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REVISION OF THE GENUS LOPHOTERGES HAMPSON, 1906 (S. L.) (LEPIDOPTERA, NOCTUIDAE, CUCULLIINAE). PART II. THE GENUS LOPHOTERGES S. STR.

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The second part of the revision is the systematic survey of the genus *Lophoterges* HAMPSON, 1906 s. str. containing the characterisations of the four supraspecific groups (three of them are described here as new subgenera, *Tibeterges, Variterges* and *Fibigerges* subgenera nova) and the descriptions of three new species, *Lophoterges radians* sp. n. (Afghanistan, Pakistan, Turkestan), *L. varians* sp. n. (Turkestan, Mongolia) and *L. atlas* sp. n. (Morocco, Algeria). The taxonomic stati of two formerly described taxa, *L. centralasiae* (STAUDINGER, 1901) and *L. aksuensis* (BANG-HAAS, 1912) (stat. rev.) are revised, both are treated here as full species. With 32 colour images and 41 genitalia figures.

Key words: Noctuidae, *Lophoterges*, new species, new stati, Eurasia

INTRODUCTION

Lophoterges HAMPSON, 1906 (s. str.) is a well-defined, easily recognizable Palaearctic genus, containing altogether ten species. The first definition of the genus is given by HAMPSON, a more detailed diagnosis and the characterization of the external and genital features, based principally on the western Palaearctic (i.e. European) species, are published by RONKAY and RONKAY (1995). It comprises four evolutionary lineages, which are considered here as distinct subgenera. The adults of the species of the two more derived groups (*Variterges* and *Fibigerges*) are very similar externally and are hardly confusable with taxa of any other genera except the species of *Lithophasia* STAUDINGER, 1892 and one of the known *Brachygalea* HAMPSON, 1906 species (e.g. *L. venosula* STAUDINGER, 1892, *L. cyaxares* WILTSHIRE, 1957 and *B. leptographa* RONKAY et GYULAI, 1997, respectively). The externally somewhat similar but otherwise rather remote Nearctic relatives are the members of the genera *Provia* BARNES et MCDUNNOUGH, 1910 and *Homohadena* GROTE, 1873.

Present paper contains the systematic survey of the taxonomy, biogeography and phylogeny of the genus. The descriptions of three new subgenera and three new species are given below.

Abbreviations: AKM – Alexander Koenig Museum, Bonn; BIN – Biological Institute, Russian Academy of Sciences, Novosibirsk; HNHM – Hungarian Natural History Museum, Budapest; MNHU – Museum für Naturkunde, Humboldt Universität, Berlin; NHMW – Naturhistorisches Museum, Vienna; DEI – Deutsches Entomologisches Institut, Eberswalde; ZIUK – Zoological Institute, University of Kiev; ZMB – Zoological Museum, Basel; ZMG – Zoological Museum, Geneva; ZMUC – Zoological Museum, University of Copenhagen; ZMUH – Zoological Museum, University of Helsinki; ZSM – Zoologische Staatssammlung, Munich.

SYSTEMATIC PART

Lophoterges HAMPSON, 1906

Lophoterges HAMPSON, 1906, *Catalogue of the Lepidoptera Phalaenae* **6**: 91. Type species: *Lithocampa fatua* PÜNGELER, 1904, *Deutsche Entomologische Zeitschrift Iris* **16**: 288, pl. 6, fig. 4. Type locality: Kuku-Noor, Tibet (China).

Phylogeny. *Lophoterges*, together with *Calliergis* HÜBNER, [1821], *Lithophasia* STAUDINGER, 1892 and *Bryomima* STAUDINGER, 1900, represent a common phyletic trunk. The closest relative of *Lophoterges* is *Lithophasia*, the two known species of this latter genus (*L. venosula* STAUDINGER, 1892, and *L. cyaxares* WILTSHIRE, 1957) are rather similar externally to the members of *Lophoterges*. The outgroup of this lineage is the *Epimecia–Rhabinopteryx* line.

The genus can be separated into four evolutionary lines, they are interpreted here as distinct subgenera. The two more primitive lineages are restricted to the Tibetan plateau and its surrounding high mountains; both contain only a single species (*L. (Lophoterges) fatua* (PÜNGELER, 1904) and *L. (Tibeterges) hoenei* DRAUDT, 1950). The two more advanced lineages display intensive allopatric speciation, and the presence of two species in the same mountain chain is exceptional; all the European taxa belong to a common subgeneric group. The members of the two monobasic subgenera (*Lophoterges* and *Tibeterges*) are easily separable from each other and from the taxa of the two other subgenera while the species of the two derived groups are very similar externally but their specific differences are easily recognizable in the genitalia of both sexes. These latter two subgenera (*Variterges* and *Fibigerges*) have a tendency of dissymmetry in the genitalia of both sexes: in the Central Asian taxa (*Variterges*) the distal parts of the valvae of males and the harpes show conspicuous asymmetry since in *Fibigerges*, the westernmost subgenus of *Lophoterges*, the sclerotised penicular lobes ("socii"; the most conspicuous synapomorphy of the genus) are also asymmetrical. This trend can be observed in the female genitalia, too, appearing mostly in the shape and sclerotisation of the ostium bursae.

Diagnosis. The most important apomorphies of the genus are as follows:

1) the *Lophoterges*-type fore wing pattern (see the detailed description of the genus and Figs 1–32),

2) the presence of the well-developed, strongly sclerotised socii,

3) the modified, sclerotised, bar-like or quadrangular-spatulate cucullus,

4) the reduction of the paired basal abdominal coremata into their sclerotised pedicels and the pocket-like membranous pouches (which are sometimes densely hairy inside; these pouches are missing in the subg. *Lophoterges*), a common synapomorphy of the genera of the *Lophoterges–Lithophasia* generic complex,

5) the presence of a pair of cartilagineous appendices on the intersegmental membrane between the last and the penultimate segments (see the Figs 36, 37, 40–42, 49, 50, 53, 56, 59, 60, 61, 64 and 66), except in the subgenera *Lophoterges* and *Tibeterges*),

6) the huge, sclerotised, flattened, asymmetrically calyculate infundibular or symmetrical, broadly funnel-like ostium bursae,

7) the rugose-wrinkled, partly gelatinous structure of the proximal part of ductus bursae (less developed in the subg. *Fibigerges*) and

8) the presence of the paired, cartilagineous, flattened, pillow-like postero-lateral prominences on the 8th sternite of the female.

Some of these features mentioned above (1, 2, 5) are unique within the entire trifine Noctuidae, the feature 4 is typical of this lineage within the subfamily Cuculliinae while features 3, 6, 7 and 8 may appear in different genera/species of the Noctuidae but very occasionally and usually in taxonomically remote groups and the combination of these characters is a very strong autapomorphy of the genus *Lophoterges*.

The apomorphies listed here are generally present in all four subgenera but their stage of development and their actual appearance may be conspicuously different. The autapomorphic character stati of these features are given under the diagnoses of the subgenera, together with the discussion of the possible other diagnostic characteristics.

CHECKLIST

Lophoterges HAMPSON, 1906
  subg. *Lophoterges* HAMPSON, 1906
    fatua (PÜNGELER, 1904)
  subg. *Tibeterges* **subgen. n.**
    hoenei DRAUDT, 1950

subg. *Variterges* **subgen. n.**
centralasiae (STAUDINGER, 1901)
aksuensis (BANG-HAAS, 1912) **stat. n.**
varians **sp. n.**
radians **sp. n.**
subg. *Fibigerges* **subgen. n.**
mariannae FIBIGER, 2001
hoerhammeri (WAGNER, 1931)
atlas **sp. n.**
millierei millierei (STAUDINGER, 1871)
millierei fibigeri RONKAY et RONKAY, 1995

Description. External morphology (Figs 1–32). Medium-sized or rather small species (wingspan 26–39 mm) with slender body and elongated, narrow fore wing; sexual dimorphism less pronounced, appearing in the somewhat larger size and the stronger dark irroration of the hind wings. Head small, frons smooth, eyes large, rounded. Labial palp porrect, hairy, relatively long, proboscis well developed; antenna of male ciliate. Collar well developed, large, forming a short but pointed hood, its colouration regularly much paler than other parts of thorax, most often silvery-greyish. Vertex and upper part of frons with strong crests of hair. Tegulae well separated, metathoracic tuft large, double. Abdomen long, slender, dorsal crest present on first segments, consisting of large tufts. Tibiae unspined, fringed with long hairs, spurs short. Basal abdominal coremata of male strongly, sometimes entirely reduced but their pedicels present (with the exception of *L. (L.) fatua*, the type species of the genus), appearing as shorter or longer, heavily sclerotised bars. Pouches of coremata may also be present, their internal surfaces usually densely covered with short, fine hairs. Last sternite of female bears paired postero-lateral, cartilagineous, more or less pillow-like prominences. Fore wing pointed, outer margin slightly crenulate, hind wing broad, rounded with fine tip. Maculation of fore wing very characteristic ("*Lophoterges*-type"), consisting of three fine, sharply defined and whitish encircled stigmata (exceptionally, *L. (L.) fatua* has greyish outlines of stigmata). Orbicular stigma narrow, long, flattened and oblique, fused partly with shorter or longer, acutely triangular suborbicular ("claviform") stigma; reniform stigma somewhat remote, narrow, lunulate, most often with fine, pointed projection at lower extremity (in *L. (T.) hoenei* the orbicular stigma is less flattened, entirely white, and the suborbicular stigma is represented by a fine white streak connecting orbicular and reniform stigmata). Costal area in most cases with conspicuous, broad light costal stripe (except in *L. (L.) fatua*).

Male genitalia (Figs 33, 34, 38, 39, 43–48, 51, 52, 54–55, 57, 58, 62, 63, 65, 67, 69–73). Uncus short, slender, slightly dilated apically. Tegumen high, penicular lobes ("socii") well developed, symmetrical or asymmetrical, smooth or dentated, with apex rounded or acute. Fultura inferior rather weak, shield-like or rounded; vinculum short, V-shaped. Valvae symmetrical or asymmetrical, saccular part broad, rather long, distal part short, narrow, usually connected with saccular part by a short neck. Distal ends of valvae more or less dilated, subrectangular or rounded, often curved; corona absent. Clavus strong, triangular, harpes asymmetrical, forming either short, pointed or acute, conical protuberances or flattened bars; in one species entirely fused with costal margin forming a strong pyramidal extension. Aedeagus cylindrical, carina smooth or finely dentated. Vesica tubular, shorter or longer, often with a larger subbasal diverticulum. Armature of vesica consisting of numerous fine, shorter or longer spinules, usually aggregated into 2–5 cornuti fields.

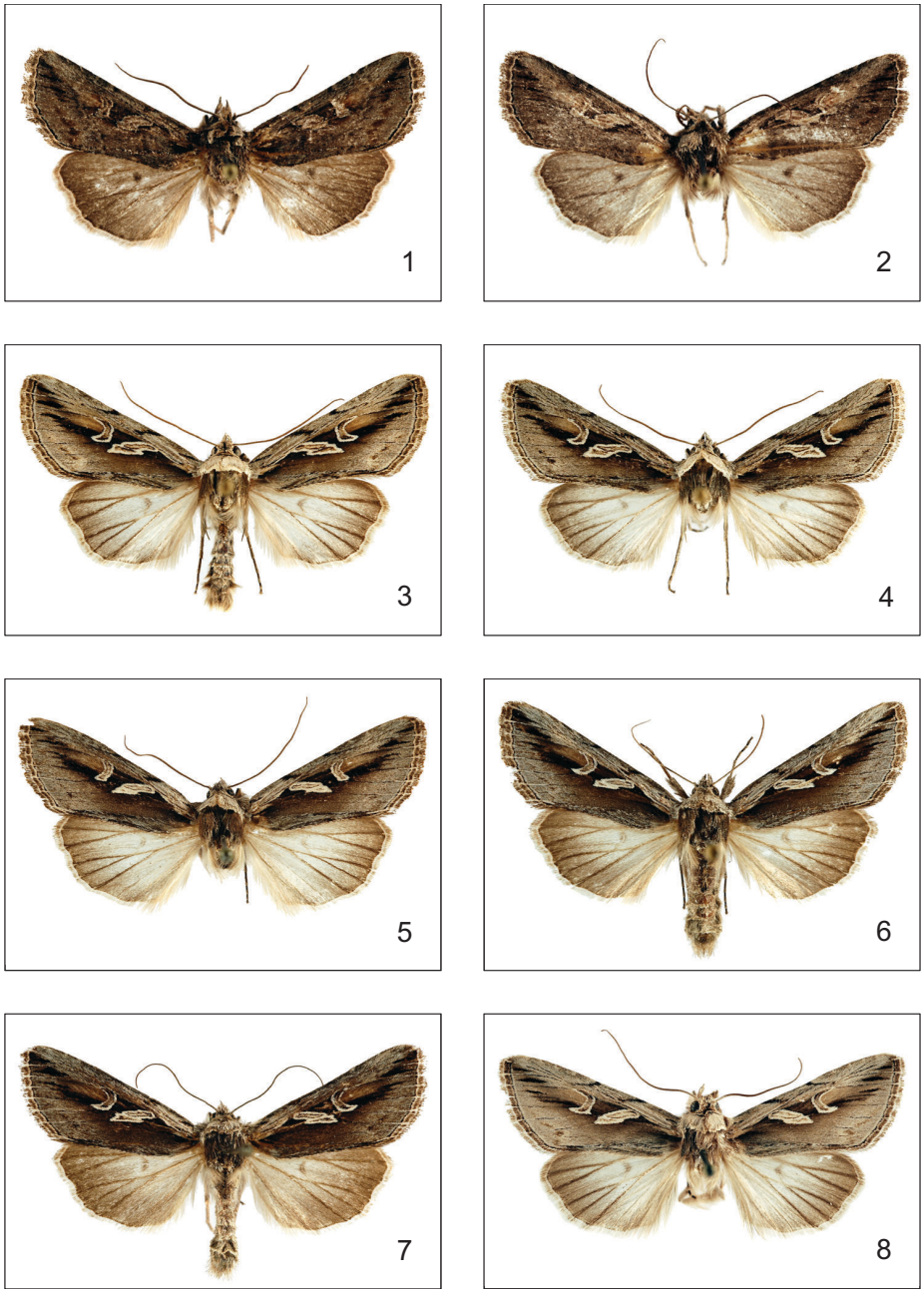
Female genitalia (Figs 35–37, 40–42, 49, 50, 53, 56, 59, 60, 61, 64, 66, 68). Ovipositor short, posterior papillae weak, densely setose, anterior papillae forming a narrow ring. Gonapophyses short, fine, intersegmental septum may have a pair of characteristic, cartilaginous, more or less moon-shaped plates (subgenera *Variterges* and *Fibigerges*). Ostium bursae large, calyculate, variably asymmetrical, sclerotised, with stronger margins and two elongated laminae on both surfaces. Ductus bursae most often tubular, connected to ostium by a membranous neck, its distal half sclerotised, long with folded margins (subgenera *Variterges* and *Fibigerges*) or rather short, membranous with sclerotised, narrow plate (subgenera *Lophoterges* and *Tibeterges*), proximal half a semiglobular or globular, gelatinous and strongly rugose bulb. Cervix bursae conical, long or short, rugose or wrinkled, often gelatinous, in certain groups partly sclerotised. Corpus bursae elliptical-ovoid, membranous with fine scobination, without or with a weak, irregular field of signa.

Bionomics. A relatively poorly known genus; the Central and West Asian and European species are associated with stream valleys, rocky gorges and localized forest patches in arid mountains, occurring at rather low and medium-high altitudes. The most ancient Inner Asian taxa occur in the more humid subalpine or alpine regions of the eastern edge of the Tibetan plateau, up to 5000 m. Uni- or bivoltine species depending on the climate and locality, the imagines are on the wing from April to August in a long single or two, partly overlapping generations. The moths are strongly attracted to artificial light. The larvae of most species are unknown; the recorded foodplants are *Lonicera* species.

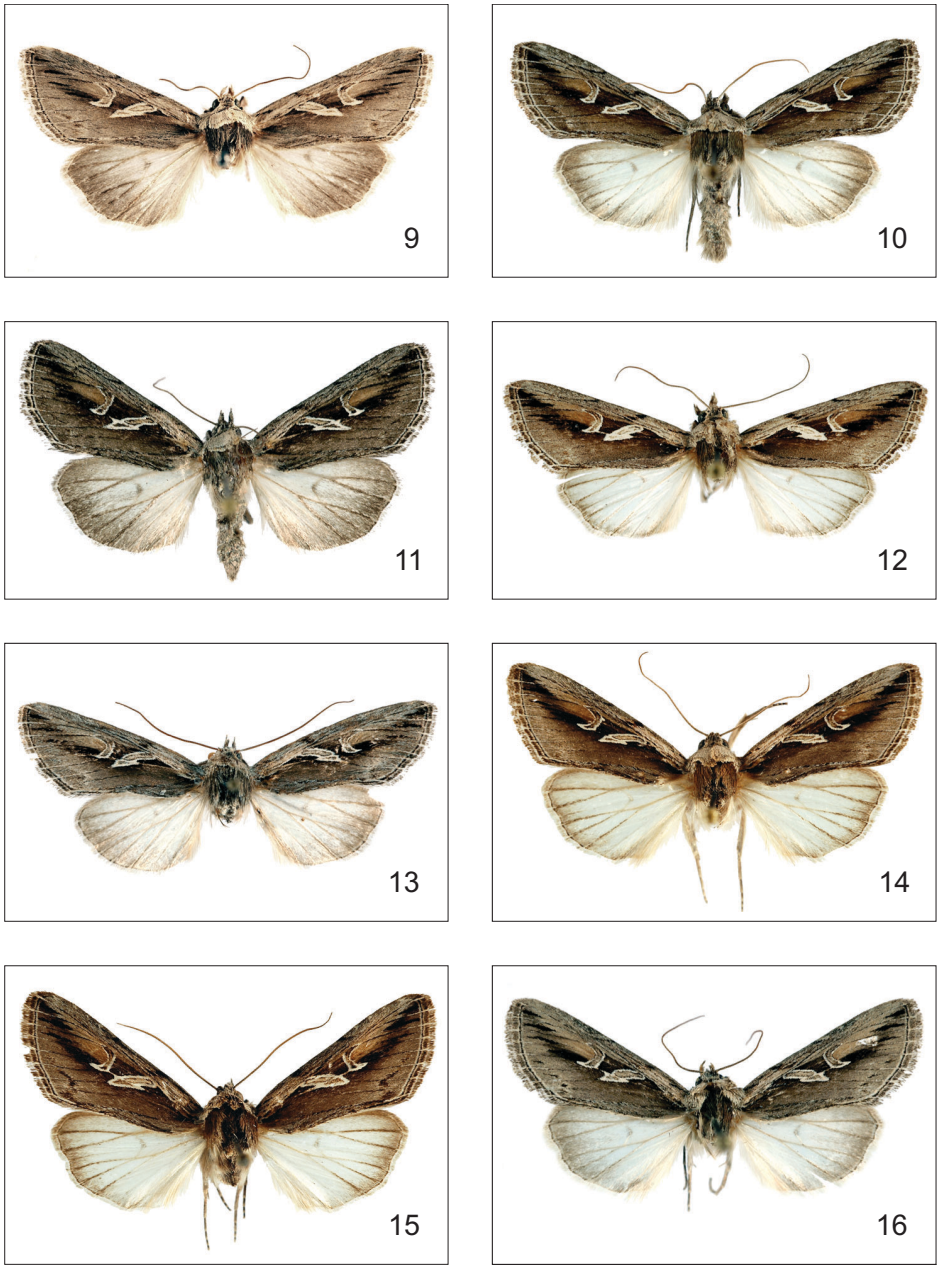
Distribution. A Palaearctic group of Sino-Tibetan origin, having two subsequent centres of dispersion in the Central Asian mountains (the Tien Shan massif and the Hissaro-Pamir mountain system) and in the eastern Mediterranean. The distribution of the species belonging to the different subgenera are almost entirely allopatric except in the Kuku-Noor region where species of at least two subgenera, *Lophoterges* s. str. and *Varierges* (*L. (V.) centralasiae*) – and possibly also a *Tibeterges* species – occur in the same smaller area. The taxa of the subgenus *Fibigerges* are also entirely allopatric while species of *Variterges* may occur sympatrically in certain parts of the Central Asian great mountains: *centralasiae* and *varians* in the western and central Tien Shan region, *centralasiae* and *radians* in the Hissaro-Pamir mountain system, while all these three species have been found in the Alai Mts and the Chatkal Mts in the western Tien Shan massif.

Key to the subgenera based on the external characters

1 fore wing with well-developed antemedial and postmedial crosslines; costal stripe not or only slightly paler than median zone of wing (Figs 1, 2, 29) *Lophoterges* s. str.



Figs 1–8. 1–2 = *Lophoterges (Lophoterges) fatua* (PÜNGELER, 1904), China, Gansu: 1 = male, 2 = female; 3–7 = *Lophoterges (Variterges) centralasiae* (STAUDINGER, 1901): 3–4 = male, Kazakhstan, Kok-Pek, 5 = male, Tadjikistan, Pamir Mts, 6–7 = female, Kirghisia, Alai; 8 = *L. (V.) aksuensis* (BANG-HAAS, 1912), male, China, Aksu



Figs 9–16. 9 = *Lophoterges (Variterges) aksuensis* (BANG-HAAS, 1912), female, China, Aksu; 10–11 = *L. (V.) varians* sp. n.: 10 = holotype, male, Uzbekistan, Chatkal, 11 = paratype, female, Uzbekistan, Chimgan; 12–15 = *L. (V.) radians* sp. n.: 12 = holotype, male, Afghanistan, Nuristan, 13 = paratype, male, Afghanistan, Safed Koh, 14 = paratype, male, Tadjikistan, Shahristan, 15 = paratype, male, Tadjikistan, Hissar; 16 = *L. (V.) radians* sp. n., paratype, male, Pakistan, Quetta

– Crosslines of fore wing reduced or fully absent; costal stripe conspicuously paler than median zone of wing (at least at basal third of wing) (Figs 3–28, 30–32) 2

2) Orbicular stigma less flattened, entirely white, suborbicular stigma represented by a fine white streak connecting orbicular and reniform stigmata (Fig. 30) *Tibeterges*

– Orbicular stigma strongly flattened, its centre darker brownish or greyish, suborbicular stigma shorter, triangular; orbicular and reniform stigmata always disconnected (Figs 3–28, 31, 32) *Variterges* and *Fibigerges*

The adults of the subgenera *Variterges* and *Fibigerges* are very similar externally, the separation of the two subgenera is rather difficult by their external features although the reniform stigma of the *Variterges* species is fully encircled with white scales (the upper part of the reniform is regularly shadowed in the taxa of *Fibigerges*) and the fore wings are somewhat larger, broader than in case of the other subgenus. The main differences between the two subgenera can be found in the configuration of the copulatory organs, they are easily distinguished by their genital features (see below).

Key to the subgenera based on the male genitalia
(the male of *Tibeterges* has not been studied)

1 Male genital capsula symmetrical (Figs 33, 67) *Lophoterges* s. str.

– Male genital capsula asymmetrical (Figs 34, 38, 39, 43–48, 51, 52, 54, 55, 57, 58, 62, 63, 65, 69–73) 2

2 Valvae strongly asymmetrical (especially their distal parts) but socii symmetrical; vesica much broader, longer, its distal part bent ventro-laterad (Figs 34, 38, 39, 43–48, 69–73) *Variterges*

– Socii strongly, conspicuously asymmetrical, heavily sclerotised and dentate (valvae only slightly asymmetrical); vesica considerably shorter, narrower, its distal part bent dorsad (Figs 51, 52, 54, 55, 57, 58, 62, 63, 65) *Fibigerges*

Key to the subgenera based on the female genitalia

1 Ductus bursae membranous with a narrow sclerotised stripe (plate); cartilaginous plates of ovipositor absent or reduced (Figs 35, 68) 2

– Distal half of ductus bursae heavily sclerotised; cartilaginous plates of ovipositor well developed (Figs 36, 37, 40–42, 49, 50, 53, 56, 59, 60, 61, 64, 66) 3

2 Ostium bursae huge, long and rather narrow, strongly sclerotised, ductus bursae with narrow sclerotised stripe; signum present (Fig. 35) *Lophoterges* s. str.

