Systematic notes on *Dasorgyia* Staudinger, 1881, *Dicallomera* Butler, 1881, and *Lachana* Moore, 1888 (Lymantriidae)

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Abstract. The little-known lymantriid moth *Dicallomera pumila* (Staudinger, 1881), comb. n. is reported from the South Ural Mountains, a first record for Russia. Based on this finding, the taxonomy of the high alpine Central Asian lymantriids formerly treated in *Dasorgyia* Staudinger, 1881 and *Gynaephora* Hübner, 1819 is discussed. Based on adult morphology, *Dasorgyia* Staudinger, 1881 syn. n. is synonymized with *Dicallomera* Butler, 1881. Three species are transferred from *Gynaephora* to *Lachana* Moore, 1888 as *Lachana selenophora* (Staudinger, 1887) comb. n., *L. sincera* (Kozhantshikov, 1950) comb. n., and *L. alpherakii* (Grum-Grzhimailo, 1891) comb. n. A new species, *Lachana kulu* sp. n. is described from Northern India. Lectotypes are designated for *Dasorgyia pumila* Staudinger, 1881, *Dasychira selenophora* Staudinger, 1887, *Dasychira alpherakii* Grum-Grzhimailo, 1891, *Dasorgyia grumi* Staudinger, 1901, and *Dasorgyia alpherakii* f. *staudingeri* Bang-Haas, 1938.

Introduction

While investigating the lepidopteran fauna of the southeastern extremity of the Irendyk mountain ridge in the Southern Urals (Russia, Bashkortostan), an unusual diminutive mature larva of a lymantriid was collected. I succeeded to a male moth from this larva, and to identify it as *Dasorgyia pumila* Staudinger, 1881 (Figs 1–2b) by comparison with the type series preserved at the Museum für Naturkunde der Humboldt Universität zu Berlin (Germany). The species was known until then only from the type series consisting of two reared pairs from Zaisan Lake (Kazakhstan). Originally this species was described in genus *Dasychira* by Staudinger (1881). However, at the end of original description Staudinger proposed the new genus *Dasorgyia* for *pumila* (by monotypy), characterising it by the small size of the moths, shortened wings of the females and their high mountain steppe habitat preference, though he noted some affinities in general habitus with *Dicallomera fascelina* (Linnaeus, 1758). Later, Staudinger (1901: 114) included five species in *Dasorgyia* Staudinger, 1881: *D. pumila* Staudinger and four other species occurring in the high alpine zone of Central Asia: *D. selenophora* (Staudinger, 1887), *D. alpherakii* (Grum–Grzhimailo, 1891), *D. semenovi* (Grum–Grzhimailo, 1891), and *D. grumi* Staudinger, 1901. Kozhantshikov (1948, 1950) transferred the whole genus *Dasorgyia* Staudinger, 1881 (s. l.) into *Gynaephora* Hübner, 1819 on the basis of the single pair of spurs on the hindtibia and the brachypterous females. Since then *Gynaephora* sensu Kozhantshikov has never been reviewed in spite of its evident heterogeneity. However, the species treated earlier in *Dasorgyia* were later separated into subgenus *Dasorgyia* within *Gynaephora* (Černi & Spitzer 1981; Spitzer 1984; Tschistjakov 2003) on the basis of the smaller size of the adults and some other morphological and ecological characteristics. After investigating larval external features (Fig. 2b) and adult characters (Fig. 20) of *pumila* I found some characters that were obviously unknown to previous authors and that point to a different taxonomic treatment, which is the content of this paper.

Abbreviations

BMNH	Natural History Museum, London
LSSU	Laboratory of Animal Systematics and Faunistics, Samara State University, Samara
MHUB	Museum für Naturkunde der Humboldt Universität zu Berlin
MWM	Entomologisches Museum of Thomas J. Witt, Munich
MTD	Museum für Tierkunde Dresden
ZFMK	Zoologishes Forschungsinstitut und Museum Alexander Koenig, Bonn
ZISP	Zoological Institute of Russian Academy of Sciences, St. Petersburg

Results

Dicallomera Butler, 1881 [February]

Type species: *Phalaena Bombyx fascelina* Linnaeus, 1758.

= *Dasorgyia* Staudinger, 1881 [October–December], syn. n. Type species: *Dasychira pumila* Staudinger, 1881.

References: Linnaeus 1758: 503 (*Phalaena*); Staudinger 1887: 97; Staudinger 1901: 115; Strand 1910: 112; Bryk 1949: 11; Ebert 1968: 182; Daniel 1952: 74; 1969: 271; Bustillo & Garnica 1980: 79 (*Dasychira*); Bryk 1934: 11; Kozhantshikov 1950: 227; (*Olene*); Butler 1881: 12; Ferguson 1978: 17; Bacallado et al. 1981: 8; Holloway 1982: 44; Holloway 1999: 34; Lukhtanov & Khruliova 1989: 41; Tschistjakov 2003: 612 (*Dicallomera*).

Redescription. Medium sized lymantriids with stout body, wingspan 26–45 mm in males and up to 55 mm in females. Fore- and hindwings elongate, triangular. Antennae strongly bipectinate in male and filliform in females. Eye rounded, large. Labial palpus hairy, short, antrorse; tufts of hairs on first 1–2 abdominal segments present; hind tibia with two pairs of spurs. Venation as in orgyiine ground plan. Forewing with R-cell wide and short; R3+R4 stalked and, as R5, originating from top of R-cell; M1 originating from top of discal cell; M2 and M3 originating from lower top of discal cell; A1 absent. Hindwing with closed basal cell; Sc and R joined or anostomosed; R+M1 on stalk; M3+Cu1 on short or long stalk. Male genitalia characters discussed and illustrated in Kozhantshikov (1950), Bacallado et al. (1981), Tschistjakov (2003), and also in species account for *D. pumila* below. The male genitalia of *Dicallomera* differ from those of genus *Gynaephora* in the rounded shape of the uncus, the extended, angulate valva, and the stout and curved phallus (Tab. 1).

