Wingspan 22.5 mm (without fringe); fore wing 12.5 mm (without fringe). Head and notum covered with greyish scales. Fore wing elongate, costal margin slightly bowed. Ground colour pale greyish brown; transverse lines not visible; discal dot narrow, elongate. Hind wing ovate, paler than fore wing; anal margin darker than rest of wing; discal dot dark, narrow and elongate. Fringe missing in type specimen.

Female genitalia (Fig. 26). Bursa copulatrix relatively small, broadened at anterior part, densely covered with spines in posterior part, and with smaller area covered with more sparse spines and curved row of spines in anterior part of bursa. Ductus seminalis broadened basally, curved, attached to medium part of corpus bursae. Colliculum collar-like, rather short and broad. Antrum membranous, broadened posteriorly. Tergite A8 large, quadrate. Anterior and posterior apophyses narrow. Papillae anales relatively large, broad, with rounded apices.

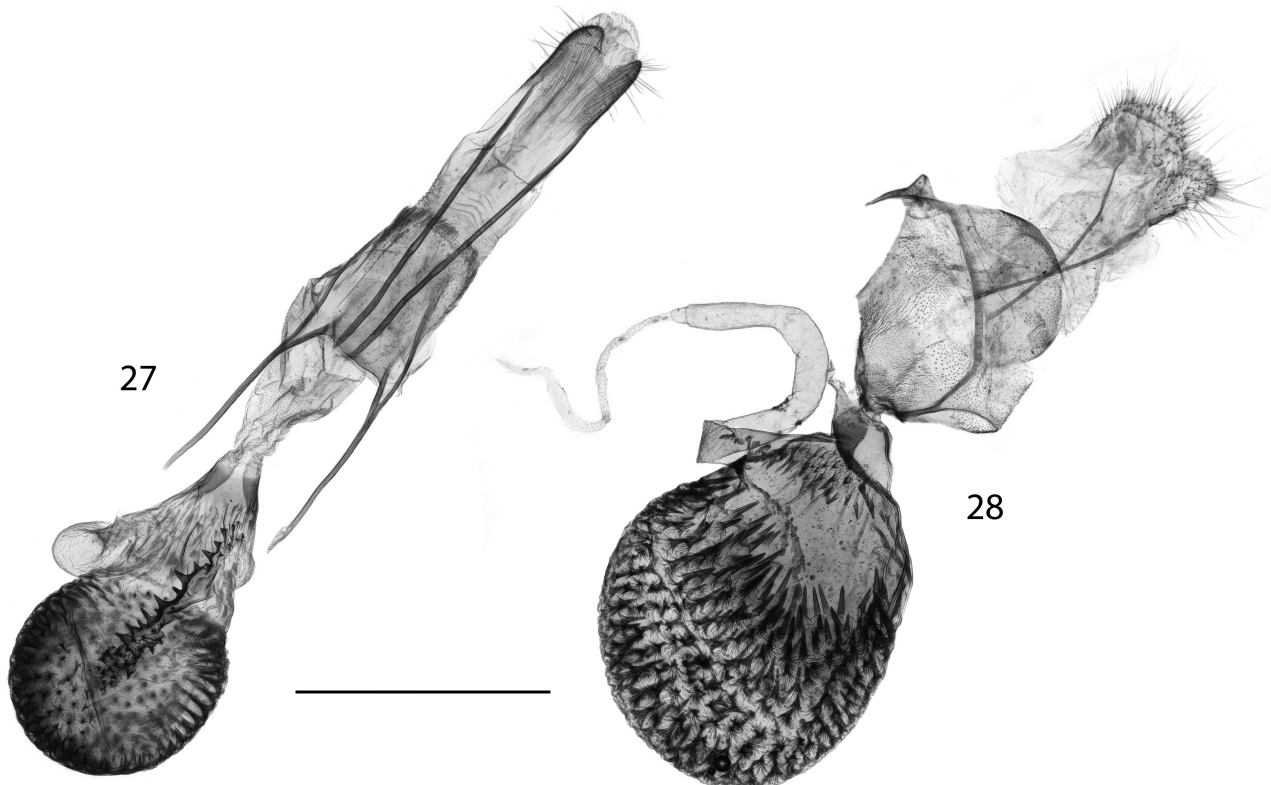
Male. Unknown.

Bionomy. Host plant unknown. Type material was collected by light in late June at an elevation of 3860 m.