– Ostium bursae short but broad, calyculate-falciform; ductus bursae with broader sclerotised lamina; signum absent (Fig. 68) *Tibeterges*

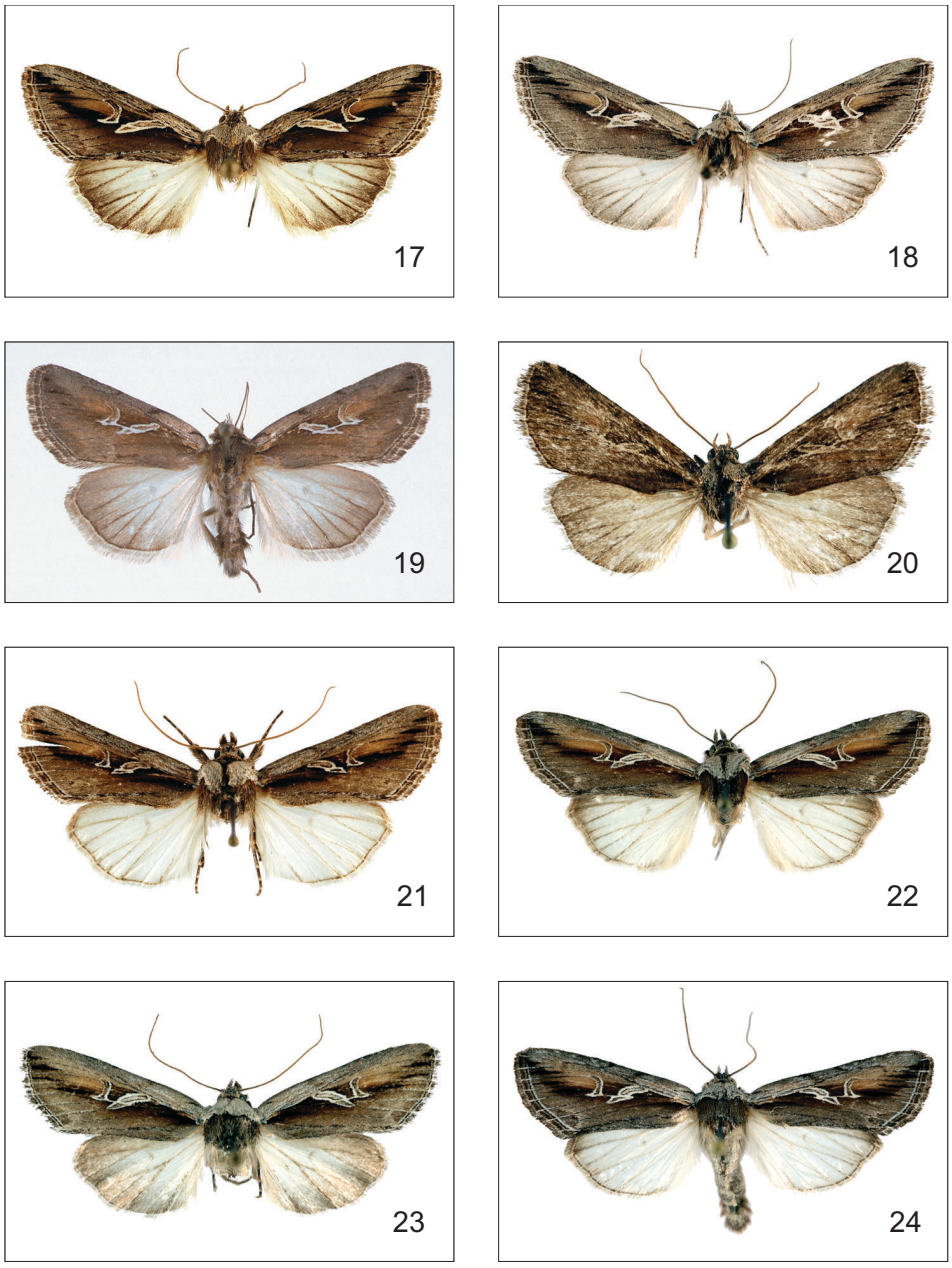
3 Ostium bursae asymmetrical, calyculate-lyriform or infundibuliform; sclerotised part of ductus bursae long (as long or longer than ostium bursae); cervix bursae large, conical, longer than corpus bursae; signum present (Figs 36, 37, 40–42, 49, 50) *Variterges*

– Ostium bursae rather symmetrical, very broad, sclerotised part of ductus bursae considerably shorter than ostium bursae; cervix bursae small, more or less globular, much shorter than corpus bursae; signum regularly absent (Figs 53, 56, 59, 60, 63, 64, 66) *Fibigerges*

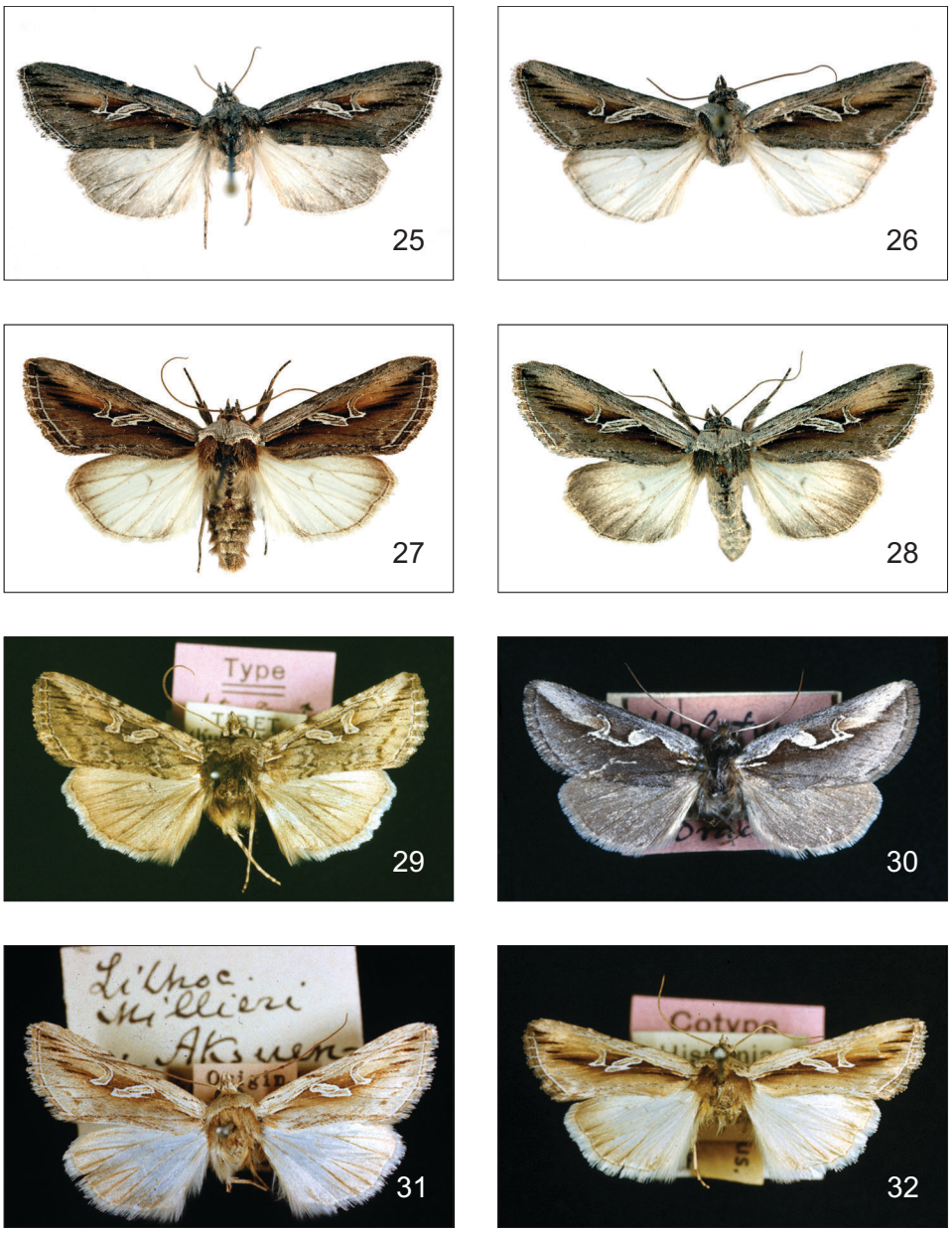
Subgenus *Lophoterges* HAMPSON, 1906

Type species: *Lithocampa fatua* PÜNGELER, 1904, *Deutsche Entomologische Zeitschrift Iris* **16**: 288, pl. 6, fig. 4.

Diagnosis. External morphology (Figs 1, 2, 29). The fore wing is rather narrow, narrower than that of all other taxa of the genus. The fore wing pattern shows a somewhat more complex picture than the characteristic *Lophoterges* type although the maculation is somewhat simplified: the orbicular stigma is less flattened and oblique and the suborbicular patch is reduced, their outlines not prominently whitish like in any other species of the genus. Contrarily, the antemedial and postmedial crosslines are clearly recognisable although diffuse, these lines are obsolete or deleted in the other *Lophoterges* species. The sclerotised pedicels of the abdominal coremata of the male abdomen are reduced to short, weak, arched bars; the membranous pockets are entirely missing.



Figs 17–24. 17–18 = *Lophoterges (Variterges) radians* sp. n.: 17 = paratype, female, Uzbekistan, Hissar, 18 = paratype, female, Afghanistan, Salang; 19–20 = *L. (Fibigerges) mariannae* FIBIGER, 2001: 19 = holotype, male, Iran, Mazandaran, 20 = male, Iran, Mazandaran; 21 = *L. (F.) hoerhammeri* (WAGNER, 1931), male, Turkey, Akshehir, 22–23 = *L. (F.) atlas* sp. n.: 22 = holotype, male, Morocco, 23 = paratype, female, Morocco; 24 = *L. (F.) millierei millierei* (STAUDINGER, 1871), male, Spain



Figs 25–32. 25 = *Lophoterges (Fibigerges) millierei millierei* (STAUDINGER, 1871), female, Spain; 26–28 = *L. (F.) m. fibigeri* RONKAY et RONKAY, 1995: 26 = holotype, male, France, Basses Alps, 27 = paratype, male, France, Sisteron, 28 = paratype, female; 29 = *L. (Lophoterges) fatua* (PÜNGELER, 1904), holotype, male, Kuku-Noor; 30 = *L. (Tibeterges) hoenei* DRAUDT, 1950, holotype, female, Tibet, Batang; 31 = *L. (Variterges) aksuensis* (BANG-HAAS, 1912, holotype, male, Aksu; 32 = *L. (Fibigerges) millierei millierei* (STAUDINGER, 1871), paratype, female, Spain

Male genitalia (Figs 33, 67). Genital capsula entirely symmetrical, socii weak, finely ciliate, apically rounded. Fultura inferior large, sclerotised, subdeltoidal; valval costa fused with harpe forming large, cuneate-pyramidal, setose extension; clavus minute but distinct. Aedeagus long, cylindrical, with large, bulbed coecum penis. Vesica everted forward, then bent dorsad and recurved towards sinus penis; distal diverticula large, subconical, armed with strong spinules, terminal bundle of cornuti even stronger, apically curved.

Female genitalia (Fig. 35). Ovipositor without cartilagineous plates on intersegmental membranes; dorsal and ventral laminae of ostium bursae homogeneously sclerotised. Appendix bursae membranous with rather strong ribs and wrinkles, proximal section with stronger, pocket-like lateral appendage.

The subgenus *Lophoterges* represents the closest stage of the supposed archetype of the genus with its fully developed fore wing crosslines, the entirely symmetrical male clasping apparatus, the absence of the cartilagineous plates of the ovipositor and the less sclerotised distal part of the ductus bursae (these two features are common with the other less developed lineage of the genus, the subg. *Tibeterges*). The morphological and biogeographical features of the three other subgenera suggest the monocentric genesis of the genus in the northern part of the Tibetan plateau and the bidirectional spreading from this centre resulting in the partly parallel speciation of the two main descendent trunks, *Tibeterges* and *Varierges*, and the secondary centre of evolution in the western Asian mountains leading to the development of the *Fibigerges* line.

Lophoterges fatua (PÜNGELER, 1904)
(Figs 1, 2, 29, 33, 35, 67)

Lithocampa fatua PÜNGELER, 1904, *Deutsche Entomologische Zeitschrift Iris* **16**: 288, pl. 6, fig. 4.
Type locality: [China] Kuku-Noor, Tibet.

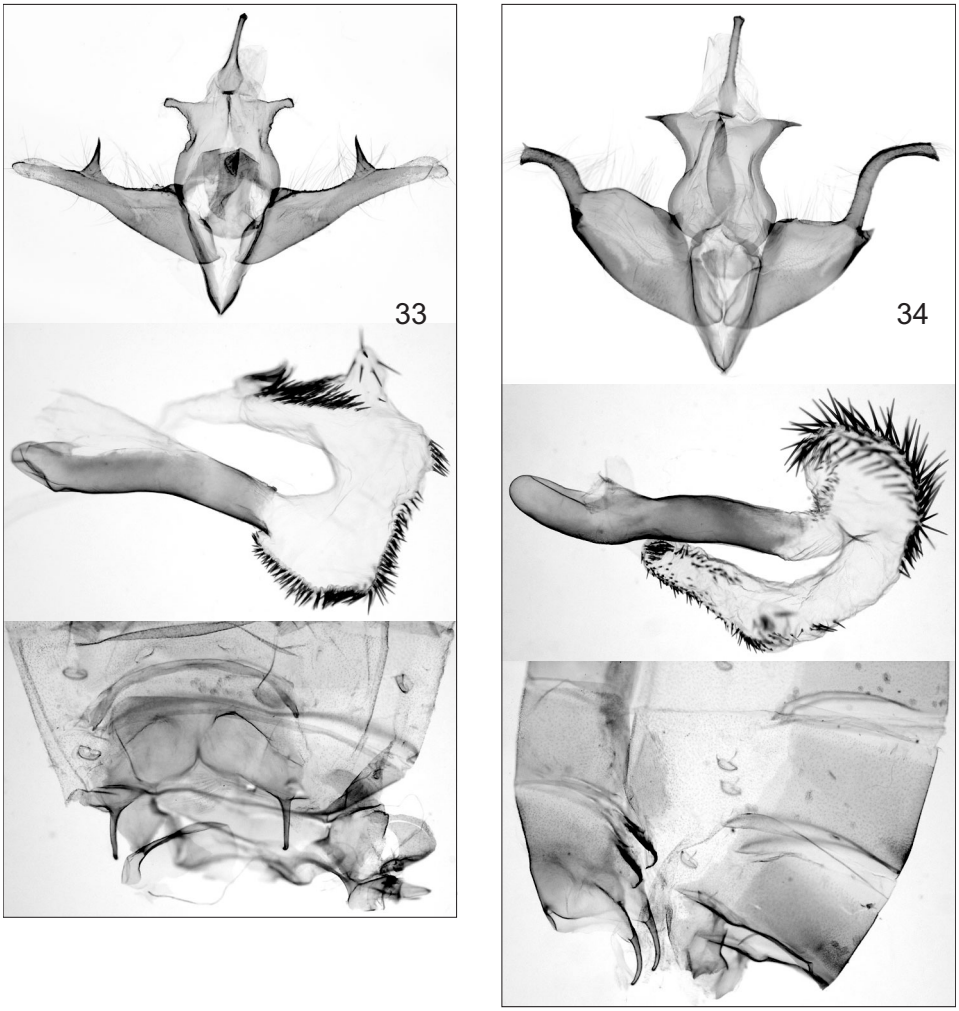
Type material examined. Holotype male, "TIBET (Kuku-Noor), Rückbeil, 98", on the underside of the label: "*fatua* Püng. ?, Original, abgebildet Iris 1903, (11/03 v. Tancr,); "Type *fatua* Püng. ?" (scarlet label); "Zool. Mus. Berlin" (yellow label); slide No. 2739 RONKAY (coll. MNHU Berlin). Paratypes: 1 male, 1 female, with the same data, labelled as "Cotype"; slide No. 3792f RONKAY (coll. MNHU Berlin).

Additional material examined. China: 1 male, 2 females, Gansu, Xiahe, 3000 m, 8.VII.1992, leg. J. VERHULST (coll. P. GYULAI & G. RONKAY); 1 female, Gansu, Xiahe, 2600–3000 m, 26–30. VI.1986, leg. GÖRGNER (coll. SPEIDEL).

Slide Nos: 8086m RONKAY (male), 5059f, 5082f RONKAY (females).

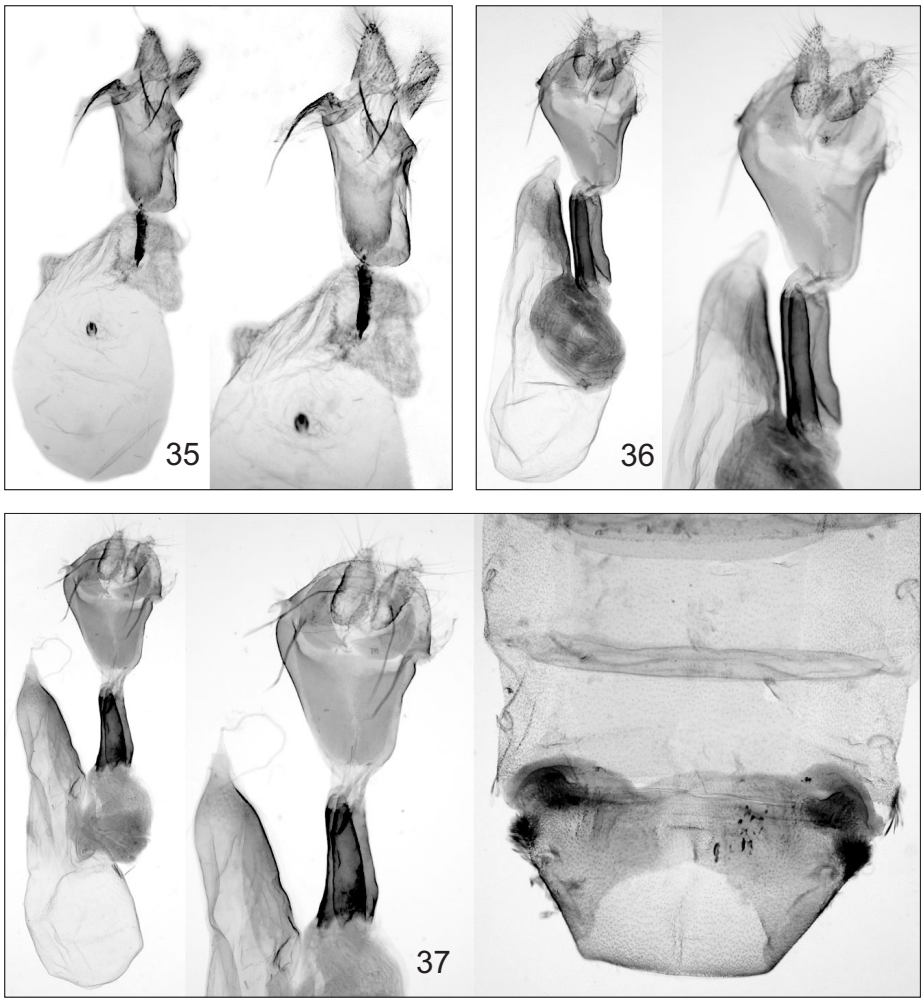
Diagnosis. The diagnostic features of the species are given under the diagnosis of the subgenus; no really similar species is known.

Description. External morphology. Wingspan 31–35 mm. Length of fore wing 14–16 mm. Head relatively large, frons broad, smooth, eyes large, globular. Antennae filiform in both sexes, distally sparsely, shortly ciliate, dorsal surface covered with pale greyish scales; antennal tuft large, bifid, grey and white. Palpi medium-long, slender, somewhat S-shaped, sides ochreous-greyish with large blackish-brown dorsal area; third segment elongate, finely curved. Collar large, pale ashy grey with strong black(ish) basal stripe. Thorax rather robust, its pubescence dark brownish grey, tegulae well developed, metathoracic tuft large, apically bifid, light grey. Abdomen slender, long, greyish brown with silvery shining, dorsal crest consisting of two chocolate-brown tufts, that of first segment minute, that of second segment large, erect. Fore wing narrow, elongated, with apex pointed, outer



Figs 33–34. 33 = *Lophoterges (Lophoterges) fatua* (PÜNGELER, 1904), male, China, Gansu; 34 = *L. (Variterges) centralasiae* (STAUDINGER, 1901), male, Kazakhstan

margin evenly arcuate, rather convex, cilia finely crenellate. Ground colour dark brownish grey, costal and marginal areas somewhat paler, more greyish, especially at termen where some ochreous irroration can be also found; veins finely covered with blackish grey. Basal dash short, white and black, with dark grey shadow around; antemedial and postmedial lines clearly visible, double, diffuse, dark grey with paler filling; median fascia thin, fine, sinuous, shadow-like. Maculation typically *Lophoterges*-like, orbicular stigma relatively broad, suborbicular stigma narrow, bar-shaped, reniform stigma narrowly semilunar, all stigmata encircled with whitish gery, filled with ground colour. Inner area of cell suffused with dark grey-brown around and between stigmata, a similarly coloured small patch can be seen at lower extremity of reniform stigma. Subterminal line sinuous, diffuse, dark grey, defined by fine blackish arrowheads. Terminal line fine, blackish with similarly



Figs 35–37. 35 = *Lophoterges (L.) fatua* (PÜNGELER, 1904): female, China, Gansu, 36–37 = *L. (V.) centralasiae* (STAUDINGER, 1901): female, Kirghisia, Alai

thin whitish inner definition; cilia as ground colour, finely striolate with whitish at veins. hind wing whitish, variably strongly suffused with brownish grey; veins and marginal suffusion somewhat darker, discal spot present, usually rather rounded. Cilia whitish with brown line. Fore wing underside brownish grey with fine violet shade, median area slightly transparent, shadows of *Lophoterges*-maculation clearly recognisable. Terminal line fine, rather sharp, blackish, cilia dark grey, chequered with paler grey. Hind wing underside whitish, irrorated with brown and grey scales; discal spot conspicuous, large; transverse line diffuse, interrupted, marked by a row of short dark streaks on veins. Cilia dirty whitish with dark brown basal and greyish medial stripes.

Male genitalia (Figs 33, 67). Genital capsula entirely symmetrical. Uncus medium-long, slender, curved, apically finely rounded; tegumen narrow, high. Socii weak, finely ciliate, apically rounded, more or less mushroom- or drumstick-like. Fultura inferior large, sclerotised, subdeltoidal; vinculum V-shaped. Valva elongate, narrow, evenly tapering distally; cucullus small, with apex rounded. Sacculus short, sclerotised, clavus minute but distinct. Harpe strong, fused with valval costa producing large, pointed, finely setose process. Aedeagus long, cylindrical, with large, bulbed coecum penis. Vesica everted forward, then bent dorsad and recurved towards sinus penis. Outer (frontal) surface covered densely with long, strong spinules forming a continuous field, medial, subterminal and terminal diverticula large, subconical, armed with strong spinules, those of terminal diverticulum even stronger, apically curved; postero-lateral field of cornuti also large, consisting of smaller, straight spinules.