Remarks. Kozhantshikov (1950) did not examine the type specimens or conspecific specimens of *Dasorgyia pumila*. However, this has not prevented him to remark on the morphology of the species as follows (p. 245: "This species is unknown to me in life... it is required to note that the structure of the legs of this species was reported [by Staudinger (1881)] inaccurately, and the single pair of spurs that is characteristic of all species of *Gynaephora* Hbn. was not noted"). As a result of this misleading argumentation, Kozhantshikov and subsequent authors (Ferguson 1978; Černi & Spitzer 1981; Spitzer 1984) treated *Dasorgyia pumila* in *Gynaephora*. A detailed study of our material showed that the hindtibia of *pumila* has the two pairs of spurs (Fig. 21) that characterise genus *Dicallomera*, but not *Gynaephora*. Based on our examination of the male genitalia and external appearance of *pumila* I am transferring *Dasorgyia pumila*

Staudinger, 1881 from *Gynaephora* to *Dicallomera*, establishing the new combination *Dicallomera pumila* (Staudinger, 1881) **comb. n.** As a result, *Dasorgyia* Staudinger **syn. n.,** with type species *Dasorgyia pumila* Staudinger, 1881, has to be considered a junior subjective synonym of *Dicallomera* Butler.

The two species, *D pumila* and *D. fascelina* have many characters in common with, for example, the absence of toothed fasciae and transparent fields on the wings, the pale brown ground colour of the forewing with an admixture of black scales, the labial palpi hairy, short, pointing forward, the large eyes, the presence of tufts of hairs on the first two abdominal segments, the hind tibia with two pairs of spurs, the male genitalia with the valva extended and angulate, the uncus rounded, the gnathos ring-like, the juxta wide and platelike, and the phallus somewhat curved, and the last instar larva with five black and white dorsal hair brushes, with a hair-pencil on the anal segment (Fig. 2a).

Dicallomera currently includes the following species: *Dicallomera fascelina* (Linnaeus) with subspecies *D. f. obscura* Zetterstedt, 1840, *D. f. caucasica* Scheljuzhko, 1919, *D. f. karafutonis* Matsumura, 1933, *D. f. moto* Bryk, 1949, *D. f. fischeri* Daniel, 1952, *D. f. salangi* Ebert, 1968, and *D. f. danieli* de Freina, 1979, *D. nivalis* (Staudinger, 1887) with subspecies: *D. n. obscurata* (Staudinger, 1900), *D. angelus* (Tschetverikov, 1904), *D. kaszabi* (Daniel, 1969), *D. kusnezovi* Lukhtanov et Khruliova, 1989, *D. olga* (Oberthür, 1881), and *D. pumila* (Staudinger). The taxa treated as subspecies of *D. fascelina* still need careful revision, preferably using molecular methods because external and genitalia characters are strongly variable (Lukhtanov & Khruliova 1989).

The species of the genus occure in the Palaearctic Region, including the mountains of Central Asia and the Far East.

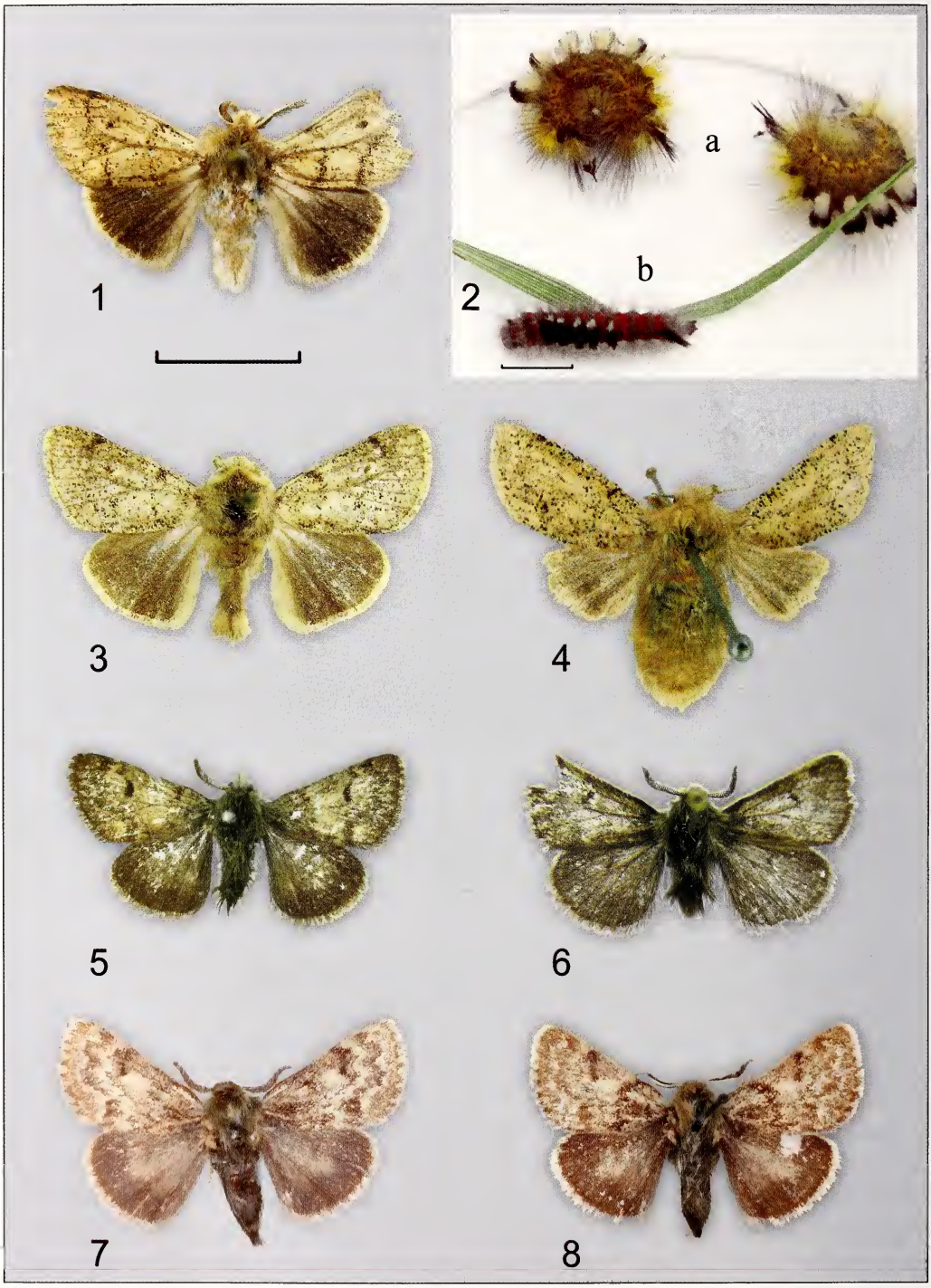
Dicallomera pumila (Staudinger, 1881) comb. n. (Figs 1–4, 20–21, 34)