Distribution. China. Known from Sichuan province.

Etymology. The species name is derived from the name of the historical region of Kham in Tibet in which the type locality Maninganggo is located.

Note. The single type specimen is very worn.



FIGURES 27–28. Female genitalia of *Eupithecia* species (scale bar = 1mm). 27. *E. solianikovi* Viidalepp, 1988; 28. *E. ensifera* Mironov & Galsworthy, 2004.

Previously described species

Eupithecia fulvidorsata Mironov & Galsworthy, 2006

(Fig. 17)

Eupithecia fulvidorsata Mironov & Galsworthy, 2006, *Transactions of the Lepidopterological Society of Japan* **57** (4): 343, figs 6, 21. Holotype ♂ (ZFMK; examined), **China**, prov. Shaanxi, Foping Nature Reserve, Panda area, 33°45' N, 107°48' E, 1600 m.

Examined material: 1 ♂, **China**, NW Yunnan, Nu Jiang valley, 15.–16.5.2018, 2100–2400 m, R. Butvila & Saldaitis leg. Gen. prep. J. Procházka 20177; Photo J. Šumpich 22/128 (NMPC).

Note. This species was described on the basis of two males from Shaanxi province and two females from Nepal (Ganesh Himal). A new species for Yunnan province. The male genitalia are illustrated (Fig. 21).

Eupithecia solianikovi Viidalepp, 1988

(Fig. 13)

Eupithecia solianikovi Viidalepp, 1988, *Fauna pyadenits gor Sredney Azii [Geometridae fauna of the Central Asian mountains]*: 106, pl. 2: fig. 9; text-pl. 22, figs 2-4, 10, 14. Holotype ♂ (IZBE; examined), [**Tajikistan**], Tadh. SSR, W. Pamirs, Vanch river, Guchevast, 2200 m.

Examined material: 1 ♀, **China**, Tibet mer., Himalaya Mts, Nyalam, 3700 m, 10.–12.vi.2005, L. Bieber leg. Gen. prep. J. Procházka 20171; Photo J. Šumpich 21/423 (NMPC).

Note. This is a new species for the fauna of China. It was described from Tajikistan and Kyrgyzstan (Viidalepp 1988). Based on the structure of the female genitalia this species belongs to the *leucostaxis* species group with the following species: *E. leucostaxis* Prout, 1926, *E. mustangata* Schütze, 1961 and *E. thomasi* Mironov & Galsworthy, 2008 (Mironov & Galsworthy 2014). The first two species listed have been recorded from Tibet (Mironov & Galsworthy 2014). The female genitalia of the Chinese specimen are illustrated (Fig. 27).

Eupithecia ensifera Mironov & Galsworthy, 2004

(Figs 15, 16)

Eupithecia ensifera Mironov & Galsworthy, 2004, *Transactions of the Lepidopterological Society of Japan* **55** (4): 298, figs 11, 24, 27. Holotype ♀ (IZCAS; examined), **China**, Qinghai, Tongren, Maixiu, 2950 m.

Examined material: 1 ♂, **China**, NW., Sichuan near Maniganggo, 31°47'22" N, 99°23'27" E, 30.6.2019, 3860 m, R. Butvila & Saldaitis leg. Photo/Gen. prep. J. Šumpich 22/122 (NMPC).

Note. This species was known only from Qinghai province and only on the basis of four specimens. A new species for the fauna of Sichuan province. The male and female genitalia of Sichuan specimens are illustrated (Figs 20, 28).

Eupithecia supercastigata Inoue, 1958

(Fig. 14)

Eupithecia supercastigata Inoue, 1958, *Tinea* **4** (2): (248), text-fig 2. Holotype ♂ (BMNH; examined), [**Japan**], Yokosuka, Funakoshi.

Examined material: 1 ♂, **China**, NE. Sichuan, NE. Guangyuan, Longmen Shan, 32°36.009' N, 105°31.913' E, H–630 m, 5.x.2016, A. Floriani leg. Gen. prep. J. Procházka 20140; Photo J. Šumpich 22/141 (NMPC).

Note. This species belongs to the *subfuscata* species group (Mironov & Galsworthy 2014). It has previously been recorded from Japan (Honshu, Shikoku, Kyushu, Tsushima), Korea and the Chinese provinces of Zhejiang, Shaanxi, Hunan and Yunnan. A new species for Sichuan province. The male genitalia of this specimen are illustrated (Fig. 19).

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