Female genitalia (Fig. 35). Ovipositor short weak, without cartilagineous plates on intersegmental membranes. Ostium bursae large, narrow, rather lyriform, dorsal and ventral laminae homogeneously sclerotised. Ductus bursae relatively short, mostly membranous, distal half with fine, narrow and medium-long sclerotised ribbon, proximal two-thirds partly gelatinous and rugulose. Appendix bursae subconical, membranous with rather strong ribs and wrinkles, proximal section with stronger, pocket-like lateral appendage. Corpus bursae elliptical-ovoid, membranous; signum present.

Bionomics. Poorly known, only a few specimens of the species are known; the newly recorded adults have been collected at light. It is supposedly univoltine, the moths are on the wing in the summer (June–July).

Distribution. Records of the species are known only from the Kuku Noor region; its occurrence in the eastern part of the Tien Shan Mts requires confirmation.

Subgenus *Tibeterges* **subgen. n.**

Type species: *Lophoterges hoenei* DRAUDT, 1950, *Mitteilungen der Münchner Entomologischen Gesellschaft* **40**: 56; pl. 4, fig. 10.

Diagnosis. External morphology (Fig. 30). Large, relatively robust species with broad, rather acutely pointed fore wings. The maculation is typical of the genus with entirely white-filled stigmata and reduced crosslines. The cartilagineous pleural patches of the female abdomen are almost fully reduced.

Female genitalia (Fig. 68). Ovipositor without lunulate intersegmental cartilagineous plates; ostium bursae broadly but conspicuously shortly calyculate with

rather V-shaped dorsal and ventral sclerotised laminae; ductus bursae mainly membranous, with elongate sclerotised dorsal patch only; cervix bursae short, subconical, without sclerotised part; corpus bursae elliptical-ovoid; signum absent.

The subgenus *Tibeterges* is rather remote from the other subgenera of *Lophoterges*, representing a specially evolved descendant of the archetype with numerous autapomorphies (see above).

Lophoterges (Tibeterges) hoenei DRAUDT, 1950
(Figs 30, 68)

Lophoterges hoenei DRAUDT, 1950, *Mitteilungen der Münchner Entomologischen Gesellschaft* **40**: 56; pl. 4, fig. 10.

Type material examined: holotype female, "Batang. (Tibet). Alpine zone (ca. 5000 m) 12.6. 1938 H. Höne"; "Holotype *Lophoterges hönei* ? Draudt." (red label); "*Lophoterges Hönei* ? Draudt" (yellow label); "Bonn". Slide No. 2810 RONKAY. The holotype is deposited in the AKM Bonn.

A male specimen is published in colour by CHEN (1982), without the drawing or a photo of its genitalia. Another specimen is illustrated by CHEN (1999) in a black and white photo, with a short characterisation of the species, unfortunately in Chinese. As the author had no opportunity to receive a male specimen for study, the male genitalia of the species have remained as undescribed.

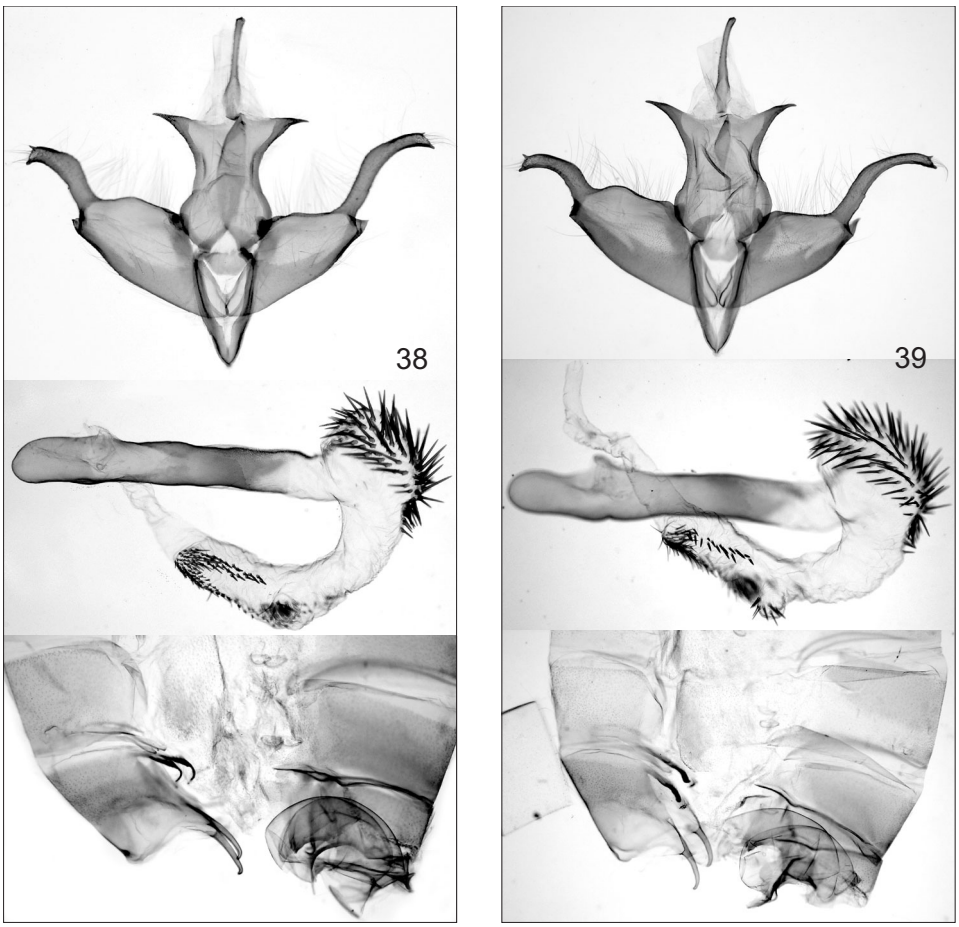
Diagnosis. See the diagnosis of the subgenus; none of the known relatives can be confused with *L. (T.) hoenei*.

Description. External morphology. Female. Wingspan 35 mm, length of fore wing 16 mm. Head small, frons smooth, eyes globular with long eye lashes. Palpi short, slightly S-shaped, ventral side covered densely with very long, blackish hairs. Antenna filiform, very shortly and sparsely ciliate, dorsal surface covered with brilliant white scales; antennal tuft bifid, unicolorous whitish. Collar produced into short, acute hood, dark grey-brown with fine metallic shining and with frosty tip. Pubescence of thorax smooth, dark brown, metathoracic tuft large. Abdomen short, dorsum smooth, shining greyish, dorsal crest represented by large, blackish-brown tuft on 2nd segment. Fore wing elongated, apically pointed, ground colour dark blackish brown with paler violaceous brown irroration, basal part of costa and long subapical patch white with fine violaceous shade. Basal dash short, fine, white, orbicular stigma elliptical, large, entirely bright white; suborbicular stigma a fine white line running along lower edge of cell from orbicular stigma to outer extremity of reniform stigma. Reniform stigma large, lunulate, encircled with fine white line, filled with brown. Marginal area suffused with ashy grey scales, subterminal line obsolescent, defined by a few dark arrowheads. Terminal line fine, blackish, with whitish shadow inside; cilia dark grey-brown with fine white lines at veins. Hind wing rounded, suffused with brownish grey; discal spot small, rounded; cilia whitish. Underside of wings pale greyish, irrorated densely with dark grey and brown. Inner and median areas of fore wing somewhat transparent, ghosts of whitish stigmata clearly visible. Hind wing veins brownish, discal spot large, arcuate, dark brown; cilia of both wings uniformly greyish.

Female genitalia (Fig. 68). Ovipositor broad but short, papillae anales wide, relatively strong. Intersegmental cartilagineous plates of ovipositor absent; gonapophyses medium-long, slender. Ostium bursae broad but short calyculate-falcate with narrow, V-shaped dorsal and ventral sclerotised plates. Ductus bursae mainly membranous, with elongated dorsal sclerotised lamina. Cervix bursae short, subconical, without sclerotised part; corpus bursae elliptical-ovoid; signum absent.

Bionomics. Poorly known. The holotype has been found at a very high altitude (5000 m a.s.l.), the records from the Kuku Noor region originate also from above the timberline.

Distribution. China: NE edge of the Tibetan plateau; Kuku Noor (Qinghai) region.



Figs 38–39. 38 = *Lophoterges (V.) centralasiae* (STAUDINGER, 1901), male, Kazakhstan; 39 = *L. (V.) aksuensis* (BANG-HAAS, 1912), male, China, Aksu

Variterges **subgen. n.**

Type species: *Lithocampa millierei* var. *centralasiae* STAUDINGER, 1901, *Catalog der Lepidopteren des palaearctischen Faunengebietes* **1**: 212. Type locality: [Kirghisia] Fergana, Osh.

Diagnosis. This lineage can be directly derived from the archetype of the genus, displaying all elements of the typical *Lophoterges* pattern of the fore wing, the rather strong dissymmetrisation of the valves and retaining the large and complex vesica in the males and the specialisation of the ductus bursae and cervix bursae as well.

The subgenus contains two subgroups, the *centralasiae*- and the *radians*-groups which are easily separable by the structure of the socii, the armature of the vesica, the shape and size of the ostium bursae and the sclerotisation of the cervix bursae. The *radians*-group is monotypical while the *centralasiae*-group comprises three closely related species, *L. (V.) centralasiae, L. (V.) aksuensis* and *L. (V.) varians*.

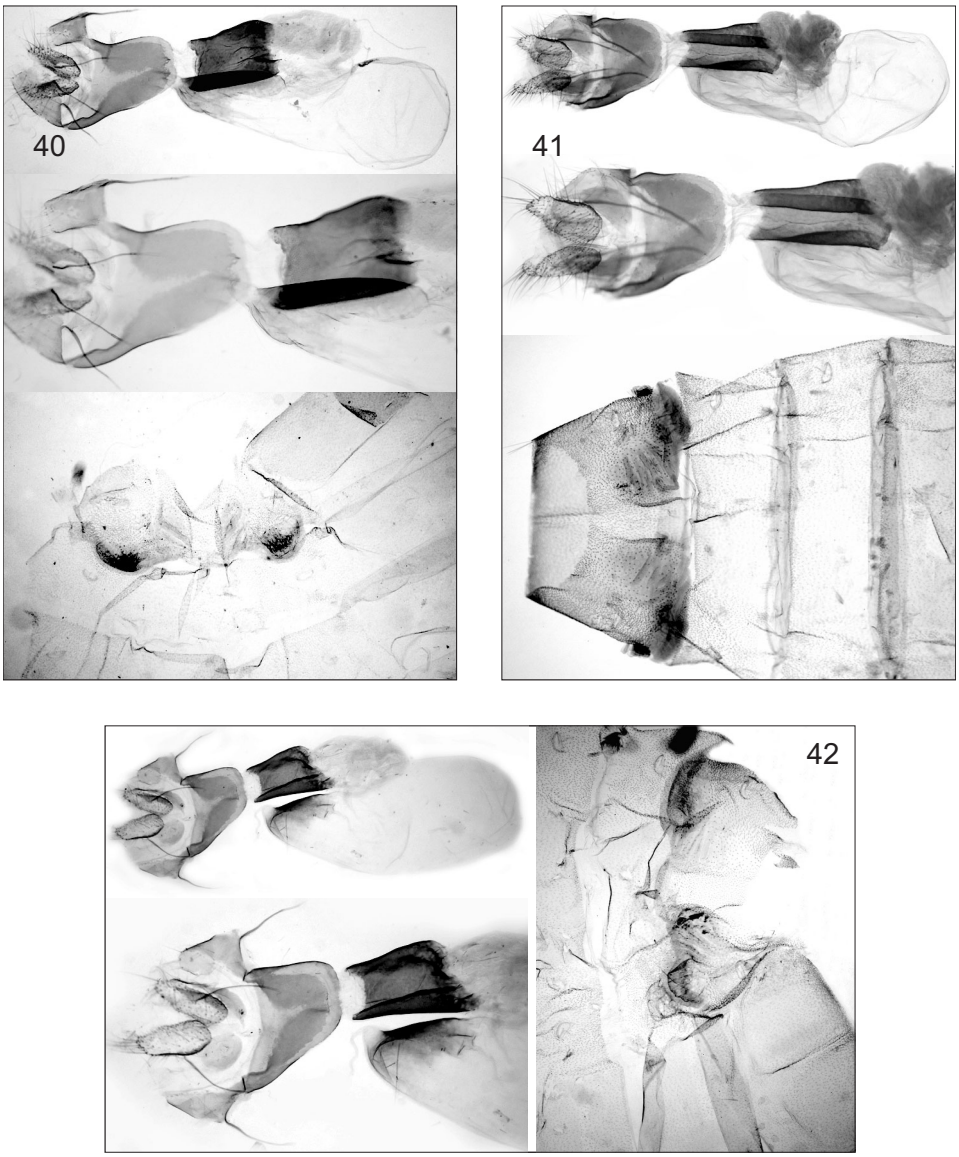
External morphology (Figs 3–18, 31). Body slender, fore wings long, relatively broad; fore wing pattern typical of *Lophoterges*, stigmata encircled with white and filled with brownish or greyish; costal stripe paler than ground colour, at least at basal third; crosslines reduced to their dark costal streaks. Abdominal coremata represented by the sclerotised pedicels of the brush-organs and the membranous pouches; last sternite of the female abdomen with well-developed pair of lateral gelatinous appendages.

Male genitalia (Figs 34, 35, 39, 43–48, 69–73). Socii well developed and sclerotised, symmetrical, acutely pointed and projected laterad, not or only finely dentate. Valvae strongly asymmetrical, saccular parts more or less equal with differently strong and long, pyramidal harpes and reduced clavi; distal parts strongly asymmetrical, represented by heavily sclerotised, variably long, arched or straight, stick- or bar-like extensions with acute apex and often with smaller or larger subapical process. Aedeagus long, strong, cylindrical, rather straight, carina less specialised. Vesica broadly tubular, everted forward then bent ventro-laterally, basal third inflated, distal two-thirds more or less evenly tapering towards ductus ejaculatorius, with two small semiglobular or conical diverticula at medial and terminal position. Armature of vesica very complex, consisting of a large number of variably strong and long, spiniform cornuti arranged into large, more or less continuous fields or into larger groups at basal, medial and terminal parts of vesica.

Female genitalia (Figs 36, 37, 40–42, 49, 50). Ovipositor short, weak, conical, cartilaginous intersegmental appendages well-developed; gonapophyses slender, fine. Ostium bursae large, flattened, strongly sclerotised, more or less asymmetrical, infundibular, calyculate or lyriform, dorsal and ventral plates unequal in size. Distal part of ductus bursae heavily sclerotised, tubular, flattened with folded lateral margins; proximal part forming a gelatinous, wrinkled-rugose bulb. Cervix bursae long, as long as or longer than sclerotised part of ductus bursae, more or less conical, with larger sclerotised patch or long sclerotised lateral lamina running from base to apex. Corpus bursae elliptical-ovoid, membranous, signum regularly present but variably strongly developed.

Bionomics. The early stages of the species are unpublished but some rearings are known from *Lonicera* species. The adults have been collected in stream valleys

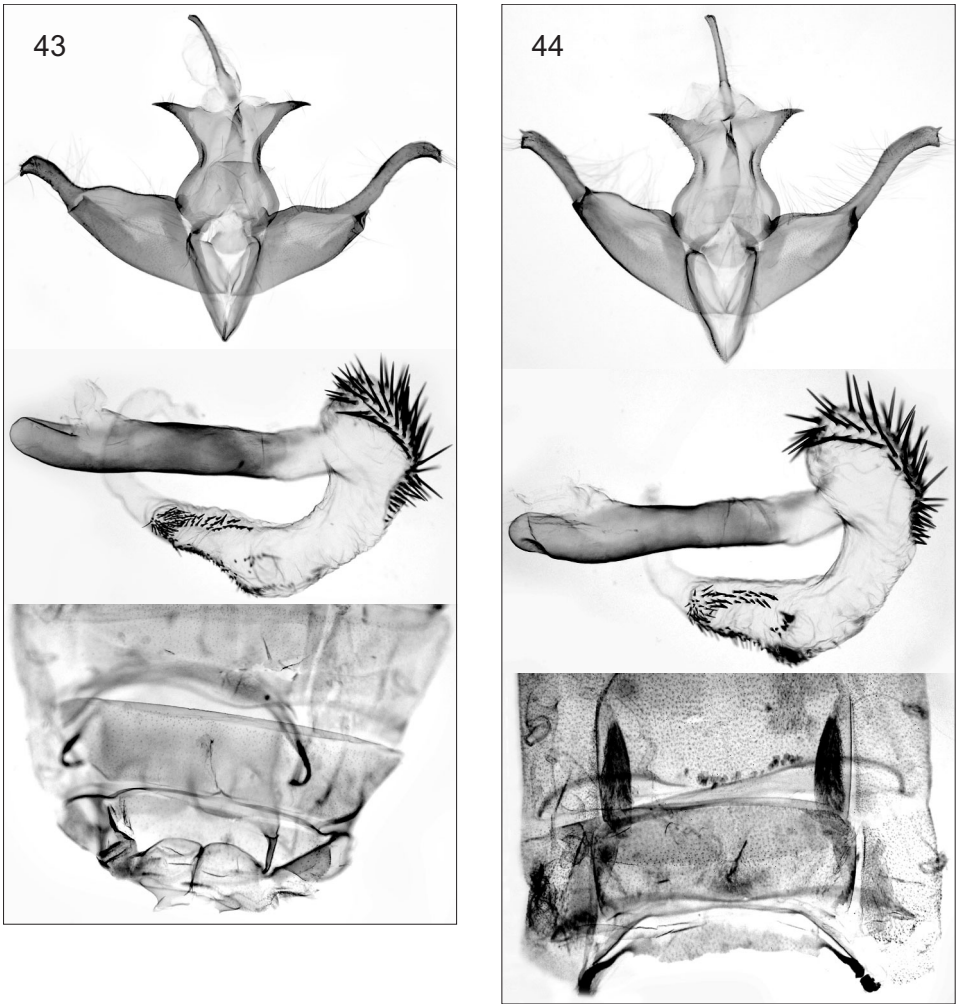
and montane rocky habitats where the *Lonicera* bushes grow, they may appear in very different zones of the Central Asian high mountain systems, from rather low altitudes up to the alpine zone. The species are univoltine or bivoltine, depending on the actual climate of the locality, the moths are on the wing from the beginning



Figs 40–42. 40 = *Lophoterges (V.) aksuensis* (BANG-HAAS, 1912), female, China, Aksu; 41–42 = *L. (V.) varians* sp. n., paratype females, Uzbekistan: 42 = Chimgan, 42 = Chatkal

of May to the end of August. They are active fliers and are attracted to the light, in certain localities may be rather frequent.

Distribution. The members of the subgenus are distributed in the Central Asian large mountains, they are typical species of the Hissar-Pamir-Hindukush and the Tien Shan mountain systems. The westernmost known locality of a *Variterges* species is the Kugitang-Tau Mts, the most easterly found specimens have been collected in the Mongolian Altai and the eastern Tien Shan Mts in Chinese Turkestan.



Figs 43–44. *Lophoterges (V.) varians* sp. n., paratype, male, Uzbekistan: 43 = Chatkal, 44 = Chimgan

Key to species of *Variterges* based on the external characters

The species of the subgenus are often very similar externally, the satisfactory identification often requires the study of the genitalia.

1 fore wing ground colour pale ochreous grey with darker grey suffusion only in cell and around termen (Figs 8, 9, 31) *aksuensis*

– fore wing ground colour darker brownish grey or ashy grey with darker greyish-brownish suffusion (Figs 3–7, 10–18) 2

2 fore wing relatively short and broad, less pointed, ground colour dark brownish grey; smaller species in average (26–31 mm) (Figs 10, 11) *varians*

– fore wing longer, more pointed apically (relatively short and broad, less pointed, ground colour dark brownish grey; usually larger species in average (28–39 mm) (Figs 3–7, 12–18) 3

3 Larger species (30–39 mm) with broader wings and darker, less shining fore wing colouration; hind wings regularly more darkened along veins, especially in females which may have broad dark marginal zone (Figs 3–7) *centralasiae*

– Smaller species (28–35 mm) with narrower, more pointed fore wings with brighter colouration; hind wings more whitish with much weaker dark brownish-greyish irroration in marginal area (Figs 12–18) *radians*

Key to species of *Variterges* based on the male genitalia

1 Vesica with more or less continuous field of long, strong cornuti from base to medial diverticulum; basal third of vesica not or only slightly inflated; lateral edges of socii always dentated-serrate (Figs 45–48, 72, 73) *radians*

– Vesica with larger membranous area between basal field of cornuti and median diverticulum; basal part of vesica inflated, bulbous; lateral edges of socii smooth (often finely setose), only rarely covered with minute teeth (Figs 34, 38, 39, 43, 44, 69–71) 2

2 Distal (stick-like) extensions of valvae curved at apical third; this extension much longer (almost twice as long) on right side; basal field or cornuti less densely spinulose, consisting of smaller number of more scattered cornuti (Figs 43, 44, 71) *varians*

– Distal (stick-like) extensions of valvae curved at middle; right extension about 1.5 as long as left extension; basal field or cornuti more dense, consisting of more numerous cornuti (Figs 34, 38, 39, 69, 70) 3

3 Socii longer, narrower, more acute; harpes larger, stronger, more pyramidal; distal parts of valvae less curved, especially on right side (Figs 39, 70) *aksuensis*

– Socii broader, less acute; harpes smaller, finer; distal parts of valvae more curved, especially on right side (Figs 34, 38, 69) *centralasiae*

Key to species of *Variterges* based on the female genitalia

1 Ostium bursae strongly asymmetrical, broad but relatively short, calyculate-lyriform, remarkably shorter than sclerotised part of ductus bursae (Figs 41, 42, 49, 50) 2

– Ostium bursae only slightly asymmetrical, broad and long, infundibular, as long as or slightly longer than sclerotised part of ductus bursae (Figs 36, 37, 40) 3

2 Cervix bursae shorter, with rounded subapical sclerotised patch; ostium bursae less strongly asymmetrical, longer and at proximal part broader (Figs 41, 42) *varians*

– Cervix bursae longer (extending towards distal end of ductus bursae), with long sclerotised lateral plate running from base to apex; ostium bursae more asymmetrical, shorter and at proximal part narrower (Figs 49, 50) *radians*

3 Ostium bursae broader and somewhat shorter, as long as or slightly shorter than sclerotised part of ductus bursae (Figs 36, 37) *centralasiae*

– Ostium bursae narrower, slightly longer than sclerotised part of ductus bursae (Fig. 40) *aksuensis*

Lophoterges (Variterges) centralasiae (STAUDINGER, 1901)
(Figs 3–7, 34, 36–38, 69)

Lithocampa millierei var. *centralasiae* STAUDINGER, 1901, *Catalog der Lepidopteren des palaearctischen Faunengebietes* **1**: 212. Type locality: [Kirghisia] Fergana, Osh.

Type material examined. Holotype female, "Ferghana, Osh, Haberhauer, 20/VII.", "Origin", slide No. 2955f RONKAY. The holotype is deposited in coll. STAUDINGER (MNHU Berlin).