Dasychira pumila Staudinger, 1881: 405. Type locality: [Kazakhstan] Saisan.

References: Staudinger 1901: 114; Strand 1910:120; Bryk 1934: 83 (*Dasorgyia*); Kozhantshikov 1950; 244; Ferguson 1978: 17 (*Gynaephora*); Spitzer 1984: 183 (*Gynaephora* (*Dasorgyia*)).

Material. Lectotype (hereby designated): ♂ *Dasychira pumila* Staudinger, 1881 'Origin[al]'<rose rectangle with printed>, 'Zaisan | Hbhr [Haberhauer]' <brown rectangle with inscription by black ink>, '161' <white rectangle with printed>, LECTOTYPUS. | ♂ *Dasychira | pumila* Staudinger, 1881 | T. Trofimova design. 2008' <red rectangle with printed>, MHUB. – Paralectotypes: 1♂, 2♀, same data (MHUB). – Additional material. 1♂ Kazakhstan, Akmola Prov., Kokshetau Mts., Terrissakan R., ex larva 23.viii.1958, leg. M. I. Falkovitch (ZISP); 1♂ Russia, Bashkortostan, Southern Urals Mts., Irendyk Ridge, N 52°29', E 58°25', ex larva 2.viii.2003, leg. T. Trofimova (LSSU).

Redescription (Figs 1–4). Male. Medium sized lymantriid. Wingspan 26 mm, length of forewing 11 mm. Wings widely triangular. Venation and pattern of fore- and hindwings generally as in *Dicallomera fascelina*. Forewings pale greyish brown irrorated with black scales, fringe pale brown. Basal and medial fasciae of forewing indistinct and consisting of scattered black scales. Discal spot dark, not prominent. Hindwings blackish-brown, lighter in basal part. Fringe yellowish grey. Abdomen coloured as thorax and forewings, brown. Body stout, length 12 mm. Thorax and abdomen with small tufts of scales. Hindtibia with two pairs of spurs. Palps hairy, short, antrorse; eyes large. Antennae bipectinate.



Figs 1–8. *Dicallomera* and *Lachana* spp.. **1.** Male of *D. pumila,* Southern Urals Mts. (LSSU). **2a.** Mature larvae of *D. fascelina*. **2b.** Mature larva of *D. pumila*. **3**. Male lectotype of *D. pumila* (MHUB). **4.** Female paralectotype of *D. pumila* (MHUB). **5.** *L. ladakensis*, male, holotype (BMNH). **6.** *L. ladakensis*, Kashmir, Zogi-La-Pass (MWM). **7.** *L. sincera*, male, holotype (ZISP). **8.** *L. sincera*, male, Pamir, Angoudar, Pr-Chorog, 3200 m (ZISP).