Additional material examined. Kirghisia: 1 male, 1 female, 30 km E Naryn, 2500 m, 41°25'N, 76°20'E, 29.VII.1990, leg. MIKKOLA & KAILA (coll. ZMU Helsinki); 1 male, Kaingdo-Katta Mts, Kajendo, 4–10.VII.1990, R. LINDT leg. (coll. ZMU Helsinki); 1 male, Kek-Art, 2000 m, 20.VII.1991, leg. DANILEVSKY (coll. HNHM); 1 male, Kirghiz Mts, alpine camp Ala-Archa, 2050 m, 30.VII.1986, leg. NEKRASOV (coll. HNHM); 1 male, 1 female, Ala-Archa, 2000 m, 1.VII.1980 (coll. KRUŠEK); 1 female, Arslanbob, 1000 m, 15.VII.1991, leg. DANILEVSKY (coll. HNHM); 2 males, 7 females, Tien Shan Mts, Susamyr Mt., Sarykhamis, 1700 m, 3–4.VII.1995, leg. LUKHTANOV (coll. B. BENEDEK & G. RONKAY); 4 females, Chatkal Mts, Ala-Buka, Mskent, 1200 m, 6.VII.1983, leg. KRUŠEK (coll. KRUŠEK); 1 female, Tash-Koro Mts, Sary-Dzhaz, 2800 m, 13.VII.1984, leg. NEKRASOV (coll. HNHM); 2 females, Talash Mts, Kara-Bura Pass, 1800 m, 71°35'E, 42°18'N, 29.VII.1993, leg. V. & A. LUKHTANOV (coll. P. GYULAI); 1 female, Talash Mts, Chickhan valley, 1700 m, 11.VI.1996, leg. PLIUSH (coll. P. GYULAI); 2 males, Chatkal Mts, Terek-Sal, 1400–1700 m, 71°18'E, 41°25'N, 22–23.VII.1993, leg. V. & A. LUKHTANOV (coll. P. GYULAI); 2 males, 7 females, Susamyr Mts, Chickhan river, 1800 m, 29–30.VII.1994, leg. TOROPOV & SINIAEV (coll. P. GYULAI); 3 males, Chickhan valley, 1650 m, 11.VI.1996, leg. R. ANDREEVA (coll. B. BENEDEK); 2 males, 4 females, Alai Mts, Tengizbai, 27.VII.1994, leg. TOROPOV & SINIAEV (coll. P. GYULAI); 2 females, Alai Mts, Maidantau, 70 km S Kizyl Kija, 2000 m, 13–14.VII.1997, leg. PLIUSH (coll. P. GYULAI); 2 males, 8 females, Alai Mts, 50 km S Kizyl Kija, 2300 m, 72°09'E, 39°49'N, 19.VII.1993, leg. V. & A. LUKHTANOV (coll. P. GYULAI); 1 male, 1 female, Alai Mts, Chak, 2700 m, 72°00'E, 39°37'N, 16–17.VII.1993, leg. V. & A. LUKHTANOV (coll. P. GYULAI); 3 males, Alai Mts, Daraut-Kurgan, 2800 m, 72°14'E, 39°35'N, 18.VII.1993, leg. V. & A. LUKHTANOV (coll. P. GYULAI); 2 females, Alai Mts, Dugobo, 1800–2000 m, 25–26.VII.1992, leg. KOPP (coll. P. GYULAI); 1 male, Alai Mts, Dugobo, 2300 m, 15.VII.1995, leg. MURZIN (coll. P. GYULAI); 1 female, Kegety, 1–17.VIII.1993, leg. TOROPOV (coll. P. GYULAI); 1 female, Naryn, Ala-myshik, 2100 m, 4–7.VII.1994, leg. TOROPOV (coll. P. GYULAI); 1 male, 3 females, Kirghis Mts, Kara-Baitta valley, Sosnovka, 1400 m, 29–30.VI.1997, leg. PLIUSH (coll. P. GYULAI); 1 male, Issyk-kul area, Chu valley, Orto-Tokoi, 1730 m, 19.VII.1998, leg. PLIUSH (coll. P. GYULAI). Kazakhstan: 2 males, 2 females, Prov. Almaty, Uzunbulak, Mt. Kuluktau, 1880 m, 79°02'E, 43°08'N, 29.VII.1995, leg. GY. FÁBIÁN & Z. VARGA (coll. BENEDEK), 29.V.1994, leg. GY. FÁBIÁN & I. RETEZÁR (coll. G. RONKAY); 7 males, Prov. Almaty, 5 km NE Kok-Pek, Mt. Syugeti, 78°45'E, 43°28'N, 20.V.1994, leg. GY. FÁBIÁN & I. RETEZÁR; 2.VIII.1995, leg. GY. FÁBIÁN & Z. VARGA (coll. HNHM and G. RONKAY); 4 males, Prov. Almaty, Temerlik Mt., 10 km SW of Tuyuk, 2100 m, 79°20'E, 43°05'N, 27.VIII.1997, leg. Z. VARGA & A. OROSZ (coll. G. RONKAY); 2 males, Chilik, 7–15.V.1994, leg. GY. FÁBIÁN & I. RETEZÁR (coll. HNHM & G. RONKAY); 1 male, Altin-Emel, 14–15.VIII.1995, leg. GY. FÁBIÁN & Z. VARGA (coll. G. RONKAY); 1 male, Koksu, 12–13.VIII.1995, GY. FÁBIÁN & Z. VARGA (coll. G. RONKAY); 1 female, Nuratau, Hayatsai, 22.IV.1991, leg. KREITZBERG (coll. G. RONKAY); 1 male, Toraygir, Kok-Pek, 22.VI.1993, leg. V. & A. LUKHTANOV (coll. P. GYULAI); 1 male, Ketmen, 20–31.VII.1993, leg. GURKO (coll. P. GYULAI). Tadjikistan: 1 female, Hissar Mts, Anzob Pass, 3200 m, 2–10.VII.1985, leg. P. FALK (coll. KRUŠEK); 2 males, Pamir, Sarykol Mts, Dunkeldik, 4300 m, 25–27.VII.1996, leg. LUKHTANOV (coll. P. GYULAI); 1 male, 1 female, Pamir, Rushan distr., 3400 m, 10–20.VIII.1998, leg. GURKO (coll. P. GYULAI). Uzbekistan: 1 female, Ferghana, Alai Mts, Aksu-Dugobo, 2200–2600 m, 2–7.VII.1983, leg. K. CERNY (coll. HACKER); 2 males, 2 females, Alai Mts, Dugoba, near Shakhimardan, 2300 m, 4–12.VII.1996, leg. KLIMENKO (coll. T. CSŐVÁRI); 1 female, Alai Mts, Ispajran, 3400 m, August (coll. MNHU); 1 female, Alai Mts, August, coll. B. KOCH (coll. ZSM); 1 female, Kumbel Pass, 2000 m, 24.VII.1977, leg. BRUSLOVSKI (coll. KRUŠEK); 1 female, W Tien Shan Mts, Chimgan, 800–2000 m, 69°58'E, 41°32'N, 15–27.VII.1990, leg. P. GYULAI & M.

HREBLAY (coll. P. GYULAI); 1 male, Turkestan Mts, Shahristan pass, Khushikat, 2000 m, 5–8.VI.1994, leg. LUKHTANOV coll. P. GYULAI). China: 1 female, Xinjiang-Uygur region, I-ning-hsien, 1500 m, 81°55'E, 44°06'N, 25–30.VII.1991, leg. J. MAJER (coll. P. GYULAI).

Slide Nos: 2517m, 4872m, 5073m, 8047m, 8048m, 8049m, 8074m, 8075m, 8078m, 8080m, 8082m, 8083m RONKAY (males), 2955f, 3107f, 3329f, 3330f, 8056f, 8058f, 8070f, 8071f, 8072f, 8084f, 8519f RONKAY (females).

Diagnosis. The largest species of the genus (wingspan 30–39 mm) with long, slender body and elongate, relatively broad, apically pointed fore wings. The best diagnostic external feature is the hind wing colouration: the strong brownish covering of the hind wing veins and the diffuse but wide marginal suffusion, the hind wings of the females may be almost entirely brownish.

The male genitalia of *L. (V.) centralasiae* differ from those of its closest relative, *L. (V.) aksuensis* by their somewhat broader, less elongate and acute socii, the more curved stick-like distal parts of the valvae and the smaller harpes; from *L. (V.) varians* by the medially curved distal parts of the valvae and the more strongly developed armature of the vesica consisting of a larger number of cornuti arranged into more dense cornuti fields; from *L. (V.) radians* by their smooth, not dentated-serrate lateral margins of the socii, the shorter but thicker distal parts of the valvae and the discontinuous arrangement of the cornuti fields of the vesica.

The main differences of the female genitalia of the *Variterges* species can be found in the shape and size of the sclerotised parts of the ostium bursae, ductus bursae and the cervix bursae. *Lophoterges (V.) centralasiae* has, comparing with those of the other species of the subgenus, the largest and broadest ostium bursae, its length is more or less equal with the length of the sclerotised part of the ductus bursae. The cervix bursae is long, conical, acute, longer and narrower than that of *L. (V.) varians* with longer sclerotised patch. The ostium bursae of *L. (V.) aksuensis* is longer, narrower, even longer than the sclerotised part of ductus bursae while the ostium of *L. (V.) radians* is conspicuously shorter and much more asymmetrical, and the cervix bursae is rather trapezoidal having the strongest sclerotisation within the entire genus.

Description. External morphology (Figs 3–7). Colouration of head and thorax dark grey-brown with a few silvery greyish and blackish hair-scales; collar whitish grey or ash-grey with blackish grey basal and paler apical lines. Abdomen much paler, light greyish or grey brownish, lateral ridges usually dark brown; dorsal crest blackish. Fore wing variably dark brownish slate-grey or whitish grey in pastel shade, suffused with darker grey and brownish, especially in median zone of wing; females usually darker than males. Costal and marginal areas irrorated with whitish grey, especially along basal third of costa; veins covered with fine blackish-brownish scaling in marginal area. Basal dash short, diffuse, blackish, median zone with more or less diffuse, interrupted, dark chocolate-brown or blackish brown area extending from base to subterminal line in and below cell. Maculation typical of *Lophoterges*, white outlines of all stigmata very conspicuous, sharply defined. Orbicular and reniform stigmata strongly flattened, reniform lunulate with very long, well-marked

tips. Subterminal line diffuse, interrupted, represented by small, obsolescent dark brownish dots with weaker or stronger whitish definition; termen with two-three longer, stronger blackish striae between veins. Terminal line very fine, blackish followed by whitish-greyish shadow; cilia dark grey with fine whitish-ochreous medial line and streaks at veins. Male hind wing shining whitish, marginal area with darker brown irroration, veins distinctly covered with brown; discal spot most often absent or shadow-like. Terminal line fine, brown; cilia white, with a few brownish scales. Hind wing of female significantly darker, marginal suffusion broad, dark grey-brownish, sometimes extending towards base of wing. Underside of fore wing dark grey with whitish grey irroration, hind wing as on upperside but dark covering of costa, marginal area and veins stronger, discal spot small but regularly present.

Male genitalia (Figs 34, 38, 69). Typical of *Variterges* with well-developed and sclerotised, symmetrical, acutely pointed and not (or only finely) dentate socii projecting laterad, their tips less elongated and acute than those of *L. (V.) aksuensis*. Valvae strongly asymmetrical, distal parts of both valvae strongly curved at middle, having long, acute apex, subapical process absent or minute. Harpes pyramidal, large, larger than those of *L. (V.) varians* but remarkably smaller than those of *L. (V.) aksuensis*. Basal third of vesica strongly inflated, basal field of cornuti large, dense, consisting of a large number of long, spiniform cornuti, medial section of vesica membranous, spineless or armed with a few scattered spinules, terminal part of vesica armed with two long stripes of shorter spinules and a group of cornuti covering terminal diverticulum.

Female genitalia (Figs 36, 37). Ostium bursae huge, robust, only slightly asymmetrical, broadly lyriform. Distal part of ductus bursae heavily sclerotised, long, as long as ostium bursae; proximal part forming large, ovoid bulb. Cervix bursae long, narrowly conical with cuneate apex and with larger sclerotised patch.

Bionomics. The species is found in various habitats in the xerothermic hilly and montane regions of the Central Asian high mountains between 1000–4300 m altitudes, most records are known from the medium high zone (2000–2500 m). It is supposedly bivoltine, the flight period is extending from the end of April to the end of August. It can be locally frequent but nowhere common, the adults are attracted strongly to artificial light. The early stages are still undescribed.

Distribution. The species has a wide distribution in the Tien Shan system, from the western ranges to Chinese Turkestan; a few records are known from the Hissar-Pamir system, too.

Remarks. A mislabelled male specimen is preserved in the HNHM with the data “Hispania, Albarracin, 36.VI.19, PREDOTA”,, “coll. Dr. ULBRICH”.

Lophoterges (*Variterges*) *aksuensis* (BANG-HAAS, 1912) **stat. n.**
(Figs 8, 9, 31, 39, 40, 70)

Lithocampa millierei var. *aksuensis* BANG-HAAS, 1912, *Deutsche Entomologische Zeitschrift Iris* **26**: 157. Type locality: [China]: Aksu. (The holotype is first illustrated by PÜNGELER, 1904, *Deutsche Entomologische Zeitschrift Iris* **16**, pl. 6, fig. 4, as “*Lithocampa millierei* ?v. *centralasiae*”).

Type material examined: holotype male, "Origin." (red label), "*Lithoc. Millieri* v. *Aksuensis*, B-H., Aksu", "Zool. Mus. Berlin" (yellow label). Slide No. 2740 RONKAY. The holotype is deposited in coll. PÜNGELER (MNHU).

Additional material examined. China: further 37 males, 18 females, Aksu, Uch-Kasanak, VI.1914, coll. SHELJUZHKO (coll. ZIUK, HNHM, ZMB, G. RONKAY); 1 male, Korla, leg. WEIDINGER, coll. SHELJUZHKO (HNHM); 1 male, Ili Range, coll. LEONHARD (coll. DEI); 1 female, Chol-Tag, ad pradum Aga, VIII.1914, leg. RÜCKBEIL (HNHM); 5 males, Aksu (coll. NHMW); 2 males, from the same locality, labelled as "millierei v. aksuensis" and "millierei v. fergana" (coll. ZMG).

Slide Nos: 2740m, 2852m, 2963m, 8053m RONKAY (males), 2876f RONKAY (female).

Diagnosis. The species is closely related to *L. (V.) centralasiae*, although they are easily separable by their colouration: the ground colour of the fore wing of *L. (V.) aksuensis* is much paler, ochreous slate-grey or beige-coloured (that of *L. (V.) centralasiae* brownish slate-grey with stronger brown-grey suffusion), elements of dark pattern also much paler, like in a strongly faded specimen of *L. (V.) L. (V.) aksuensis*. The hind wings of *L. (V.) aksuensis* are more ochreous-whitish and the darker suffusion is paler brownish although similarly broad as in *L. (V.) L. (V.) aksuensis*. The differences in the male genitalia are slight but recognisable, *L. (V.) aksuensis* has longer, more acute, terminally finely curved socii, medially less curved, apically less pointed distal parts of the valvae with stronger subapical peaks and larger, more pyramidal harpes; the structure of the vesica shows no distinctive features. In the female genitalia, *L. (V.) aksuensis* has longer, narrower ostium bursae, the longest within the entire genus and the proportion of the ostium bursae/ductus bursae is also different, see the identification key of the subgenus.

Description. External morphology (Figs 8, 9, 31). Wingspan 31–35 mm, length of fore wing 14–17 mm. Head and thorax ochreous grey or pale browhish grey mixed with a few blackish-brown hair-scales; collar ochreous whitish or light ochreous-grey, basal and apical lines somewhat darker grey. Abdomen pale ochreous grey, both tufts of dorsal crest dark brown, second one very large. Fore wing light, ochreous slate-grey or beige in pastel shade, suffused with some brownish grey in basal and median zones. Wing pattern typical of *Lophoterges* but less contrasty, except of costal streaks of antemedial and postmedial lines, dark brownish zone in and along cell, dark striae of termen and darker covering of veins in marginal area. Terminal line very fine, blackish followed by ochreous-greyish line; inner part of cilia dark grey, outer half remarkably paler; cilia striolate with fine whitish-ochreous streaks at veins. Male hind wing shining milky whitish with some ochreous shade, marginal area with darker brown irroration, veins also covered with brown; discal spot small, shadow-like. Terminal line fine, brown; cilia white, with pale brownish line. Hind wing of female with darker, more dense marginal suffusion. Underside of both wings pale, whitish ochreous with weak greyish and brown irroration. Inner and median areas of fore wing rather transparent, shadows of upperside maculation clearly visible. Veins finely covered with darker scales, terminal line fine, brownish, cilia as on upperside. Hind wing with fine darker costal and marginal suffusion, veins covered with pale brown; discal spot small but rather strong, rounded brown dot. Cilia white with brownish basal line.

Underside of fore wing dark grey with whitish grey irroration, hind wing as on upperside but dark covering of costa, marginal area and veins stronger, discal spot small but regularly present.

Male genitalia (Figs 39, 70). Typical of *Variterges*. Socii sharply projecting, apically finely curved their tips more elongated and acute than in case of *L. (V.) centralasiae*; distal parts of valvae less curved at middle, their tips less cuneate but having longer, more distinct subapical processi absent or minute. Harpes pyramidal, large, larger than those of *L. (V.) centralasiae*. Basal third of vesica inflated, covered by numerous large spiniform cornuti arranged into dense, extensive cornuti field. Medial part of vesica bears a few spines in a short row, medial small diverticulum covered by a small group of longer spinules; terminal field of cornuti consists of shorter spinules, terminal diverticulum armed with several fine spinules.

Female genitalia (Fig. 40). Ostium bursae large, long and relatively narrow, only slightly asymmetrical, somewhat longer than distal part of ductus bursae. Cervix bursae long, acutely conical, narrow, with large sclerotised patch.

Bionomics. Poorly known, the laconic labelling of the old specimens provides only approximate information even about the flight period (June and August). The species is probably xerophilous, occurring in the shrubby habitats of the foothills and the stream valleys of the eastern Tien Shan massif. A larger series was collected by one expedition only, otherwise seldom specimens are preserved in a few large museums.

Distribution. The species is known from the historical localities of Chinese Turkestan (Aksu, Korla, the Ili Range), no new records are available.

Remarks. CHEN mentioned this species twice from China, first time (1985) under the name *L. centralasiae*, later (1999) as *L. millierei*.

Lophoterges (Variterges) varians sp. n.
(Figs 10, 11, 41–44, 71)

Holotype: male, "Uzbekistan, W-Tien-Shan 1200 m, Tshatkal Reserve, Bash-Kizil-Say, 27.V.-VI.3.1982, leg. Peregovits". The holotype is deposited in coll. HNHM Budapest.

Paratypes. Uzbekistan: 7 males, 5 females, W-Tien-Shan Chatkal Reserve, Bash-Kizil-Say, 1200 m, 27.V.-VI.3.1982, leg. L. PEREGOVITS (coll. HNHM, HACKER and FIBIGER); 1 male, 1 female, from same locality, 1–4.VI.1981, leg. O. MERKL & I. HAHN (coll. HNHM); 67 males, 88 females, Chimgan, 800–2000 m, 18–25.VII.1990, leg. GYULAI & HREBLAY (coll. HNHM Budapest, P. GYULAI, M. HREBLAY, G. RONKAY); 1 male, 1 female, Bolshoj Chimgan, 1500 m, 3.VII.1981, leg. K. & P. KRUŠEK (coll. KRUŠEK); 1 female, Chimgan, 1700 m, 5.VII.1991, leg. DANILEVSKY (coll. HNHM). Kazakhstan: 2 males, 2 females, W Tien-Shan, Thalasskiy Alatau, valley Aksu-Dzhabagli, 1300 m, 8.VII, 17.VII.1985, leg. I. KOSTYUK (coll. HNHM and G. RONKAY); 1 male, Prov. Almaty, Zailisky Alatau, 4 km SE Kaskelen, 1000 m, 76°47'E, 43°08'N, 16.VI.1996, leg. GY. FÁBIÁN and L. NÁDAI (coll. BENEDEK); 1 female, Saisan, 84°55'E, 47°28'N, 13–15.VI.1993, coll. SCHINTLMEISTER (coll. SPEIDEL); 1 male, Akterek, 25.V.1994, leg. GY. FÁBIÁN & Z. VARGA (coll. G. RONKAY); 1 male, Alma-Ata, Aksay, 800 m, 9.VII.1981, leg. K. CERNY (coll. SPEIDEL); 1 male, Karatau Mts, Kentau, 800 m, 4.V.1994, leg. PLIUSH (coll. P. GYULAI); 1 female, Boroldai Mts, Pisteli, 700 m, 8.VI.1992, leg. M. DANILEVSKY (coll. P. GYULAI). Kirghisia: 2 males, 1 female, Chon-Aryk, 1200 m,

17–22. VIII.1993, leg. TOROPOV (coll. P. GYULAI); 2 females, Alai Mts, 20 km E Uch-Kurgan, near Kuva, 1800 m, 13.VII.1993, leg. M. KOPP (coll. P. GYULAI and G. RONKAY); 1 female, Tash-Kumyr valley, Burzhu-bulak, 1100 m, 8.VII.2001, leg. S. CHURKIN (coll. P. GYULAI). Mongolia: 1 female, Chovd aimak, Mongol Altai Mts, Uliassutai gol, 45 km NNE Somon Bulgan, 1400 m, 6.VII.1966, leg. Z. KASZAB, No. 638 (coll. HNHM).

Slide Nos: 2518m, 2744m, 2745m, 3818m, 4541m, 8051m, 8052m, 8522m, 8523m, 8530m, 8531m RONKAY (males), 2521f, 2523f, 2743f, 8059f, 8060f, 8061f, 8065f, 8067f, 8525f, 8526f, 8528f, 8529f RONKAY (females).

Diagnosis. *Lophoterges (V.) varians* is the smallest species of the subgenus (wingspan 26–31 mm), being regularly considerably smaller than the other taxa of *Variterges*. *Lophoterges (V.) varians* is more broad-winged than the other *Variterges* taxa, its fore wing apex is more rounded and the basis colouration is less variegated, less shining than those of *L. (V.) centralasiae* and *L. (V.) radians*.

The male genitalia of *L. (V.) varians* differ from those of the *L. (V.) centralasiae – L. (V.) aksuensis* species-pair by the almost straight, only apically curved distal parts of the valvae and the shorter, broader, less acutely pointed socii, and the harpes are the smallest in *L. (V.) varians*. The male genitalia of these three species differ from those of *L. (V.) radians* by their smooth socii, shorter valvae and, especially, by the discontinuous armature of the vesica, having two large spinulose areas being separated by a longer spineless section.

The female genitalia of *L. (V.) varians* can be distinguished more easily from those of *L. (V.) centralasiae* and *L. (V.) aksuensis* by the considerably smaller, shorter and more asymmetrical ostium bursae, the shorter distal part of the ductus bursae and the shorter cervix bursae having smaller sclerotised plate. The ostium bursae of *L. (V.) radians* is even more shortened and more asymmetrical and the cervix bursae is considerably larger, longer and more sclerotised than those of *L. (V.) varians*.