Male genitalia (Fig. 20). Tegumen narrow. Uncus symmetrical, consisting of lateral processes, rounded, with small depression apically. Gnathos ring-like, wide, apically divided. Valvae simple, ovate-triangular, basally more sclerotised. Juxta flattened, rhomb-shaped. Vinculum narrow. Saccus rounded, weakly developed. Phallus stout, cylindrical, with weak curvation, distally slightly expanded, vesica without cornuti.
Female (Fig. 4). Larger than male. Wingspan 27 mm. Brachypterous: forewing 11 mm, 2/3 length of body, slightly narrower than in male, with coloration and pattern as in male, can be questionably used for flying. Hindwing 1/5 smaller and lighter than that of male. Abdomen very robust, colored as forewing. Antenna filiform. Female genitalia not examined.
Larva (Fig. 2b). Mature larva reaching 34 mm. Head, legs and prolegs ash grey. Body dark red with dorsolateral ash grey bands. Five well differentiated dorsal hair tufts black with white setae on flanks. Anteriorly, black hair pencils on first thoracic segment very short rudimentary, posterior dorsal black hair pencil on eighth abdominal segment present. Pupal skin not conserved.
Life history. Food plants unknown. A mature larva was collected walking on 13 July 2003 on a stem of *Koeleria cristata* (L.) Pers. (Poaceae), on a mountain slope of southern exposition at an altitude of 707 m and with a mozaic of petrophytic dry steppe and mesoxerophytic steppe. The basic vegetable cover present there by: *Stipa zalesskii* Wilensky, *S. capillata* L., *Festuca valesiaca* Gaud., *Helictotrichon desertorum* Nevski., *Calamagrostis epigeos* (L.) Roth., *Phleum phleoides* (L.) Karst. (all Poaceae), *Crinitaria villosa* Grossh., *Artemisia dracunculus* L., *A. austriaca* Jacq., *Centaurea ruthenica* Lam. (all Asteraceae), *Veronica incana* L. (Scrophulariaceae), *Potentilla humifusa* Willd. ex Schlecht., *Filipendula hexapetala* Gilib., *Spiraea hypericifolia* L. (all Rosaceae), *Caragana frutex* (L.) C. Koch (Papilionaceae), *Thymus marshallianus* Willd. (Lamiaceae), *Onosma simplicissima* L. (Boraginaceae), *Gypsophyla altissima* L. (Caryophyllaceae) and others plants. On 14 July 2003 the larva spined a cocoon and on 2 August 2003 a male adult emerged.
Distribution (Fig. 34). Central Asia – Zaisan (Eastern Kazakhstan), Kokshetau Mts. (Northern Kazakhstan), Southern Ural Mts., 52°29'N, 58°25'E (Russia). The species could be widely distributed on petrophytic dry steppes of Western Siberia and Kazakhstan, but surprisingly it is not known from similar localities in neighboring regions so far.
Taxonomic notes. *Dasorgyia* was described by Staudinger by monotypy. Later on it was considered to be a subgenus within *Gynaephora* and to include three species (*G. selenophora* (Staudinger), *G. sincera* Kozhantshikov, G. *alpherakii* (Grum-Grzhimailo)) with similar ecological peculiarities and occuring in the cryophyte steppe zone of the highlands of Central Asia. Bionomic details are known only for the Tian-Shanic and Pamiro-Alaian species *G. selenophora* (Černi & Spitzer 1981). Our comparative study of external characters and genitalia structures has revealed that these three Central Asian mountain lymantriids do not possess characters that would make them congeneric with *Dicallomera pumila*. They have a different number of spurs on the hindtibia, another type of wing pattern, completely apterous (not brachypterous) females, and differences in the shape of the valva, phallus, and uncus. Thus, all species placed ear-

Figs 9–19. *Lachana* spp. **9.** *L. selenophora*, male, lectotype (MHUB). **10.** Female of *L. selenophora*, Kirgizen–Zaailiski Alatau, (MWM). **11.** Male of *L. selenophora*, Kirgizen–Zaailiski Alatau, (MWM). **12.** Male of *L. selenophora*, Kirgizen–Zaailiski Alatau, (MWM). **13.** *L. alpherakii*, male, lectotype (ZISP). **14.** *L. alpherakii*, male, Tibet, (ZFMK). **15.** *Dasychira semenovi*, male, holotype (ZISP). **16.** *Dasorgyia grumi*, male, lectotype (MHUB). **17.** *Trichosoma haulberti*, male, holotype (BMNH). **18.** *Dasorgyia alpherakii* f. *staudingeri*. male, lectotype (MHUB). **19.** *L. kulu* sp. n. male, holotype (ZISP).

lier in *Dasorgyia* are in need of revision. All available material of these species was investigated. As a result of my examination, I found that they all possess a unique combination of external characters and genitalia structures that also makes them non-congeneric with *Gynaephora* s. str., with type species *Gynaephora selenitica* (Esper, 1789). Consequently, I propose to separate this group of lymantriids into another genus. The oldest suitable name to accommodate them is the little-known *Lachana* Moore, 1888, with type species *Lachana ladakensis* Moore, 1888, from the high mountains of Ladak (Nothern India, Kashmir) (by monotypy). It is obvious that this species is congeneric with the three species under consideration. Using characters of wing venation and genitalia structure they are moved to genus *Lachana* as follows: *L. selenophora* (Staudinger, 1887) comb. n., *L. sincera* (Kozhantshikov, 1950) comb. n., and *L. alpherakii* (Grum-Grzhimailo, 1891) comb. n. A new species, *Lachana kulu* sp. n. is also described below.