Description. External morphology (Figs 10, 11). Wingspan 26–31 mm. Colouration of head and thorax dark chocolate-brown with grey-brown shade, mixed with a few silvery greyish and blackish hair-scales; collar pale ash-grey with blackish grey basal and paler apical lines. Abdomen much paler, light greyish with more brownish lateral ridges; dorsal crest well developed, blackish. Fore wing relatively short, apically less pointed than in other species of *Variterges*, ground colour dark brownish, suffused with whitish grey, darker grey and brownish. Costal and marginal areas paler, irrorated with whitish grey or ashy grey, median zone darker, more brownish; veins covered with fine blackish-brownish scaling in medial and marginal areas, this covering turns into whitish along terminal line. Basal dash medium long, blackish, with dark brownish shadow around; median zone with dark chocolate-brown or blackish stripe running from base to termen in and below cell. Maculation typical of *Lophoterges*, white outlines of stigmata very sharp. Orbicular and reniform stigmata strongly flattened, reniform semilunar, narrow, with long, pointed tips. Costal streaks of antemedial and postmedial lines most often present, blackish grey, other parts of crosslines deleted. Subterminal line diffuse, interrupted, partly whitish greyish defined by small, dark brownish dots; termen with two-three longer, stronger, rather diffuse blackish striae between veins. Terminal line

very fine, blackish followed by whitish line; cilia with fine whitish-ochreous medial line and whitish streaks at veins, basal half as ground colour, outer half paler greyish brown. Male hind wing shining silky whitish, marginal area with darker brown irroration, veins with fine brownish covering, especially in marginal area; discal spot diffuse but usually present. Terminal line fine, brown; cilia whitish, with a few brownish scales. Hind wing of female with broader, more intense darker marginal suffusion. Underside of fore wing greyish with whitish grey irroration, hind wing as on upperside but dark covering of costa, discal spot, marginal area and veins stronger.

Male genitalia (Figs 43, 44, 71). Ground plan typical of *Variterges*. Uncus short, curved apically and slightly dilated, tegumen narrow, high, socii symmetrical, relatively broadly cuneate-triangular, acutely pointed but their tips less elongated and acute than those of *L. (V.) aksuensis* and *L. (V.) centralasiae*; their lateral margins smooth, finely setose, sometimes minutely dentate. Valvae strongly asymmetrical, distal parts of both valvae rather slender, curved at apical third; right extension twice as long as left one, rather hockey-stick-like with relatively short, pointed apex and small but well-visible subapical peak. Harpes pyramidal, small, smaller than those of *L. (V.) centralasiae* and *L. (V.) aksuensis*. Basal third of vesica strongly inflated, basal field of cornuti large, consisting of a large number of long, spiniform cornuti, this field rather dense but more sparse than those of *L. (V.) centralasiae* and *L. (V.) aksuensis*, its proximal section (close to dorsal edge of carina) consists of smaller, shorter spinules. Medial third of vesica membranous, regularly spineless, terminal part of vesica armed with two long stripes of shorter spinules; terminal diverticulum small, semiglobular, covered with fine cornuti.

Female genitalia (Figs 41, 42). Ovipositor very short, weak, conical; gonapophyses thin, short. Ostium bursae moderately long, broader than longer, strongly asymmetrical, lyriform-calyculate. Distal part of ductus bursae heavily sclerotised, long, longer than ostium bursae; proximal part forming large, elliptical-ovoid, wrinkled-rugose, gelatinous bulb. Cervix bursae moderately long, shorter than those of *L. (V.) centralasiae* and *L. (V.) aksuensis*, conical with larger, apically rounded sclerotised patch, terminated in small, pointed apex.

Bionomics. The species is a typical member of the fauna of the shrubby forest belt following the stream valleys in the lower and medium high altitudes of the semiarid-xeromontane regions of the Tien Shan system. It appears as local but not rare in its habitats. *Lophoterges (V.) varians* is presumably bivoltine, the adults are on the wing from the beginning of May to the end of August; the moths are strongly attracted to light.

Distribution. The core area of the species is the western Tien Shan (Chatkal, Chimgan, Alai) including also the insular mountains in the steppe zone located north-westwards from the western chains of the Tien Shan massif; only a few records are known from the central parts of the Tien Shan (Thalasskiy Alatau, Zailiskiy Alatau, Saisan). Interestingly, a seldom female specimen of the species was found in the western part of the Mongolian Altai (Chovd province), indicating the supposedly larger range of the species and, indirectly, the level of exploration of the Noctuidae fauna of the eastern Tien Shan region.

Lophoterges (Variterges) radians sp. n.
(Figs 12–18, 45–50, 72, 73)

Holotype: male, "NE Afghanistan, Prov. Badakhshan (Darwaz), vic. Kwahan, Pari Kham, 2500 m, 26.7.72, No. 353, leg. Brade & Naumann". Slide No. 2519 RONKAY (coll. HNHM Budapest).

Paratypes. Afghanistan: 1 female, Pr. Kunar, Nuristan, ob. Lindai-Sin Valley, vic. Barg-e-Matal, "Flussaue", 2200 m, 4.7.70, leg. NAUMANN, No. 73. (coll. NAUMANN, AKM). 1 female, Nuristan, Bashgal, vic. Barg-e-Matal, Flussaue, 2200 m, 16.VII.1971, leg. NAUMANN (coll. KRUŠEK); 1 female, Badakhshan, Pejuj, NE Baharak, 1750 m, 27.VI.1971, leg. BRADE & NAUMANN (coll. NAUMANN, AKM); 1 female, Prov. Kadaghan, Salang Pass, N slope, 2100 m, Khinjan valley, 13.VI.1970, leg. NAUMANN (coll. KRUŠEK); 1 female, Badakhshan, Pejuj, NO Baharak, 1750 m, 27.VI.1971, leg. BRADE & NAUMANN (coll. NAUMANN); 1 female, from the same locality, 13.VI.1971, leg. E. VARTIAN (coll. VARTIAN, NHMW); 1 male, Safed Koh, S slope, 2350 m, 21.VI.–1.VII.1969, leg. E. VARTIAN (coll. HNHM). Pakistan: Baluchistan, Quetta, Ziarat, 2500 m, 14–19.VI.1992, leg. WEIDENHOFFER (coll. SPEIDEL). Tadjikistan. Pamir Mts: 1 male, Khorog, Botanical garden, 2300 m, 4.V.1989, leg. NEKRASOV (coll. HNHM); 1 female, Vantsh, Gumajar, 5–7.VI.1978, leg. A. SCHINTLMEISTER (coll. HACKER); 1 male, Shugnanski hrebet, 2000 m, 17–23.V.1971, leg. WOJTUSIAK (coll. HNHM); 1 male, Chorog, 2700 m, 2.VII.1969, leg. L. LASOTA (coll. HNHM); 2 females, W Pamir, Khorog, 2300 m, 28.VI, 8.VII.1982, leg. SHCHETKIN (coll. P. GYULAI); 1 male, Ishkasimski hrebet, 2000 m, 8.V.1976, leg. WOJTUSIAK (coll. HNHM); 1 female, SW Pamir, Ishkashim Mts, Khashkhorog, 2300 m, 15.VII.1991, leg. PLIUSH (coll. P. GYULAI). I. Peter Mts: 1 male, Goluboe ozero, 16.VII.1990, R. LINDT leg. (coll. ZMUH); 2 females, W. Peter Mts, Obichingou river, 1550 m, 39°N, 71°E, 11.VI.1971, JÜRIVETE leg. (coll. ZMHU). Hissar Mts: 1 female, Kondara, 30.IV.1980 (coll. BIN); 2 females from the same locality, 1100 m, 30.V.1956, 29.VIII.1956, leg. SHCHETKIN (coll. G. RONKAY); 4 males, 7 females, Hissar Mts, Barzob valley, Kondara, 30-V.–7.VII.1956, leg. SHCHETKIN (coll. P. GYULAI); 1 male, Hissar Mts, Kondara (coll. T. CSŐVÁRI); 1 female, Barzob valley, Gushary, 1350 m, 19.VI.1966, leg. SHCHETKIN (coll. P. GYULAI); 1 female, Ramit (coll. BIN); 4 males, Ramit natural reserve, 26.IV.1988, leg. O. GORBUNOV (coll. M. FIBIGER, G. RONKAY and W. SPEIDEL); 1 female, 20 km NW Tursunsade, 1000–1200 m, 30.VI.–3.VII.1994, leg. LUKHTANOV (coll. P. GYULAI); 1 male, 50 km N Shakhrisabz, 22–24.V.1994, leg. KLIMENKO (coll. P. GYULAI). Turkestan Mts: Shahristan pass, Khushikat, 2000 m, 5–8.VI.1994, leg. LUKHTANOV (coll. G. RONKAY). Seravshan valley: 1 male, Pendzhikent, 1200 m, 13.V.1994, leg. LUKHTANOV (coll. P. GYULAI); 1 male, Pendzhikent, Aini-Revad, 1200 m, 12.VII.1994, leg. LUKHTANOV (coll. P. GYULAI); 1 female, Pendzhikent distr., Farob, 1800 m, 16–19.VI.1994, leg. LUKHTANOV (coll. P. GYULAI). Karategin Mts: 3 males, 4 females, Sangikar, 1700 m, 15.VII.1969, 30.V.1971, 1.VI.1971, 21.IV.1972, 2.VI.1972, 3.VI.1972, leg. SHCHETKIN (coll. P. GYULAI). Kirghisia: 1 male, 1 female, Alai Mts, 20 km E Uch-Kurgan, near Kuva, 1800 m, 13.VII.1993, leg. M. KOPP (coll. P. GYULAI). Turkmenistan: 5 males, Kugitang-Tau Mts, 4 km SW Airi-Baba peak, 2000 m, 22.V.1991, No. L24, leg. M. HREBLAY & G. RONKAY (coll. HNHM, M. HREBLAY & G. RONKAY). Uzbekistan: 1 male, Kugitang Mts, Chashmaobisan, 1500 m, 120 km NNW Termes, 4.VII.1994, leg. LUKHTANOV (coll. P. GYULAI); 4 females, Amankutan Mts, 1200 m, 60 km S of Samarkand, 28–30.VI.1981, leg. K. & P. KRUŠEK (coll. KRUŠEK); 2 females, Hissar Mts, Djapoja, Tankhizdarya valley, 67°19'E, 38°53'N, 4.VI.1995, leg. J. MAJER (coll. P. GYULAI); 4 males, Turkestan Mts, Shahristan pass, Khushikat, 2000 m, 5–8.VI.1994, leg. LUKHTANOV (coll. P. GYULAI); 1 female, Bukhara, env. Katan, V.1994, leg. ROMANOV (coll. P. GYULAI); 1 male, 3 females, W Tien Shan, Chatkal Mts, Zaaminsky reserve, 1–10.VII.2001, leg. GURKO (coll. P. GYULAI);

2 females, Nuraton Mts, Sarmitan, 40 km W Farish, 1300 m, 11–13.VI.1994, leg. LUKHTANOV (coll. P. GYULAI).

Slide Nos: 2690m, 3965m, 5074m, 5081m, 7539m, 7540m, 7541m, 8050m, 8066m, 8076m, 8079m, 8081m, 8088m, 8517m, 8518m, 8521m RONKAY (males), 2522f, 2755f, 3429f, 3696f, 3981f, 3982f, 4290f, 4291f, 5222f, 5223f, 8057f, 8073f, 8077f, 8085f, 8087f, 8089f, 8520f, 8524f, 8527f RONKAY (females).

Diagnosis. *Lophoterges (V.) radians* is rather remote from the other members of the subgenus although it is hardly distinguished externally from *L. (V.) centralasiae* (and sometimes also from *L. (V.) varians*). The fore wings of *L. (V.) radians* are, however, somewhat more elongated and apically more pointed and the scaling is finer, more brilliant than those of the related species.

The most conspicuous autapomorphy of the male genitalia of *L. (V.) radians* is the laterally dentated-serrate socii (they are smooth in the other species of the subgenus), another diagnostic, although rather plesiomorphic character is the continuous cornuti field of the dorsal (frontal) surface of the vesica running from the edge of the carina towards the terminal diverticulum (the other three species of *Variterges* have two large cornuti fields with a regularly longer spineless part at the medial third of the vesica).

The female genitalia of *L. (V.) radians* are easily separable from those of *L. (V.) centralasiae*, *L. (V.) aksuensis* and *L. (V.) varians* by the smallest, shortest and most asymmetrical ostium bursae within *Variterges* and the long, more or less trapezoidal, strongly sclerotised cervix bursae which is the specific autapomorphy of *L. (V.) radians*.

The species shows a considerable variation in the external and genital features as well and the early studies on a smaller material from Afghanistan and Tadjikistan suggested to arrange the specimens into two groups (specimens with more dentated-spinose, dorsally almost straight socii and shorter, thicker, apically less pointed but more curved valvae versus specimens with less dentated, dorsally arched socii and longer, slendered, apically pointed and more or less straight valvae with well-developed subapical peaks) which could be considered as distinct species (see Figs 45–48, 72, 73). The opportunity to investigate larger, recently collected material (cca 60 specimens) shows a more or less continuous range of variation between the two extremes, displaying no geographic tendencies in the changs of the given character states. Thus, all *Variterges* specimens having dentated-spinose socii and continuous arrangement of the cornuti in the vesica (males), short, strongly asymmetrical ostium bursae and widely sclerotised, rather trapezoidal cervix bursae (females) are relegated into a common, new species, described here under the name *L. (V.) radians*. It is not impossible that this taxon comprises more than one species but new material (especially from the southern

and south-eastern parts of Afghanistan) and additional studies (e.g. DNA-taxonomic analysis) would be essential for the more detailed examinations.

Description. External morphology (Figs 12–18). Wingspan 28–35 mm. Head and thorax dark chocolate-brown mixed with a few grey-brown hair-scales; collar pure ash-grey or silvery-grey with blackish grey basal and apical lines; abdomen much paler, pale greyish with slightly darker lateral ridges, dorsal crest blackish. Fore wing narrow, elongated, narrower and more pointed than those of the other species of *Variterges*, ground colour shining, variably dark brownish grey in pastel shade, with vivid, bright dark red-brownish or chocolate-brownish suffusion in median area. Costal and marginal areas irrorated with whitish grey, basal third of costa prominently whitish-greyish; veins marked with fine whitish-greyish scaling in marginal area. Basal dash short, diffuse, blackish, long, fine; dark stripe of median zone dark chocolate-brown area; inner margin and anal vein fine, blackish in median area. Maculation typical of *Variterges*, white outline of reniform strongly lunulate with sharply defined, long tips; orange-brownish patch behind reniform small, usually less conspicuous. Costal streaks of antemedial and postmedial lines usually well-discernible, dark grey; subterminal line most often obsolete, sometimes represented by a few dark dots; termen with two-three stronger black-brown striae between veins. Terminal line double, very fine, white and blackish; cilia as ground colour with lighter outer part, finely striolate with whitish-ochreous streaks and medial line. Male hind wing shining silk-white, marginal area narrow with weak dark brownish-greyish irroration, veins with fine darker covering; discal spot most often obsolescent, shadow-like. Terminal line fine, dark brown; cilia white, with a few brownish scales. Hind wing of female with somewhat broader but diffuse brownish marginal suffusion and stronger dark covering on veins. Underside of fore wing greyish with variably intense whitish grey irroration, hind wing as on upperside but with somewhat stronger dark irroration, discal spot stronger, more prominent.

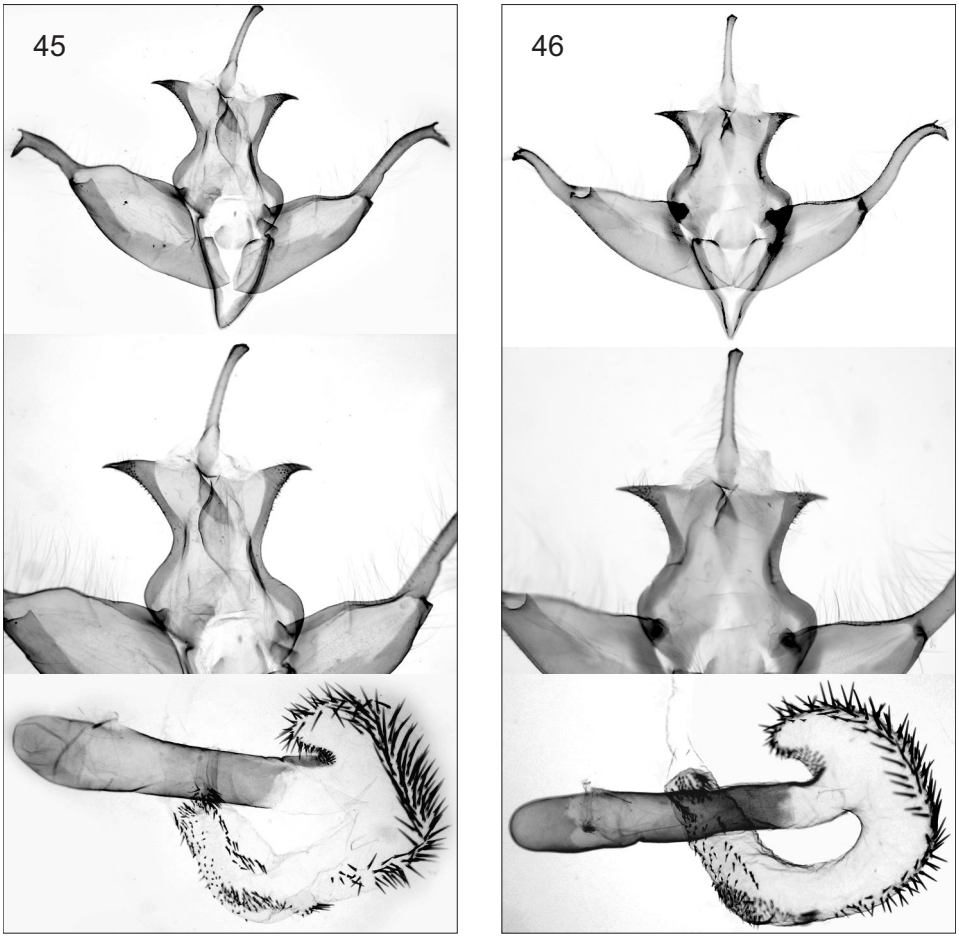
Male genitalia (Figs 45–48, 72, 73). Ground plan typical of *Variterges*. Socii symmetrical, ventro-lateral margins variably strongly dentated-spinose, dorsal margins finely arched or rather straight, apices acutely pointed and heavily sclerotised. Valvae strongly asymmetrical, saccular part of left valva larger, broader; distal parts of valvae long, stick-like, considerably longer on right side; their apical parts most often acute, curved downwards (ventrad), subapical peak well developed. Harpes also asymmetrical, larger, broader on left side, both harpes more or less pyramidal, relatively small. Aedeagus long, strong, cylindrical, ventral edge of carina sclerotised. Vesica long, broadly tubular, everted forward then recurved ventro-laterad. Armature of vesica very complex, consisting of a great number of variably strong and long, acute spinules arranged into a long continuous zone from dorsal edge of carina to terminal diverticulum; cornuti longest and strongest in subbasal area. Terminal diverticulum small, semiglobular, covered densely with fine spinules.

Female genitalia (Figs 49, 50). Ostium bursae strongly sclerotised, broad and short, strongly asymmetrical, rather calyculate-lyriform. Distal sclerotised part of ductus bursae long, longer than ostium bursae, proximal wrinkled-rugose, gelatinous part large, regularly longer than distal section. Cervix bursae long, more or less trapezoidal with apex acute, most parts sclerotised; corpus bursae elliptical-ovoid, membranous with fine scobination; signum present, relatively strong.

Bionomics. A species connected to the higher montane shrubby vegetation and the gallery forests following the upper parts of the stream valleys of the high mountains. The known localities lie between 1000–2700 m altitudes, the majority of the records comes from about 2000 m a.s.l. The species is most probably univoltine with a long generation, with the flight period extending from the end of

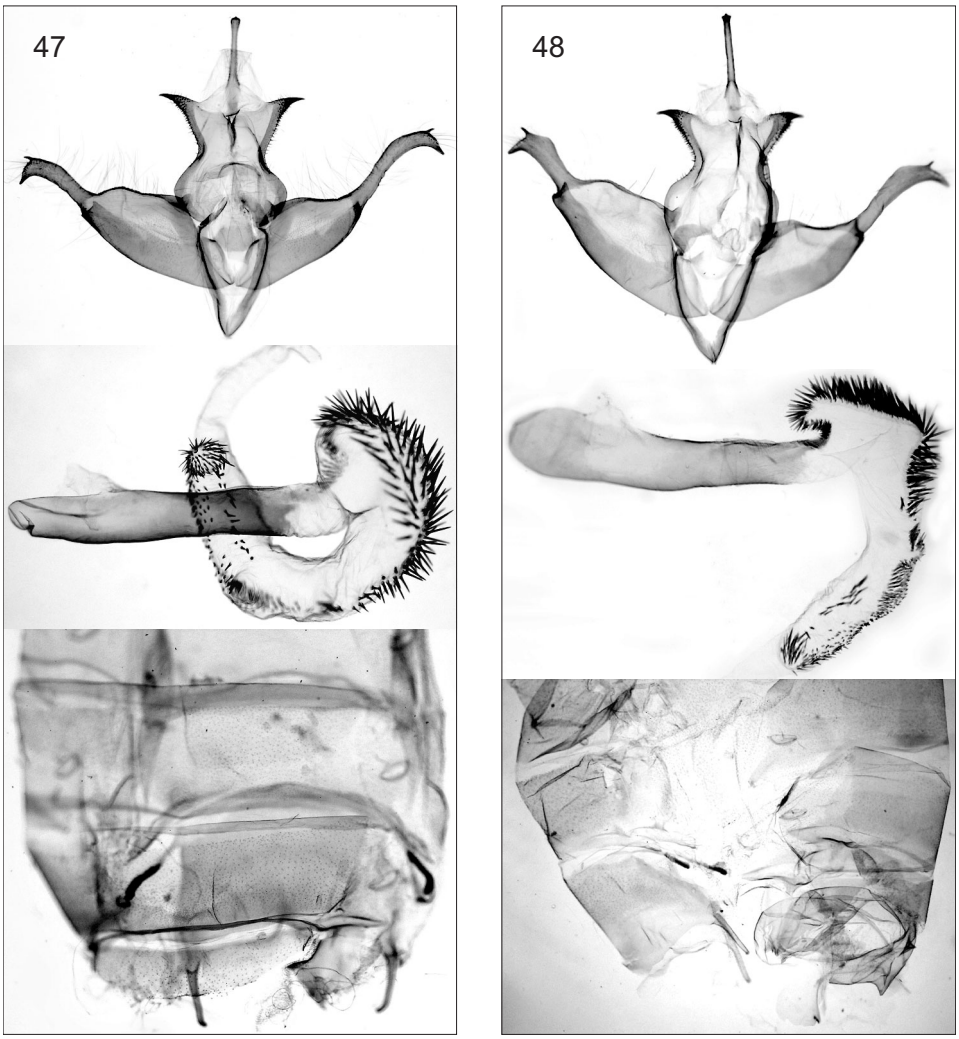
April to the middle of July; the moths are strongly attracted to artificial light. The early stages are undescribed but rearings of specimens on *Lonicera* species are documented on their labels (collected by SHCHETKIN in the Hissar Mts).

Distribution. The species is distributed widely in the Hissar–Pamir–Hindukush mountain system but nowhere is common. The westernmost records from this mountain system are known from the Kugitang-Tau Mts; a few additional specimens are found southwards from the main chain of the Hindukush (Quetta in Pakistan; Safed Koh in Afghanistan). The range of *L. (V.) radians* has a slight overlap here with that of *L. (V.) centralasiae* (Turkestan Mts: Shahristan, Hissar Mts, the plateau of the Pamir).



Figs 45–46. *Lophoterges (V.) radians* sp. n., male: 45 = holotype, Afghanistan, Nuristan, 46 = paratype, Tadjikistan, Hissar Mts

Interestingly, *L. (V.) radians* has been discovered recently in the western parts of the Tien Shan Mts (Alai Mts) where it occurs sympatrically with *L. (V.) varians* and *L. (V.) centralasiae*.

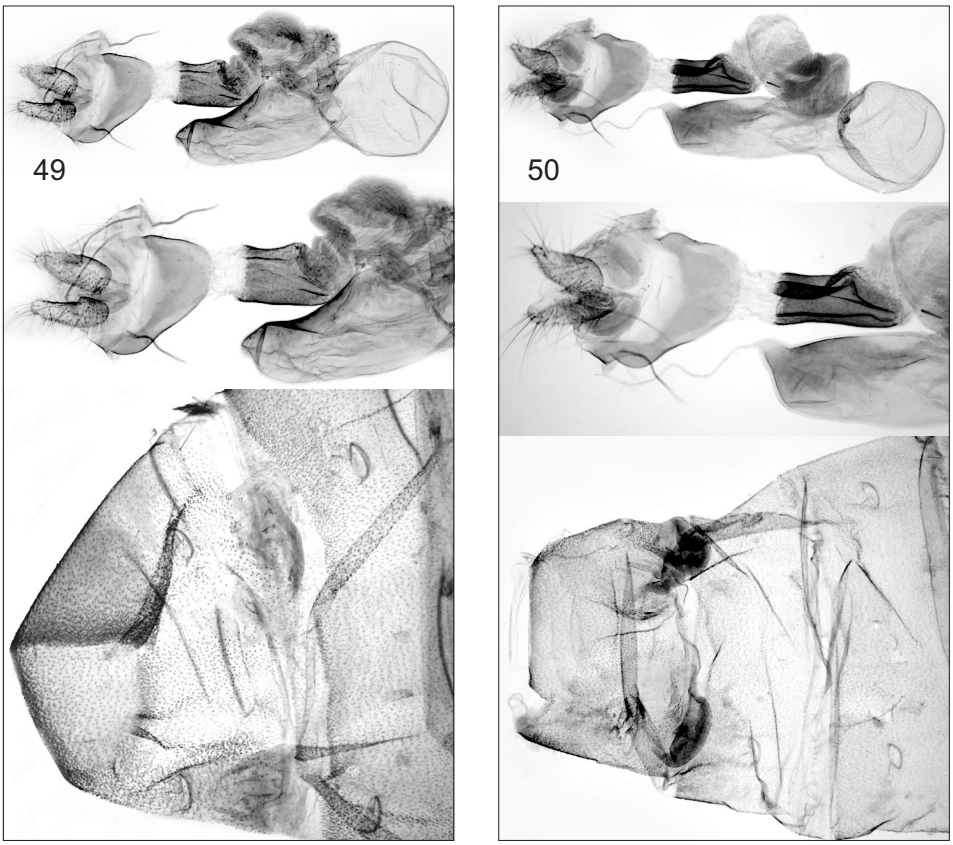


Figs 47–48. *Lophoterges (V.) radians* sp. n., male, paratypes: 47 = Tadjikistan, Hissar Mts, 48 = Pakistan, Quetta

Subgenus *Fibigerges* **subgen. n.**

Type species: *Lithocampa millierei* STAUDINGER, 1871, *Berliner Entomologische Zeitung* [1870]1871: 119, 330. Type locality: Spain.

Diagnosis. External morphology (Figs 19–28, 32). Body slender, fore wings long, relatively broad, apex finely pointed. Fore wing ground colour most often shining brownish with fine grey and blackish-brown irroration. Wing pattern typical of *Lophoterges*, stigmata encircled with white and filled with brownish or greyish, upper part of reniform stigma rather shadowed; costal stripe paler than ground colour, at least at basal third; crosslines reduced, sometimes their dark costal streaks may be recognised; terminal line regularly double, its inner white line most often conspicuous, sharply marked. Abdominal coremata represented by variably



Figs 49–50. *Lophoterges (V.) radians* sp. n., female, paratypes: 49 = Uzbekistan, Hissar, 50 = Afghanistan, Salang

strongly sclerotised pedicels of the brush-organs and their membranous pouches; last sternite of the female abdomen with well-developed pair of lateral gelatinous appendages.

Male genitalia (Figs 51, 52, 54, 55, 57, 58, 62, 63, 65). Socii well-developed and heavily sclerotised, projected ventrad, strongly asymmetrical, their apices acutely pointed or finely bifurcate, laterally strongly dentated/serrate. Valvae less strongly asymmetrical, saccular parts usually slightly unequal in size: left valva somewhat broader (in *L. (F.) millierei* considerably broader). Clavi reduced, costal margin with sclerotised, small basal process; harpes represented only by their basal bars. Distal parts of valvae shorter, flattened, straight and bar-like or somewhat arched and terminally spatulate, forming variably broad, quadrangular cucullus. Aedeagus long, strong, cylindrical, rather straight, carina less specialised. Vesica strongly shortened and simplified, narrowly tubular with somewhat inflated basal part; everted forward then bent dorsad and recurved towards coecum penis. Armature of vesica arranged into two small groups: a smaller subbasal and a more or less discontinuous, larger terminal field of cornuti consisting of fine spinules.

Female genitalia (Figs 53, 56, 59–61, 64, 66). Ovipositor short, weak, broadly conical, cartilaginous intersegmental appendages well-developed; gonapophyses slender, fine. Ostium bursae huge, strongly sclerotised, more or less symmetrical (except in *L. (F.) hoerhammeri*), broadly infundibular, dorsal and ventral plates very strongly unequal in size. Distal, heavily sclerotised, part of ductus bursae relatively short, considerably shorter than ostium bursae, tubular, flattened with folded lateral margins; proximal part forming a gelatinous, wrinkled-rugose bulb. Cervix bursae shortened, always shorter than sclerotised part of of ductus bursae, semiglobular or subconical, its apical section gelatinous-rugose, sometimes partly sclerotised. Corpus bursae elliptical-ovoid, weakly membranous; signum regularly absent, rarely represented by a diffuse verrucose patch.

The most westernly distributed lineage of the genus has been derived supposedly from an archaic taxon of the *Varierges* line. The known four species are completely allopatric but their morphological features do not fit completely with a "linear tendency of changes" theory: the three main morphotypes of the subgenus (the *mariannae-,* the *hoerhammeri-*, and the *millierei*-groups) are rather divergent in their male genital characteristics while the female genitalia are much more conservative, displaying only small specific differences. The first two species-groups represented by single species while the *millierei*-group contains three closely related taxa: *L. (F.) millierei millierei, L. (F.) millierei fibigeri* and *L. (F.) atlas*, respectively.

Bionomics. The species inhabit most often stream valleys and rocky slopes in xerothermic hilly and mountainous areas (from the low altitudes up to 3000 m), occurring also in semiarid and arid regions where their foodplants live. They seem to prefer the lower and medium-high places except *L. (F.) mariannae* which has been found exclusively above 2000 m a.s.l. The species are univoltine or bivoltine but it is often hardly decided whether they have a single, long or two short, partly overlapping generations in a given locality; the imagines are on the wing from the beginning of May to the end of August–beginning of September.

The early stages of the species are usually unknown, the caterpillars of *L. (F.) millierei* have been found and reared on *Lonicera* species.

Distribution. The range of the subgenus covers small, more or less disjunct areas in the Mediterranean and western Asia but their ranges are still incompletely known; the most easterly distributed species is known from the Elburs Mts. All members of the subgenus are stenochorous and their ranges, at least in case of the European species, are strongly fragmented.

Key to species of *Fibigerges* based on the external characters

The species of the subgenus are often very similar externally, the satisfactory identification often requires the study of the genitalia.

1 fore wing ground colour uniformly dark brownish with paler brown basal costal stripe; hind wing with darker grey suffusion (Figs 19–20) *mariannae*

– fore wing ground colour paler, fore wing patter more complex and vivid in colouration; hind wing brilliant white (Figs 21–28, 32) 2

2 hind wing almost pure white, without darker shadow and/or ochreous shade; fore wing shorter, less elongated and pointed, pale zone along inner margin more whitish-greyish; subapical orange-brownish patch smaller, less conspicuous (Fig. 21) *hoerhammeri*

– hind wing with wider darker shadow, especially around termen and on veins; fore wing longer, apically more pointed, pale zone along inner margin more brownish; subapical orange-brownish patch bright, large, conspicuous (Figs 22–28, 32) *atlas* and *millierei*

Key to species of *Fibigerges* based on the male genitalia

1 Distal parts of valva narrowly bar-shaped, long, without spatulate cucullus (Figs 51, 52) *mariannae*

– Distal parts of valva shorter, cucullus spatulate, sitting on shorter or longer, narrow neck (Figs 54, 55, 57, 58, 62, 63, 65) 2

2 Socii only slightly asymmetrical, apically bifid (Figs 54, 55) *hoerhammeri*

– Socii strongly asymmetrical, terminated in long, thorn-like (single) process (Figs 57, 58, 62, 63, 65) 3

3 Valvae narrower, saccular part proportionally longer, distal part arched, forming rather narrow, less separated cucullus (Figs 57, 58) *atlas*

– Valvae broader, more asymmetrical, distal part proportionally longer, cucullus broader, more capitate, not or only slightly arched (Figs 62, 63, 65) *millierei*

Key to species of *Fibigerges* based on the female genitalia

1 Distal sclerotised part of ductus bursae not bulbous anteriorly, its lateral margins almost parallel; cervix bursae with stronger sclerotisation (Figs 53, 56) 2

– Distal sclerotised part of ductus bursae with well-developed lateral bulb anteriorly; cervix bursae without stronger sclerotisation (Figs 59, 60, 61, 64, 66) 3

2 Ostium bursae significantly shorter, somewhat more asymmetrical; sclerotisation of cervix bursae weaker (Fig. 56) *hoerhammeri*

– Ostium bursae much longer, stronger, almost symmetrical; most parts of cervix bursae with stronger sclerotisation (Fig. 53) *mariannae*

3 Distal part of ductus bursae longer (cca as long as medial length of ostium bursae); ostium bursae more infundibular (more strongly tapering proximally) (Figs 59, 60) *atlas*

– Distal part of ductus bursae shorter; ostium bursae more calyculate (less tapering towards ductus bursae) (Figs 61, 64, 66) *millierei*

Lophoterges (Fibigerges) mariannae FIBIGER, 2001
(Figs 19, 20, 51–53)

Lophoterges mariannae FIBIGER, 2001, *Acta zoologica hungarica* **46**(4): 333. Type locality: Iran, Elburs.

Type material examined. Holotype male, Iran, Elburs, Masandaran, Haraz-Rud-valley, Polur, 27.VI.1973, leg. WAGENER & SCHMITZ, deposited in coll. M. FIBIGER (Sorø; later in ZMUC). Paratypes: 1 male and 2 females, with the same data, coll. S. WAGENER (Bocholt, Germany).

Additional material examined. Iran: 1 male, Prov. Mazandaran, Demavend, 3000 m, 4.VI. 1999, leg. HÁCZ & KŐSZEGI (coll. P. GYULAI).

Slide Nos: 2516 FIBIGER, 8090m RONKAY (males); 4404f RONKAY (female).

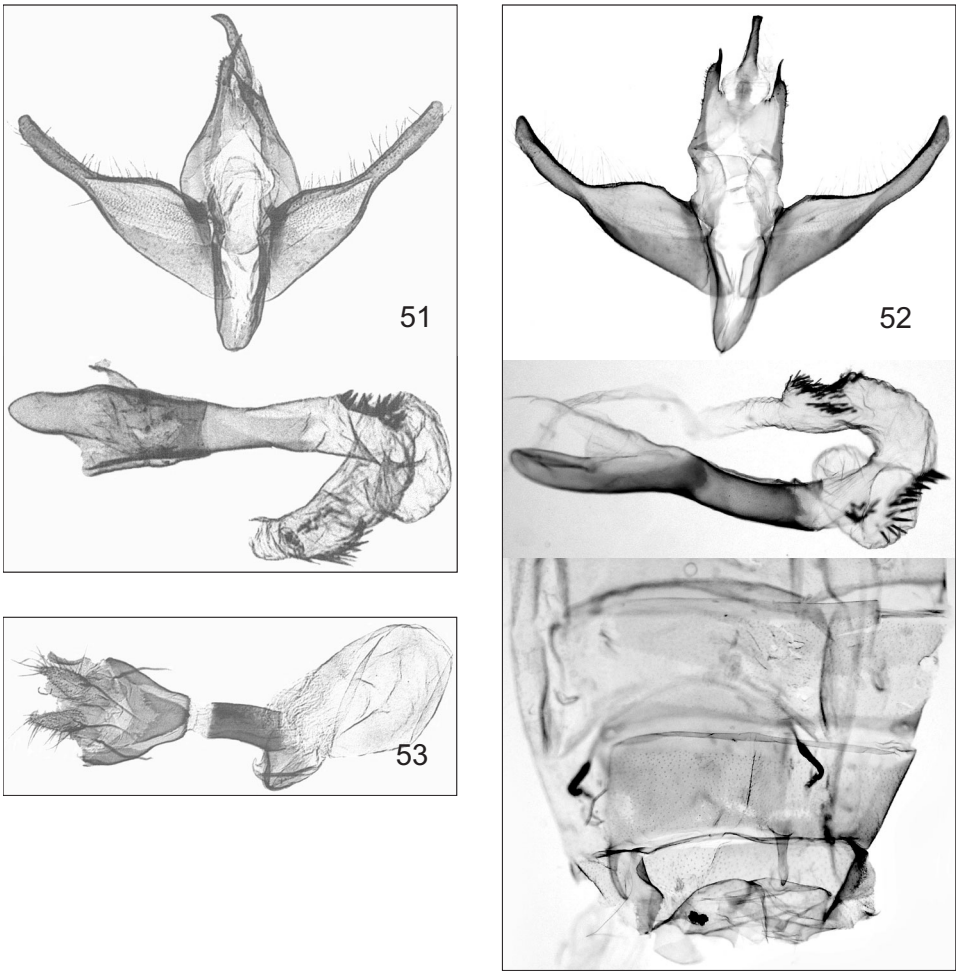
Diagnosis. *Lophoterges (Fibigerges) mariannae* is rather remote from the other members of the species-group, its closest relative is *L. (F.) hoerhammeri. Lophoterges (F.) mariannae* differs externally from all related taxa by its generally brownish fore wing ground colour and less sharply defined lighter costal stripe and whitish stigmata. The diagnostic feature of the male genitalia are the narrow, bar-like distal half of the valva having parallel margins, without flattened, broad cucullus which is present in the other taxa of the subgenus. This shape of the valva resembles that of the subgenus *Variterges* but the valvae are less asymmetrical, the harpe is completely missing and the distal part of the valva is straight, not arcuate or curved. The socii of *L. (F.) mariannae* are strongly asymmetrical, with long, acute apical processi, those of *L. (F.) hoerhammeri* are significantly less asymmetrical, less dentated but having bifid apical process; those of *L. (F.) millierei* are similarly strongly asymmetrical but less strongly sclerotised and the apical processi are less differentiated, especially on left side. In addition, the uncus of *L. (F.) mariannae* is stronger than those of the other members of the subgenus *Fibigerges*. The ground plan of the vesica is the same in all taxa of the group but the cornuti of *L. (F.) mariannae* are longer, stronger than those of the related species.

The female genitalia of *L. (F.) mariannae* differ from those of the other allied species by its narrower, higher, more trapezoidal ostium bursae with stronger, larger dorsal plate and the more sclerotised apical section of the cervix bursae; in addition, the margins of the ductus bursae are almost parallel, not tapering caudally and anteriorly not bulbous as in case of the *L. (F.) atlas – L. (F.) millierei* species-pair.

Description. External morphology (Figs 19, 20). Wingspan 28–30 mm. Antenna of male ciliate, that of female filiform. Head and thorax brownish, abdomen light brownish beige, dorsal crest consisting of long brown tufts. Fore wing ground colour fawn-brownish with costa light brown basally, interrupted by three black spots representing costal patches of basal, antemedial and postmedial

lines. Basal dash narrow, black. Maculation of typical *Lophoterges*-type, stigmata white, orbicular stigma elongated, flattened, oblique, fused with white outline of subcellular stigma; reniform stigma lunulate. Marginal area rather unicolorous, termen with two wedge-shaped black dots near apex. Male hind wing whitish, with darker brownish marginal suffusion; cilia whitish. Hind wing of female more brownish with broader marginal suffusion, terminal line brown, cilia brownish white. Underside greyish white, slightly darkened towards termen; discal spot and terminal line of hind wing fine but visible.

Male genitalia (Figs 51, 52). Uncus short, strong, slender, apically flattened and slightly hooked. Tegumen high, narrow, socii strongly sclerotised and markedly asymmetrical dentated extensions with acute apical processes; left extension significantly longer than right one. Fultura infe-



Figs 51–53. *Lophoterges (Fibigerges) mariannae* FIBIGER, 2001, Iran, Mazandaran: 51 = holotype male, 52 = paratype, male, 53 = paratype, female

rior small, rather weak, cup-shaped; vinculum long, slender, rather U- than V-shaped. Valvae only slightly asymmetrical, saccular part of left valva somewhat larger, broader. Valva elongated, saccular part broad at base, distally tapering, clavus a small, strong process with truncated apex, originating from a heavily sclerotised, narrow plate. Harpe reduced to its slender, sclerotised basal bar, fused with ventral margin. Distal half of valva sclerotised, narrow, flattened, with parallel margins, without wider apical part ("cucullus"); editum long, narrow, densely setose. Aedeagus elongated, cylindrical; ventral plate of carina short, double-peaked, sclerotised. Vesica tubular, membranous, everted forward, then bent dorso-laterally. Proximal half with a large field of short but strong, acute spinules and a tubular, curved, membranous diverticulum. Distal part of main tube slightly tapering, with two narrow, partly stalked fields of longer, finer spinules.

Female genitalia (Fig. 53). Ovipositor weak, short, posterior papillae slightly elongated, intersegmental gelatinous plates fine, less strongly developed. Ostium bursae large, calyculate, sclerotized, almost symmetrical, dorsal plate strong, considerably smaller than ventral plate, caudal incision deep, triangular. Ductus bursae medium-long, flattened, its distal part heavily sclerotised, having more or less parallel lateral margins and a stronger lateral fold; connected to ostium bursae with a short, wrinkled, hyaline neck. Cervix bursae rather short, conical, sclerotised, with fine crests and ribs; corpus bursae elliptical, distal part rugulose, proximal part membranous, finely scobinate.

Bionomics. The habitats for *L. (F.) mariannae* are the open, dry mountain slopes, the imagines are on the wing in June (–July). The early stages are unknown.

Distribution. The species has been found only in a small area in the Mazandaran valley (Elburs Mts, northern Iran).

Lophoterges (Fibigerges) hoerhammeri (WAGNER, 1931) (Figs 21, 54–56)

Lithocampa millierei var. *hoerhammeri* WAGNER, 1931, *Internationale Entomologische Zeitschrift, Guben* **25**: 367. Type locality: Turkey, Akshehir.

Type material examined: holotype male, [Turkey], Asia min. c., Akshehir, 24.VI., coll. WAGNER; deposited in the collection of the ZSM, Munich.

Additional material examined. Turkey: 1 male, Asia min., Akshehir, 3–15.VI., leg. WAGNER (coll. NHMW); 1 male, "Umgebung Angora (= Ankara), SUREYA BEY, 1929" (coll. NHMW). Greece: 1 male, Attika, Athens, Penteli, 1.VII.1919, coll. SHELJUZHKO (coll. HNHM), 1 male, Meteora, VI.1986, leg. K. SZEŐKE (coll. SZEŐKE); 1 female, Peloponnes, Mt. Chelmos, 18.VII.1990, leg. Å. SELLING (coll. SELLING); 1 male, Voiotia, Mt. Parnassos, 8 km NW Arachova, 1400 m, 28.VI.1985, leg. P. SKOU & B. SKULE (coll. G. RONKAY); 1 male, 5 km E Delphi, Arachova, 11.VI.1989, leg. Å. SELLING (coll. G. RONKAY).

Slide Nos: 2760m, 2878m, 8055m RONKAY (males), 4865f RONKAY (female).

Diagnosis. The external appearance of *L. (F.) hoerhammeri* is highly similar to those of *L. (F.) atlas* and *L. (F.) millierei*; the recognisable differences between them (*hoerhammeri* has shorter, less elongated, apically less pointed fore wings, with less intense orange-brownish irroration, almost pure white hind wings with

very narrow brownish margin but without darker shadow at apical part and along veins, etc.) often cannot serve as a good basis for the satisfactory identification due to the remarkable variation of the three species.

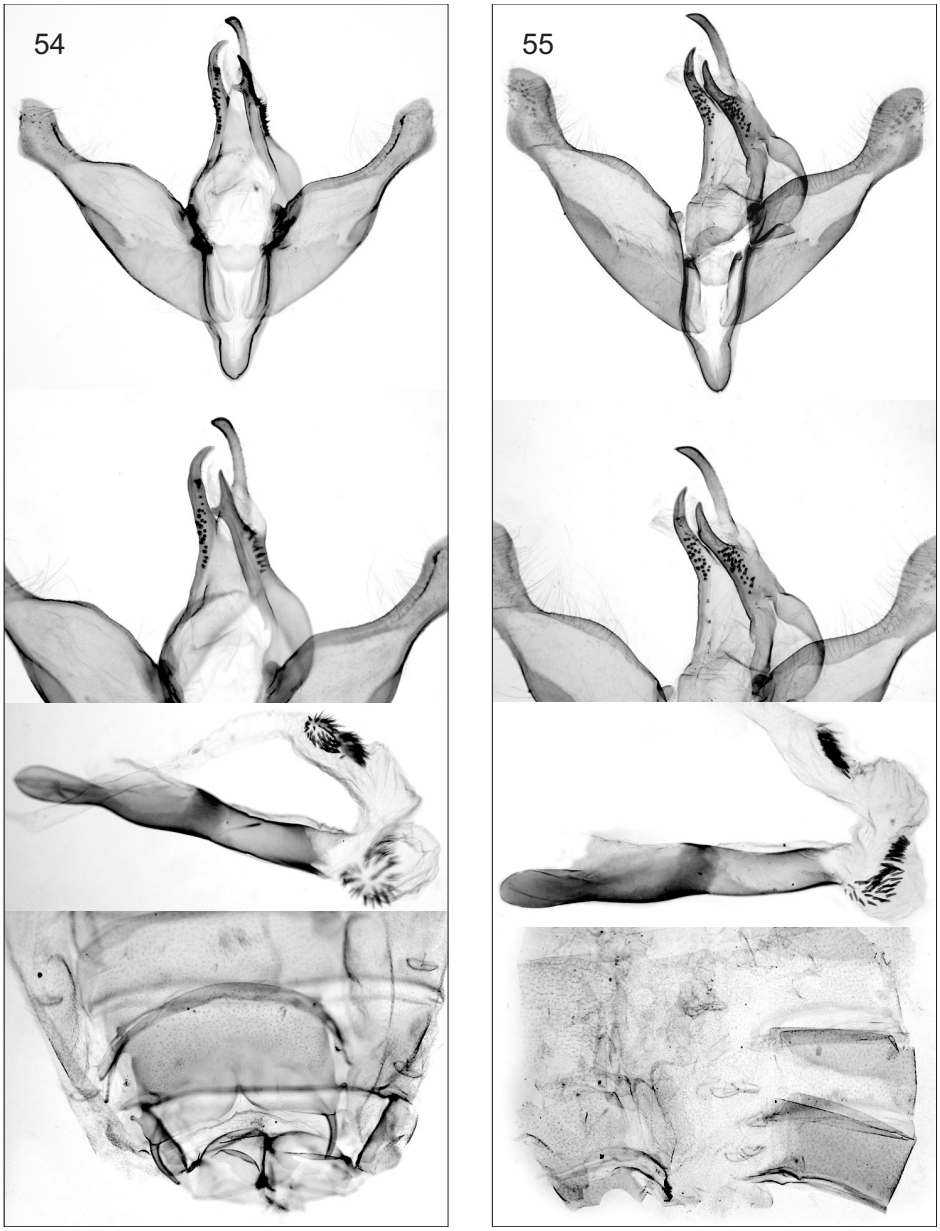
The specific autapomorphy of the male genitalia of *L. (F.) hoerhammeri* is the apically bifurcate, almost symmetrical socii; the socii of the *millierei*-line are much more asymmetrical and are terminated in an acute spine. In addition, the cornuti fields of the vesica in *L. (F.) hoerhammeri* consist of more numerous spinules, the uncus is somewhat shorter and the proximal parts of the valvae are shorter, broader than those of the taxa of the *millierei*-line. The female genitalia differ from those of the species of *L. (F.) atlas* and *L. (F.) millierei* by the longer, non-bulbous ductus bursae and the significantly smaller, shorter, more asymmetrical ostium bursae.