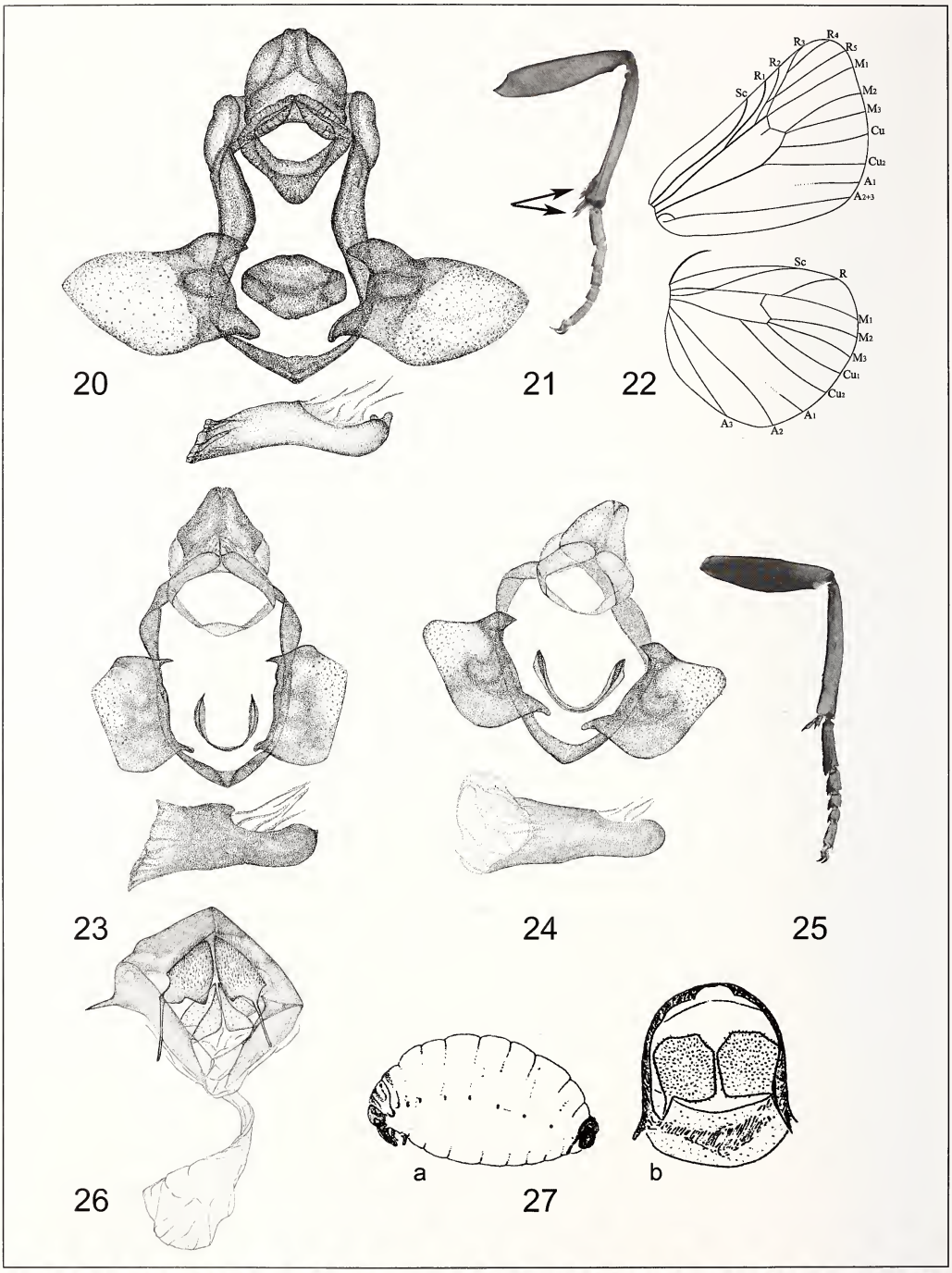
Remarks. *Dasorgyia pumila* was described based on a type series of two couples preserved at MHUB. One male is designated here as lectotype in order to clarify the taxonomy of the species. The only two known female specimens of *pumila* are in the MHUB. They were bred ex larvae and Staudinger (1881) supposed that their shorter wings were the result of unsuccessful breeding. In our opinion, these females are slightly brachypterous, but this remains to be proven.

Lachana Moore, 1888 (Figs 5–19, 22–33, 35, 36)

Type species: *Lachana ladakensis* Moore, 1888.

Description (Figs 5–19, 22, 33)**.** Little to medium sized lymantriids, wingspan 22–28 mm in males. Body stout. Antennae bipectinate or strongly bipectinate (in males of *alpherakii* and *kulu* sp.n.). Eye rounded, not very large. Labial palpus hairy, short, descending. Proboscis reduced. Head, body, and legs strongly hairy with admixture of scales. Hindtibia with one pair of spurs of different lengths (Fig. 25). Claws with wide base and acute ventral lobe. Fore- and hindwings widely triangular. Venation as in orgyiine ground plan. Forewing with R-cell wide and short; M1 originates from top of discal cell; M2 and M3 originate from top of discal cell; A1 absent. Hindwing venation similar to that of genus *Dicallomera* Butler, 1881. Forewing and hindwing with strongly modified pattern with indistinct or obvious slightly zigzag fasciae and with dark lunular spots on discal vein. Hindwing with dark basal and outer marginal areas and indistinct lunular spots on discal vein. Moths Later on it was considered to be a subgenus within *Gynaephora* and to include three species (*G. selenophora* (Staudinger), *G. sincera* Kozhantshikov, G. *alpherakii* (Grum-Grzhimailo)) with similar ecological peculiarities and occuring in the cryophyte steppe zone of the highlands of Central Asia.strongly dimorphic with apterous females. Female of type species unknown. Description based on females of *L. selenophora* (Fig. 10). Female wingless and similar to some species of genus *Orgyia* Ochs., 1810, which even have no wing rudiments. Head developed, legs rudimental. Antenna short, very slightly pectinate. Body covered with short pale yellow hairs.