Description. External morphology (Fig. 21). Wingspan 27–32 mm. Antenna of male ciliate, that of female filiform. Head and thorax brownish, collar silvery greyish; abdomen light brownish beige, dorsal crest consisting of long blackish brown tufts; pedicels of male brush organ weak, less sclerotised. fore wing relatively short with finely rounded apex; ground colour shiny brownish grey with fine orange-ochreous irroration between cell and termen, median zone of wing with long, interrupted blackish brown stripe running from base of wing to place of subterminal line (including also relatively long basal dash). Costal stripe suffused with light greyish, most intensely at basal third, a narrow zone along inner margin also irrorated with ashy grey. Maculation of typical *Lophoterges*-type, stigmata encircled with white filled partly with , orbicular stigma elongated, flattened, oblique, fused with white outline of subcellular stigma; reniform stigma lunulate. Marginal area rather unicolorous, subterminal line represented by a few cuneiform blackish dots near apex. Terminal line fine, double: black with white inner definition; cilia as ground colour, with fine ochreous-brownish inner line and whitish streaks at veins. hind wing brilliant white with very fine brown terminal line; distal parts of veins partly pale ochreous-brownish; discal spot shadow-like; cilia whitish with pale brown line. fore wing underside greyish white, slightly darkened towards termen; hind wing silky white, discal spot and terminal line visible but pale.

Male genitalia (Figs 54, 55). Uncus short, slender; tegumen narrow, high. Socii almost symmetrical, long, projecting ventrally; their apices finely bifurcate, lateral sides moderately dentated. Valvae also only slightly asymmetrical, saccular part of left valva somewhat broader. Clavi reduced, basal costal process sclerotised, small; basal bars of harpes flattened, broad at base, tapering distally. Distal parts of valvae spatulate, forming variably broad, quadrangular cucullus connected to proximal part with short, narrow neck. Aedeagus long, strong, cylindrical, rather straight. Vesica narrowly tubular, everted forward then recurved dorso-laterally, basal bulb broader, inflated. Subbasal field or cornuti relatively long, terminal field of cornuti also elongated, rather dense, both fields of cornuti consist of fine spinules.

Female genitalia (Fig. 56). Ovipositor short, broadly conical, papillae anales elongated, finely pointed; intersegmental appendages well-developed; gonapophyses slender, fine. Ostium bursae large, rather short and relatively strongly asymmetrical, rather calyculate than infundibular. Distal sclerotised part of ductus bursae relatively long, straight, distally slightly tapering, its lateral margins straight, proximal part not bulbous. Cervix bursae shortened, rather semiglobular, wrinkled-rugose, finely sclerotised. Corpus bursae elliptical-ovoid, weakly membranous; signum absent but a small scobinate patch present at place of signum consisting of short, fine ribs.

Bionomics. The species occurs in moderately warm biotopes of xerothermic mountain regions, inhabiting rocky gorges and slopes and clearings of shrubby forests at low and medium-high elevations. The few known examples were collected



Figs 54–55. *Lophoterges (F.) hoerhammeri* (WAGNER, 1931), males, Turkey

at light. The flight period is June–September. It is not exactly clear whether there is a long and extended generation or two more or less overlapping generations; the second possibility seems more probable.

Distribution. The species is restricted to the southern Balkans (Greece, Albania, Makedonia) and western and central Turkey.

Lophoterges (Fibigerges) atlas sp. n.
(Figs 22, 23, 57–60)

Holotype: male, "Morocco, Mrassine, May 1921, leg. H. POWELL", slide No. 3103m RONKAY. The holotype is deposited in coll. NHM, Vienna.

Paratypes. Morocco: 1 female, Moyen Atlas, El-Ksiba, 940 m, 12.VI.1973, leg. VARTIAN (coll. HNHM). Algeria: 1 male, Hodna Mts, 2–3.V.1986 (coll. HACKER); a series of both sexes, Oran, Sebdou, 26.VII.1918, leg. P. ROTROU; 21.VII.1919, leg. V. FAROULT (coll. BMNH); 1 male, 1 female, Prov. Alger, Gorges de la Chiffa, 200–400 m, 25.V.1979, leg. C. NAUMANN (coll. KRUŠEK).

Slide Nos: 4156m, 8054m RONKAY (males), 2738f, 4155f, 8062f RONKAY (females).

Diagnosis. *Lophoterges (F.) atlas* is the allopatric sister-species of *L. (F.) millierei*. The two species are very similar externally and hardly separable without the study of the genitalia. *Lophoterges (F.) atlas* has, however, somewhat more unicolorous fore wing colouration as compared with that of *L. (F.) millierei*, the differently coloured parts of the wing are less contrasting, less vivid, and the costal

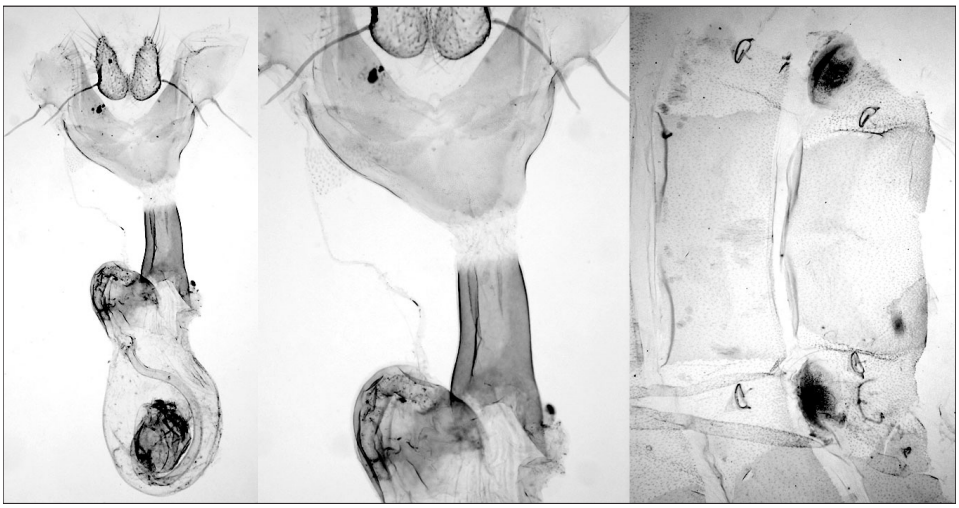


Fig. 56. *Lophoterges (F.) hoerhammeri* (WAGNER, 1931), female, Turkey

stripe is more expressed, broader and more whitish grey than in case of the sibling species.

The key features of the male genitalia are the valval shape and the size and shape of the socii. The distal thirds of the valvae of *L. (F.) atlas* are curved dorsally, with narrow and less separated cuculli, their tips are not or only very finely pointed (the valvae of *L. (F.) millierei* are more or less straight with more distinct, broader quadrangular, acutely pointed cuculli sitting on short, narrow neck); the socii are somewhat more slender, apically not so acute and the right socius is proportionally longer than those of its sibling species. The female genitalia of the two species can be distinguished by the shape of the ostium bursae (that of *L. (F.) atlas* is more elongated, proximally more tapering) and the relative length of the ductus bursae: the sclerotised posterior part of ductus bursae is longer in case of the new species.

Description. External morphology (Figs 22, 23). Wingspan 28–32 mm. Head dark grey-brown, collar pure ash-grey with blackish grey lines at base and on tip. Thorax uniformly dark red-brown or chocolate-brown; abdomen much paler, light grey, dorsal crest blackish. Fore wing variably dark brownish slate-grey in pastel shade, irrorated with whitish grey, especially along basal third of costa; veins covered with fine whitish scaling in marginal area. Basal dash black, long, fine, broad at base; median zone of wing with a more or less diffuse, interrupted, dark chocolate-brown area extending from base to subterminal line in and below cell, defined by claret-brown suffusion below. Maculation typical of *Lophoterges*, white outline of reniform somewhat shadowed of upper extremity but defined on outer part by an irregular, orange-ochreous or orange-brownish patch which extends from the reniform (sometimes from outer edge of orbicular) to apex. Subterminal line diffuse, whitish grey, marked with black-brown striae between veins. Terminal line double, very fine, white and blackish; cilia dark grey with outer part often lighter, finely striolate with white and ochreous grey. Male hind wing shining white with weak ochreous shade, costa and termen with darker brown irroration which may extend along outer margin. Discal spot most often absent, veins partly covered with brown. Terminal line fine, blackish-brown; cilia white, with a few brownish scales. Hind wing of female with broad, diffuse, brownish marginal suffusion. Underside of fore wing dark grey with whitish grey irroration, hind wing as on upperside but dark covering of costa, marginal area and veins stronger, discal spot small, prominent.

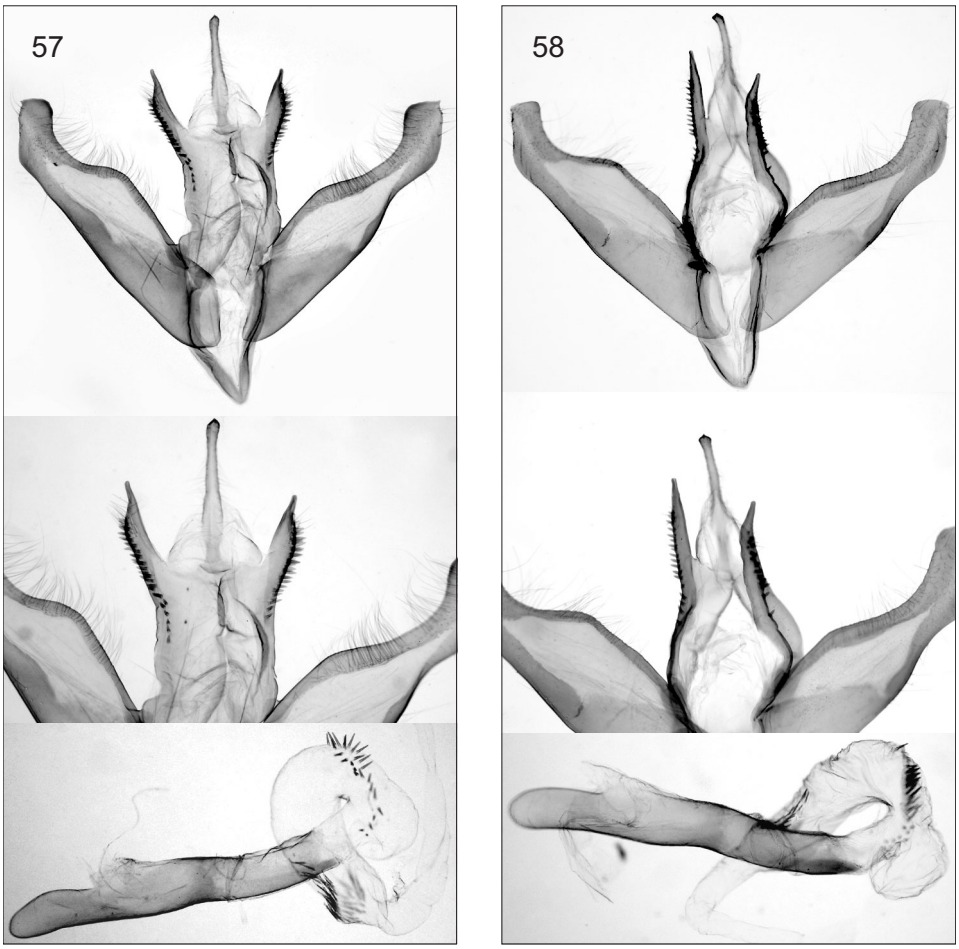
Male genitalia (Figs 57, 58). Uncus short, curved apically and slightly dilated, tegumen narrow, high. Socii asymmetrical, longer on left side, heavily sclerotised, dentated laterally, with apex acute. Valvae also asymmetrical, saccular part of left valva larger, broader. Valva relatively long and narrow, basal two-thirds straight, distal third curved, forming narrowly quadrangular, finely pointed cucullus. Clavus indistinct; harpe reduced to its flattened basal bar fused partly with ventral end of sacculus. Aedeagus cylindrical, distal part thicker, ventral edge of carina sclerotised. Vesica broadened basally, recurved dorso-laterally then bent ventrally; basal diverticulum large, more or less globular, projecting forward. Armature of vesica consisting of two fields of short, fine spinules, basal field rather sparse, consisting of longer, stronger spinules, terminal field more dense, composed of numerous finer, thinner spiculi.

Female genitalia (Figs 59, 60). Ovipositor very short, weak, conical; gonapophyses thin, short. Ostium bursae only slightly asymmetrical, strongly sclerotised, very large and broad, rather calyculate, proximally strongly tapering. Ventral plate entirely sclerotised with margins upturned dorsally, dorsal plate significantly smaller, more or less V-shaped. Ductus bursae short, distal part

sclerotised with semiglobular bulb on right side, lateral margins stronger; proximal third wrinkled-rugose, gelatinous. Cervix bursae short, conical, upper part with a slightly sclerotised lamina; corpus bursae rather elliptical, membranous with fine scobination.

Bionomics. Poorly known, it was found in lower and medium high zones, in semi-arid biotopes. A rarely observed species, it is supposedly univoltine with a relatively long generation, the adults are on the wing from the beginning of May to the end of July.

Distribution. *Lophoterges (F.) atlas* is known from Morocco and Algeria, the known localities lie in the lower zones of the Atlas Mts and the edges of northern parts of the Sahara.

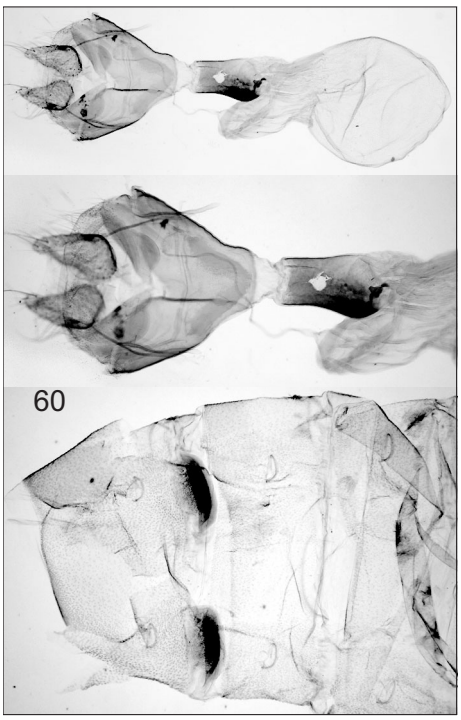


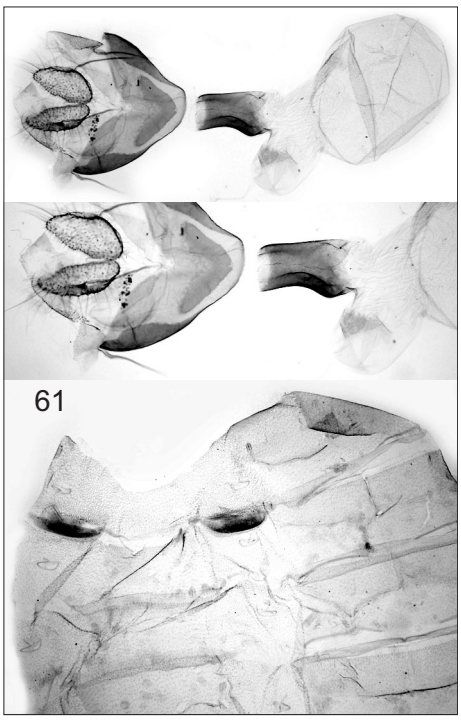
Figs 57–58. *Lophoterges (F.) atlas* sp. n., males: 57 = holotype, Morocco, 58 = paratype, Algeria

Lophoterges (Fibigerges) millierei millierei (STAUDINGER, 1871) (Figs 24, 25, 32, 61–64)

Lithocampa millierei STAUDINGER, 1871, *Berliner Entomologische Zeitung* [1870]1871: 119, 330.
Type locality: Spain, Catalonia.

Type material examined: Paratype female (labelled as "Cotype"), "Hispania, Barcelona, Himmighofen e.l.", "Cotype *Millierei* Stgr. ?" (red label), "Zool. Mus. Berlin" (yellow label). Slide No. 2741 RONKAY. The specimen is deposited in the MNHU, Berlin.





Figs 59–61. 59 = *Lophoterges (F.) atlas* sp. n., paratype, female, Algeria, 60–61 = *L. (F.) millierei millierei* (STAUDINGER, 1871), females, Spain

Additional material examined. Spain: 1 male, 1 female, Montes ibericos, Albarracin, 1–15. VIII.1936, coll. WAGNER (HNHM, ZSM); 2 mm from same locality, 2 and 19.VI.1936, leg. PREDOTA (HNHM and ZSM); 1 male, from the same locality, 22.VII.1930, leg. TURNER (ZSM); 1 male from the same locality, 6.VII.1980, leg. & coll. HACKER; 1 male, Berrocal (Huelva) 380 m, 18.VIII.1982, leg. DE LA TORRE (coll. YELA); 2 males, Roblehondo (Sa de Cazorla, Jaen), 4.VI.1986, leg. HERRERA (coll. YELA); 1 female, Arroyo Truchas (Sa de Cazorla, Jaen), 11.VII.1986, leg. HERRERA (coll. YELA); 1 male, El Ventorrillo (Cercedilla) (Madrid), 5.VII.1981, leg. & coll. YELA; 1 male, La Mesa (Sa de Cazorla, Jaen), 19.V.1987, leg. HERRERA (coll. YELA); 1 female, Seis Pinos (Sa de Cazorla, Jaen), 27.V.1986, leg. HERRERA (coll. YELA); 1 male, Trillo, Guadalajara, 6.VIII.1983, leg. et coll. YELA; 1 male, Sa de Tragacete (Tragacete)(Cuenca), 27.VII.1985, leg. & coll. YELA; 1 female, Mte Dehesa del Pinar (Albarracin, Teruel), 17.VII.1986, leg. & coll. YELA; 1 female, Prov. Teruel, Mt. Universales, Fuente del Tejo, 1650 m, 25–26.VI.1990, leg. BEHOUNEK (coll. P. GYULAI); 1 female, Catalonia (ZSM); 1 male, Sierra de Espuna, 19.V.1955, leg. EISENBERGER (ZSM); 3 males, Catalonia, vic. of Barcelona, 22.IV.1923, 15.IV.1925, 23.V.1943, leg. MARTEN (coll. BEHOUNEK); 1 male, Gerona, 2.VII.1980 (coll. HACKER); 1 female, Blanes, 21.VI.1973 (coll. HACKER); 1 male, Albarracin, 24–25.VI.1992, leg. P. SKOU (coll. G. RONKAY).

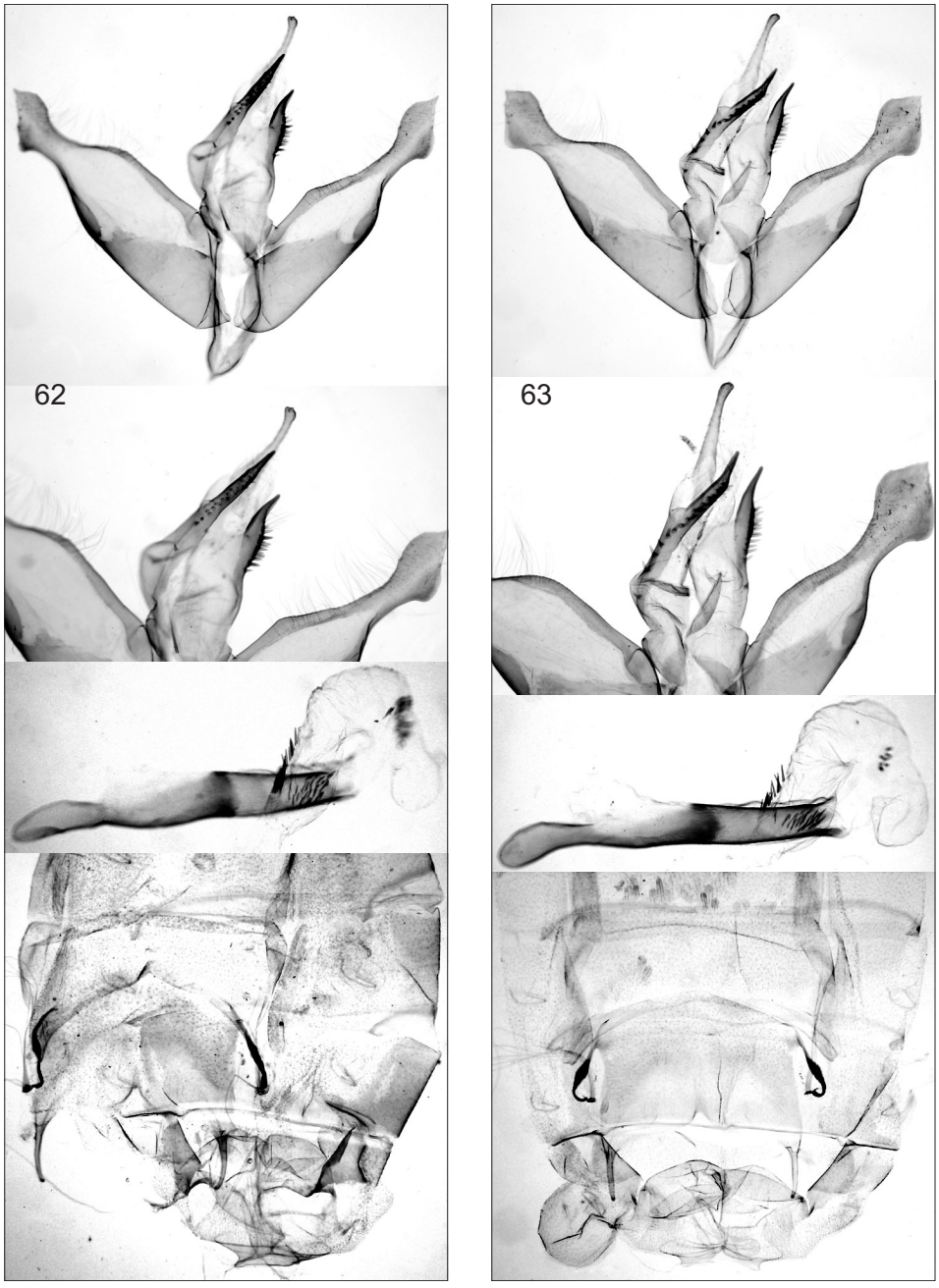
Slide Nos 4520 HACKER, 2746m, 2748m RONKAY (males), 4523 HACKER, 2524f, 2747f RONKAY (females).