Male genitalia (Figs 19, 20, 24–29). Uncus triangular, apically pointed, consisting of joined lateral processes, ventrally flexed, uncus separated by seam from tegumen;



Figs 20–27. Different features of *Dicallomera* and *Lachana*. **20.** Genitalia male of lectotype *Dicallomera pumila*. phallus below. **Fig. 21** Hindtibia of *Dicallomera pumila*. **Fig. 22.** Wing venation of genus *Lachana*; **Fig. 23.** Genitalia of *Lachana ladakensis* male, Kashmir, Zogi-La-Ppass. (MWM), phallus below. **Fig. 24.** Genitalia of lectotype *L. selenophora*, phallus below. **Fig. 25.** Hindtibia of *L. selenophora*.. **Fig. 26.** Female genitalia *L. selenophora*, Uzbekistan, Ferghanskaya region, Alai. Mts. (MWM). **Fig. 27a.** Female of *Gynaephora qinghaensis* **b.** Female genitalia *G. qinghaensis* Chou & Ying (both from Chou & Ying 1979).

tegumen and vinculum narrow; gnathos ring-like; valvae squarish and relatively short, without lobes, with strong sclerotization basally and with weak sclerotization in distal part; juxta arcuate, slender; phallus slightly curved, distally expanded, vesica simple without cornuti.

Female genitalia (Fig. 26). Papillae anales triangular, with well developed pseudopapillae basally; anterior and posterior apophyses developed, anterior apophyses two times as long as posterior apophyses; antrum and ductus without sclerotization; ductus very slender, somewhat more shorter than corpus bursae; latter flimsy, rounded, without signa.

Diagnosis. *Lachana* differs from *Gynaephora* by the following characters: (1) distinctly smaller size, with wingspan up to 28 mm; (2) forewing M1 originating from top of discal cell, with latter rather wide; M2 and M3 originating from top of discal cell, in hindwings M3 with Cu1 originating from top of discal cell, but not on stem as in *Gynaephora*; (3) male juxta arcuate, slender, valva squarish and relatively short; (4) habitat at higher altitudes. Apterous females are known only for *selenophora* and *alpherakii*. However, this character would be an important additional characteristic of the genus if females of the other species are found to be apterous.

Distribution (Figs 35, 36). The genus is limited to high mountains (3000 m and above) of Middle Asia (Tian-Shan and Pamiro-Alai) and Central Asia (Tibet, Ladak, the Himalayas).

Remarks. The males are day-fliers. The host-plants are little known. The genus includes five species.

Lachana ladakensis Moore, 1888 (Figs 5, 6, 23)

Lachana ladakensis Moore, 1888: 398. Type locality: [India] Ladak.

References: Strand, 1910:111; Kozhantshikov, 1950: 232.

Material. Holotype ♂ *Lachana ladakensis* Moore, 1888, with labels: 'Ladak | 83-26 | 491.', 'Type' (BMNH). – Additional material. 2♂ **India**: Kaschmir, Zogi-La-Pass, 4200 m, 21.vii.1980, leg W. Thomas (MWM); 1♂ India: Jammu & Kaschmir, Kaschmir, Fatu-La-Pass, 3700 m, 7.–8.vii.1980, leg W.Thomas (MWM); 1♂ Ladak (ZFMK).

Redescription (Figs 5, 6). Male. Wingspan 24 mm. Head, thorax, and abdomen densely pilose, with long silky brown and brownish grey hairs. Legs brown, slightly pilose. Antennae bipectinate. Eyes ovate. Forewings triangular, brown ochreous with dark brown bands; basal area sepia-brown, covered with dark brown scales and outlined by dark band from sepia-brown medial area, expanded dorsally. Brown costal area shaded by dark scales; discal veins covered with dark brown scales forming lunular spot. External band dark brown with angles on M1 and M2+M3; marginal area dark brown. Hindwings widely triangular, dark brown with indistinct dark marginal band, and with lighter medial area; dark scales distinct on discal vein; fringe brownish ochreous.

Male genitalia (Fig. 23). Uncus cone-shaped with wide basis; height of uncus as long as valva; gnathos consisting of ribbon, ring-like sclerite divided apically and narrowed distally; valva characteristic: rectangular, two times wider than long, dorso-caudal superior edge and ventro-caudal edge bevelled, caudal edge straight, basal part and interior half more strongly sclerotised, dorso-caudal angle weakly sclerotised, almost

membranous; juxta arcuate, slender; tegumen and vinculum narrow; saccus expressed slightly; phallus rather wide, almost straight, distally expanded.

Distribution and life history (Fig. 35). The distribution of this species is limited to Northern India (Kaschmir) in the Ladak mountain range. The life history and immature stages are unknown.

Remarks. I did not have the possibility to study the genitalia of the type specimen preserved in the BMNH. Therefore, my description and figure are based on specimens collected at the type locality and kept in MWM.

Lachana selenophora (Staudinger, 1887) comb.n. (Figs 9–12, 24–26)

Dasychira selenophora Staudinger, 1887: 96. Type locality: [Uzbekistan], Margelan.

References: Grum-Grzhimailo 1890: 556; Kirby 1892: 485 (*Dasychira*); Staudinger 1901: 114; Strand 1910:120; Bryk 1934: 83 (*Dasorgyia*); Kozhantshikov 1948: 151; 1950: 245; Ferguson 1978: 17 (*Gynaephora*); Černi & Spitzer 1982: 41–44; Spitzer 1984: 180–183 (*Gynaephora* (*Dasorgyia*)).