Diagnosis. The detailed comparisons of *L. (F.) millierei* with the other species of the subgenus are provided above in the diagnoses of the preceding three taxa. The diagnostic features of *L. (F.) millierei* are the strongly asymmetrical, apically acute, laterally strongly dentate-spinose socii, the distally conspicuously spatulate valvae forming quadrangular, acutely pointed cuculli sitting on short, narrow neck and the reduced armature of the vesica consisting of a small number or fine spinules arranged into two small fields of cornuti (males); the huge, broadly calyculate, more or less symmetrical ostium bursae and the relatively short, proximally strongly bulbed ductus bursae (females).

The two races of *L. (F.) millierei* are more or less isolated by the Pyrenees, but their genital differences are significantly smaller when compared with those of the other taxa of the subgenus.

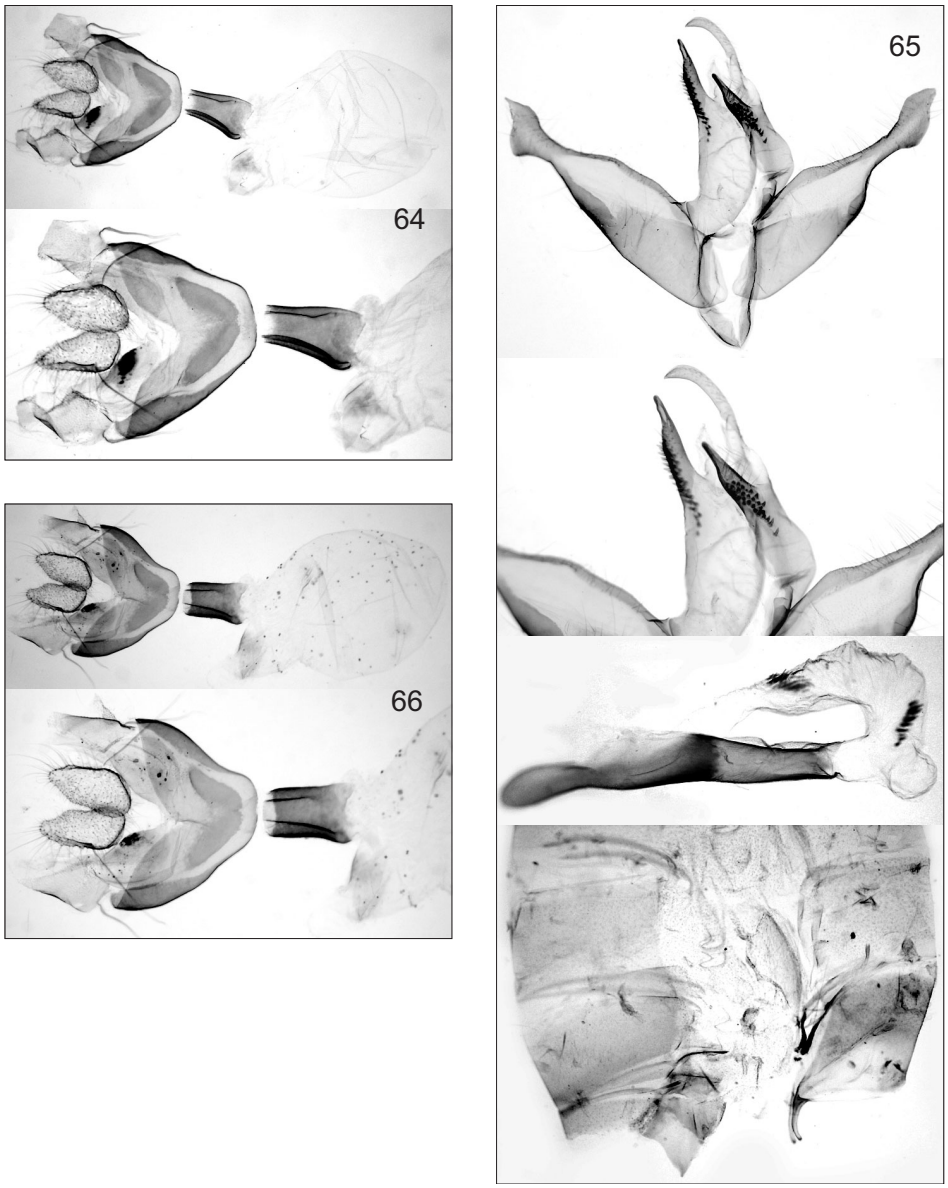
Description. External morphology (Figs 24, 25, 32). Wingspan 27–33 mm. The external appearance is very similar to those of *L. (F.) atlas* and *L. (F.) hoerhammeri*. It differs from the preceding species by its somewhat more variegated fore wings with more contrasting dark markings, stronger costal streaks of crosslines and darker covering of veins, and less intense whitish-greyish suffusion on costal area.

Male genitalia (Figs 62, 63). Uncus short, curved apically and slightly dilated, tegumen narrow, high. Socii heavily sclerotised, acute, dentated laterally; strongly asymmetrical, much longer on left side. Valvae also asymmetrical, saccular part of left valva larger, broader. Valva relatively long, broadened at basal two-thirds, constricted at apical third. Costa and cucullus sclerotised, latter elongated-quadrangular with apex acute. Clavus reduced, harpe reduced to its flattened basal bar fused partly with ventral end of sacculus. Aedeagus cylindrical, distal part thicker, ventral edge of carina sclerotised. Vesica broadened basally, recurved dorso-laterally; armature of vesica consisting of two (a basal and a terminal) fields of short spinules.



Figs 62–63. *Lophoterges (F.) millierei millierei* (STAUDINGER, 1871), males, Spain

Female genitalia (Figs 61, 64). Ostium bursae strongly sclerotised, huge, broad, rather calyculate, only slightly asymmetrical. Ductus bursae short, shorter than that of *L. (F.) atlas*, its distal part sclerotised with semiglobular bulb on right side. Cervix bursae short, conical, upper part with slight sclerotisation; corpus bursae elliptical-ovoid, membranous, finely scobinate.



Figs 64–66. 64 = *Lophoterges (F.) millierei millierei* (STAUDINGER, 1871), female, Spain; 65–66 = *L. (F.) m. fibigeri* RONKAY et RONKAY, 1995, paratypes, France: 65 = male, 66 = female

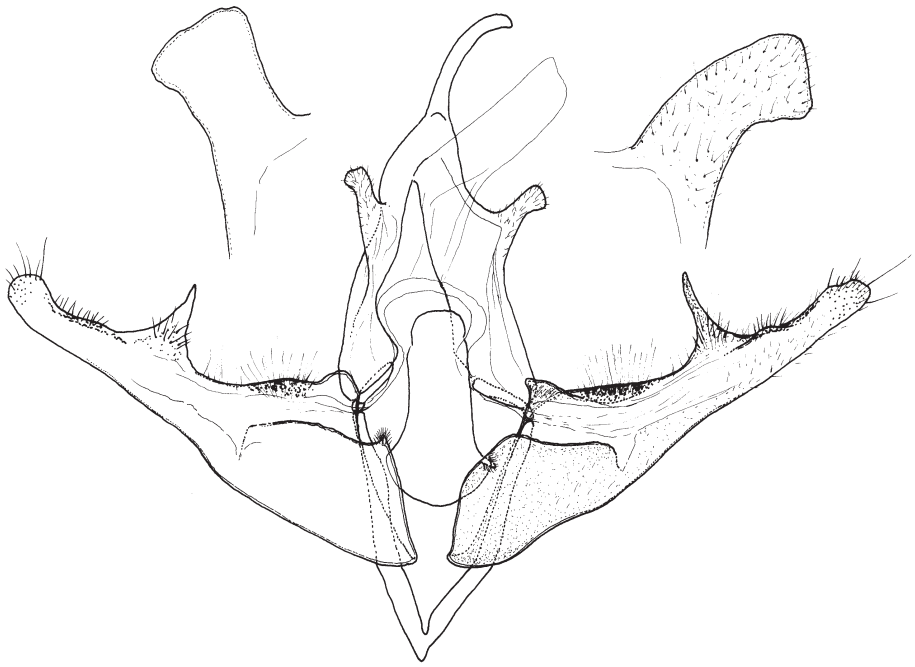


Fig. 67. *Lophoterges (Lophoterges) fatua* (PÜNGELER), holotype male, Kuku-Noor

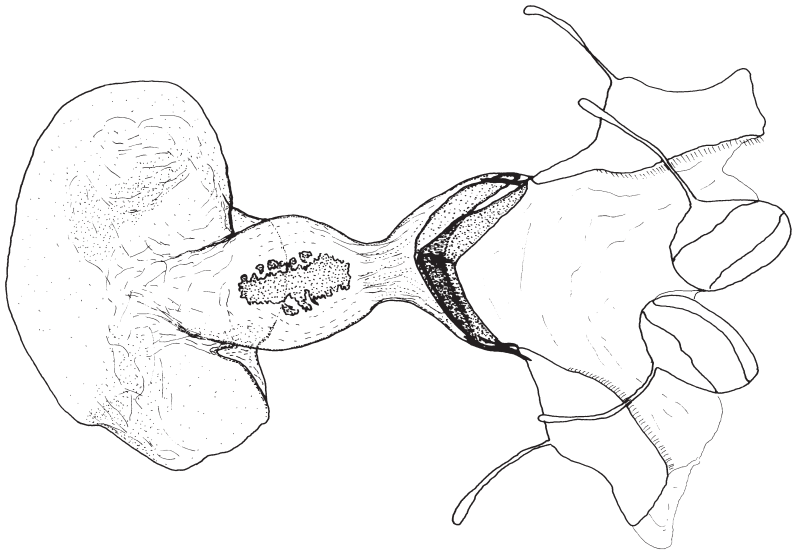


Fig. 68. *Lophoterges (Tibeterges) hoenei* DRAUDT, holotype female, Tibet, Batang

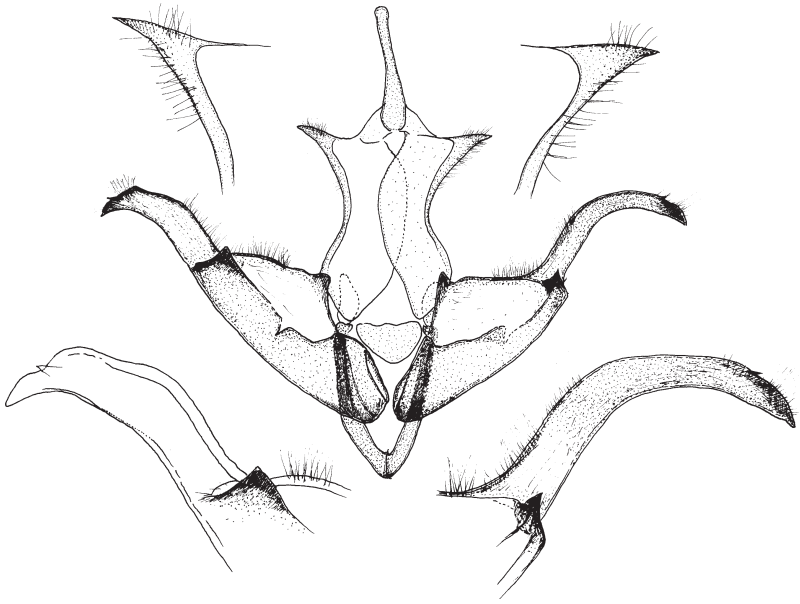


Fig. 69. *Lophoterges (Variterges) centralasiae* (STAUDINGER), male, Aksu

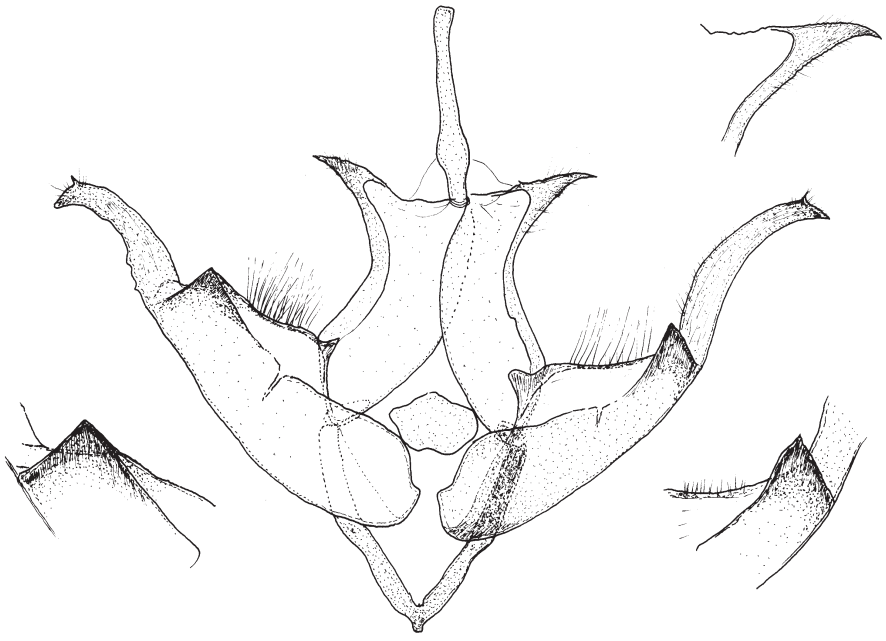
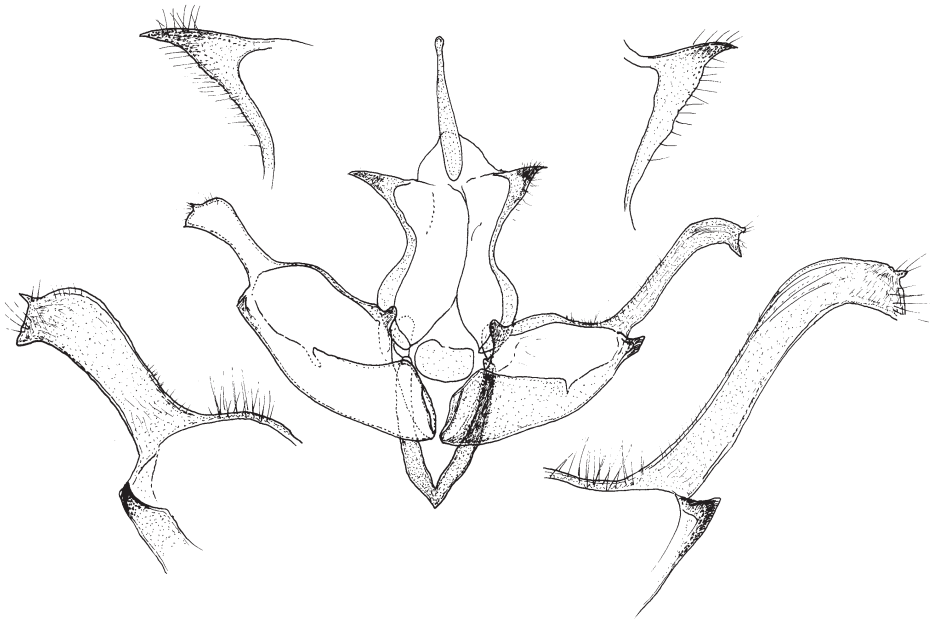


Fig. 70. *Lophoterges (V.) aksuensis* (BANG-HAAS), male, Aksu



Fg. 71. *Lophoterges (V.) varians* sp. n., paratype male, Uzbekistan

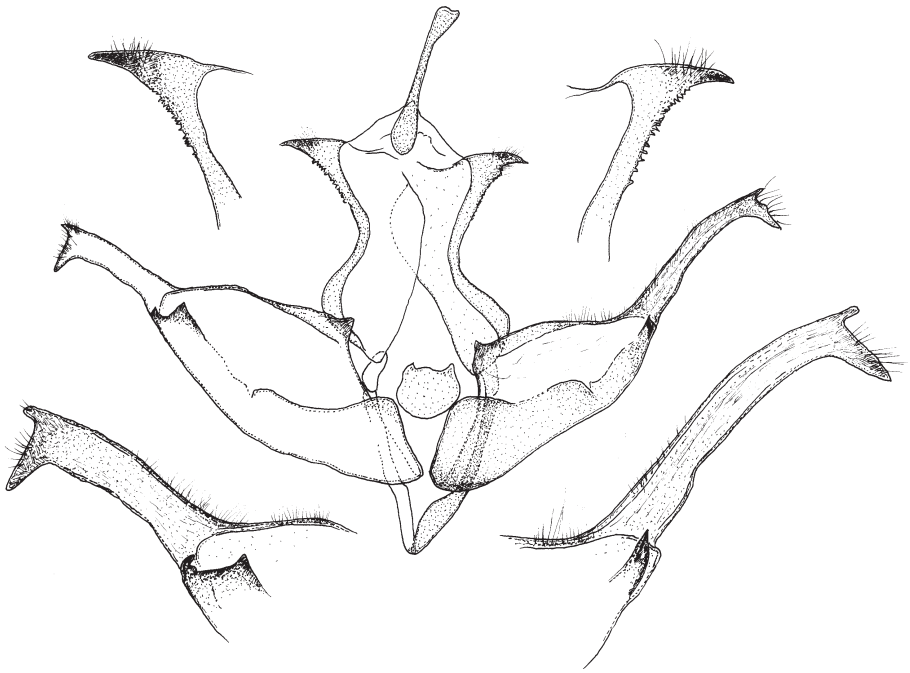


Fig. 72. *Lophoterges (V.) radians* sp. n., holotype male, Afghanistan, Nuristan

Bionomics. The species occurs in the forested, relatively wet, warm lower and medium-high zones of the xerothermic, sometimes semi-desert-like mountain regions in southern France and Spain, especially stream valleys, rocky gorges and open rocky forests.

The imagines are nocturnal, visiting regularly the light but avoiding baits, and are usually on the wing throughout the night. Bivoltine, the flight periods are April–June and July–August (but mainly August). The first, laconic description of the larva was given by STAUDINGER in comparison with that of *Calliergis ramosa* (ESPER, 1786) (with reference to MILLIÈRE); subsequently it was described by HAMPSON (1906). The known foodplants are *Lonicera* species.

Distribution. Atlantico-Mediterranean, its range being restricted to Spain.

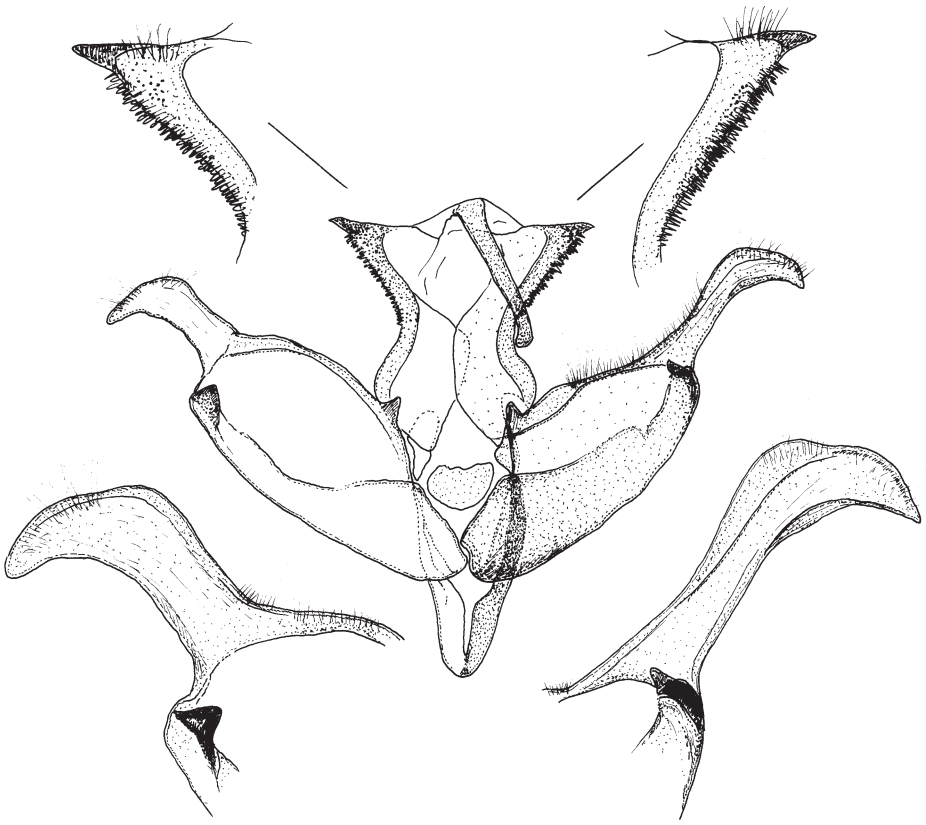


Fig. 73. *Lophoterges (V.) radians* sp. n., paratype male, Afghanistan, Safed Koh

Lophoterges (Fibigerges) millierei fibigeri RONKAY et RONKAY, 1995 (Figs 26–28, 65, 66)

Lophoterges millierei fibigeri RONKAY et RONKAY, 1995, *Noctuidae Europaeae* **7**: 119, 330. Type locality: France, Basses Alps.

Type material examined: Holotype, male, "Südfrankreich, Basses Alpes, 400 m, Oraison, 5.5.69., Ziegler München", slide No. 2520m RONKAY. The holotype is deposited in the HNHM Budapest.

Paratypes. France: 1 male, from the same locality and data (coll. P. GYULAI); 1 male, from the same locality, 1.VI.1971, leg. KUCHLER (coll. BEHOUNEK); 1 male, from the same locality, 13.VII.1975, leg. & coll. BEHOUNEK; 7 males, 4 females, Drome, St. Restitut by St. Paul Trois Chateaux, 250 m, VI.1984, leg. FIBIGER & MOBERG (coll. HNHM, FIBIGER, MOBERG & G. RONKAY); 1 male, 1 female, Basses Alps, Mezel, Asse valley, 13–18.VI.1974, leg. et coll. BEHOUNEK; 5 males, 2 females, Basses Alps, Estoublon, Asse valley, 3–4.VI.1983, leg. FLUNGER (coll. BEHOUNEK & P. GYULAI); 2 males, 1 female, from the same locality, 19–26.VI.1984, leg. FLUNGER (coll. BEHOUNEK); 1 male, Digne, 7–18.VII.1955, leg. SCHÜTZE (coll. ZSM); 1 female, from same locality, VI.1959, leg. PFISTER (coll. ZSM); 5 males, 2 females, Basses Alps, Sisteron, 18–22.V.1963, leg. FRIEDEL (coll. ZSM); 1 male, from same locality, V.1958, leg. PINKER (coll. ZSM); 1 male, Lavagne, VIII.1978 (coll. HACKER).

Additional material examined. France: 1 male, Alpes maritimes, Col de Vence, 8.VIII.1983, leg. B. GOATER (coll. HNHM); 1 female, Ardeche, la Voulte, 600 m, 24.V.1987, leg. B. GOATER (coll. HNHM).

Slide Nos: 4513 HACKER, 2749m RONKAY (males), 2742f RONKAY (female).

Diagnosis. External morphology (Figs 26–28). Wingspan 29–33 mm. The northern populations differ from the nominate subspecies by the somewhat paler, more brownish grey ground colour of the fore wing with slightly lighter costal stripe and less conspicuous dark medial zone; hind wing of male with weaker apical (and marginal) irroration, vestige of discal spot more distinct, hind wing of female with stronger, more regular marginal suffusion.

In the male genitalia of subsp. *fibigeri* (Fig. 65) the cuculli are somewhat more elongated and narrower than those of ssp. *millierei* (Figs 61, 62), the short, wedge-shaped apical processi are longer, stronger, the penicular lobes have more numerous teeth. The female genitalia of the two races differ mainly in the shape of the sclerotised part of the ductus bursae: the proximal bulbous extension is more distinct, semiglobular in subsp. *millierei* (Figs 61, 64) but is essentially smaller in subsp. *fibigeri* (Fig. 66).

Distribution. Southern France (Basses Alps, Digne, Drôme).

*

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