Material. Lectotype (here designated) with the following labels: 'selenophora | Stgr.' <white rectangle, hand–written in black ink>, 'Margelan | [18]84 Maur[er]' <brown rectangle, hand–written in black ink >, 'Origin' <rose square, printed> 'LECTOTYPUS | *Dasychira selenophora* | Staudinger, 1887 | T. Trofimova design. 2008' <red rectangle, printed>, MHUB. – Paralectotype: 1♂ same data (MHUB). – Additional material. 1♂ [Kyrgyzstan] Artcha-Bakhi, m[ountain]. Alai sept. 20.vi.1908, leg. A. Avinoff (ZISP); 1♂ b. Chagdir, (ZISP); 1♂ Aleksandrovsky range, Shakshi, 16. vii.1910 (ZISP); 1♂ Alai ridge, nothern slope, Nary-Kazyk, 3600 m, 25.vii.1952, leg. Bundel (ZISP); 1♂ Alai Mont., 1905, Korb [leg.] (ZFMK); 1♂ Artcha-Baschi, 21.vi. [19]08 (ZFMK); USSR, 7♂ 4♀ Kyrgyzstan, mer. occ., Oshskaya region, Alai, Alaiskyi hrebet, Kadamzhai lake, Aksu river, 1000 m, 21.–22.v.1980, Černỳ (MWM); 2♂ Asia Centralis, USSR Kyrgyzstan, Mt. Tian-Schan, Alaartscha, 3900 m, 7. vii.1981, K.+L. Krusek leg. (MWM); 146♂, 21♀ Kirgizen–Zaailiski Alatau, river Bolshoi Almatinca, Kosmosstanzija, 3200 m, 5.–25.vii.1992, leg.Murzin (MWM); 1♂, 2♀ Kyrgyzstan, Tian-Schan-Geb., Songkol-See, 3200 m, vii. 1995, V. Luchtanov leg. (MWM); 2♂ Kyrgyzstan, Talasskij khrebet, Kara-Buura-Schlucht, 3200 m, 30.vii.1999, leg. O.Novikov (MWM); 1♂, 2♀ Uzbekistan, Ferghanskaya region, Alai Mts, 300–3300 m, Aksu valley, Jordon, 22.–24. vi. 1982, Černỳ leg. (MWM); 1♂ Alai ridge, central southern slope, Kok-Su river, (ZISP);); 1♂ Mts. Alaensis, centr cl. meridional. Kok-Su pr. fl. Kosh-Tjuss, 3600 m, 6.viii.1964, leg. Bundel (ZISP); 1♂ Mts Alaensis, centr. cl. Meridional, Kok-Su pr. fl. Kosh-Tjuss, 3300 m, 29.vii.1964, leg. Bundel (ZISP); 2♂ Kosh-Dube, 3200 m, 7.viii.1964, leg. Bundel (ZISP); 1♂ Afghanistan, Kot. Parandey, 3500 m, 2.viii.1972, leg. Dr. Reshöft (MWM); 1♀ Afghanistan, Nord-Salang, 2700 m, 26.vi.1976, leg. Dr. Reshöft (MWM).

Redescription (Fig. 9). Male. Wingspan 24–28 mm. Externally close to *Lachana ladakensis*, but larger and more greyish. Forewing contrasting pale grey with dark brown bands; basal area grey, covered with dark brown scales restricted by dense dark brown band expanded dorsally; internal area dark, discal cell grey, discal veins covered with dark brown scales forming lunular spot, external band in zigzag and merging with marginal area. Hindwing widely triangular, dark brown with wide, dark marginal band expanding on Cu2 and interlocking with dark discal spot; fringe greyish brown.

Male genitalia (Fig. 24). Uncus cone-shaped; gnathos ribbon ring-like; valva characteristically trapezium-shaped, 1.5 times wider than long, dorso-caudal angle tapered, ventro-caudal angle rounded, caudal edge straight oblique, basal part and interior half more strongly sclerotized, dorso-caudal angle weakly sclerotized; juxta arcuate, slender; saccus slightly expressed; phallus rather straight, distally expanded.

Female (Figs 10, 26). As discussed in generic account of *Lachana*.

Remarks. This is a very variable species (Figs 9, 11, 12) in size – wingspan 24–28 mm in males – and in forewing coloration. Males occur in two forms, one with a dark brown forewing with confluent bands and the second with a yellowish grey forewing with three

distinct dark bands and with a lighter hindwing. The genital structures also vary in the degree of tapering of the dorso-caudal angle of the valva, but proportions are always constant.

Lachana selenophora was described from 2 males: "Von dieser neuen Art erhielt zwei anscheinend gezogene ♂ von Herrn Maurer aus Margelan.", now kept in MHUB. One of them is here designated as the lectotype of the species.

Distribution and life history (Fig. 35). High mountains from 1000 to 3600 m in Middle Asia (Tian-Shan and Pamiro-Alai, Hindukush).

Černy and Spitzer (1981) described the life cycle of *Lachana selenophora* in the high mountains of Pamiro-Alai and pointed out some bionomic peculiarities: the species inhabits high-mountain ecosystems of the cryophytic steppe zone. Larvae resemble those of Arctiidae – they are black, dark rusty on the thoracic segments with no distinct dorsal brushes or hair-pencils. The males are common day-fliers from the second half of June to early August. Females are wingless and do not leave the cocoon like as in *Orgyia dubia* (Tauscher, 1806). The larva feeds on *Dactylis* (Poaceae).

Lachana sincera (Kozhantshikov, 1950) comb. n. (Figs 7, 8, 28)

Gynaephora sincera Kozhantshikov, 1950: 248. Type locality: Tajikistan, Pamir, river Mats.

References: Spitzer 1984: 180–183 (*Gynaephora* (*Dasorgyia*)).

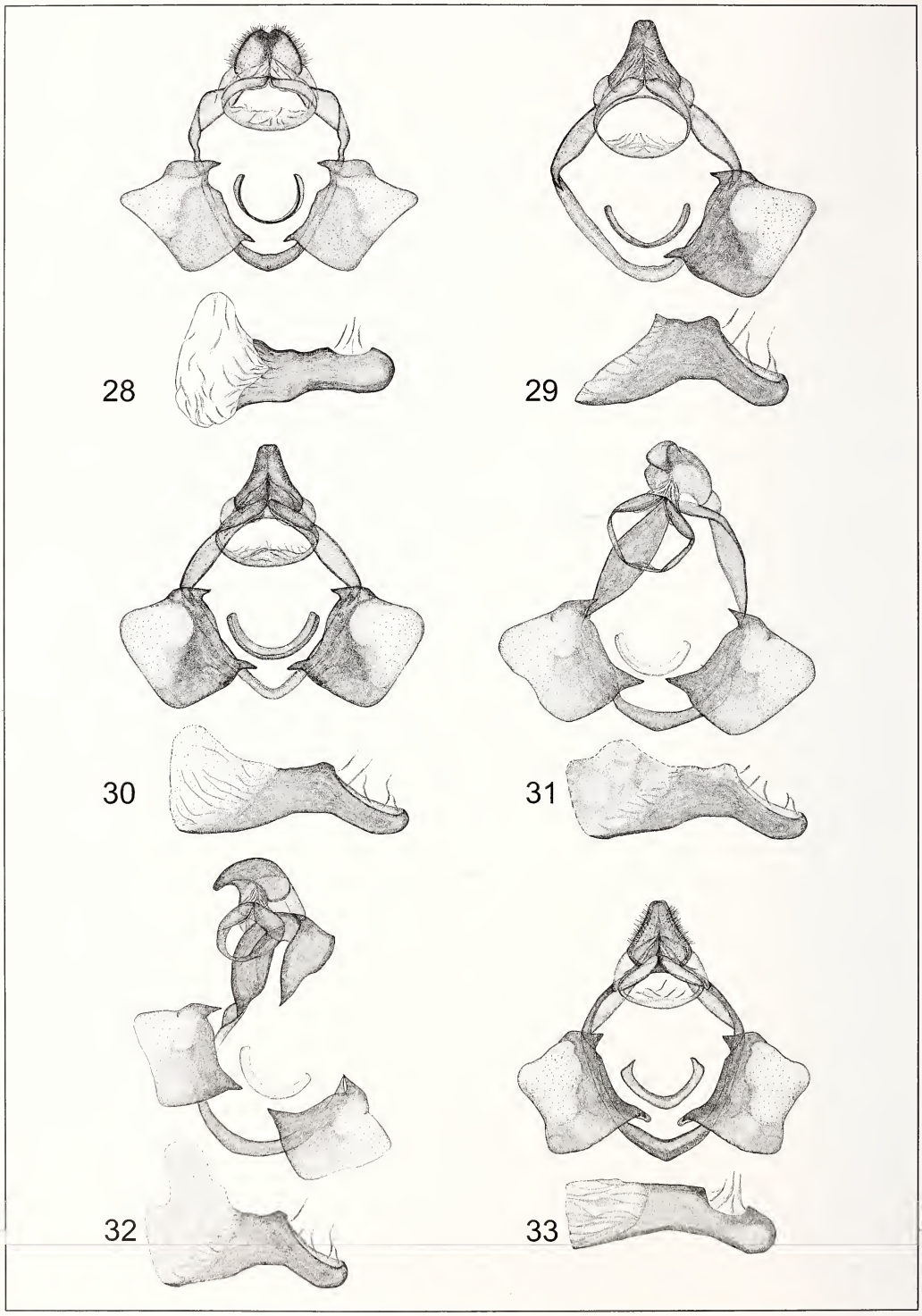
Material. Holotype ♂ with labels: 'р. Мацъ [river Mats, Pamir] | 3600 м | 29 vi. 1909. А. Я.', 'coll. O. John', 'Gynaephora typus | sincera | Kozh.' (ZISP); – Additional material. 2♂ [**Tajikistan**] Pamir, Angoudar, Pr-Chorog, 3200 m, 19. vii.1961, Bundel leg. (ZISP).

Redescription (Figs 7, 8). Male. Wingspan 24 mm. Head, thorax, and abdomen densely pilose: long silky brown hairs with admixture of pale greyish and red hairs. Pattern of wings similar to that of *L. ladakensis* and *L. selenophora* but differing in showing clear zigzag bands. Forewing mostly light beige, in basal area brown, mixed with whitish-grey scales, internal brown band narowly zigzag, outer brown bands zigzag in lower half curved by angle to internal bands, medial area beige but lighter on discal cell, discal spot formed by brown scales on discal veins and reaching costal edge of wing, marginal area pale brown. Hindwing dark brown with indistinct dark marginal band and slightly lighter medial area, discal veins weakly outlined by dark scales; fringe pale greyish with dark spots.

Male genitalia (Fig. 28). Uncus rounded, triangular, smaller than in previous species and following; gnathos ribbon, ring-like and rather narrow; valva trapezium-shaped, two times wider than long, dorso-caudal angle distinctly tapered, ventro-caudal angle almost right, rounded, caudal edge cut off obliquely, valva sclerotized as in *selenophora*; juxta arcuate, very slender; saccus expressed; phallus robust, rather straight, distally expanded.

Female. Unknown.

Distribution and life history (Fig. 35). This species is found in the high mountains of Middle Asia (Pamir). The life history and immature stages are unknown.



Figs 28–33. Male genitalia of *Dicallomera* and *Lachana* types (phallus below). **28.** *L. sincera*. **29.** *L. alpherakii*. **30.** *Dasychira semenovi*. **31.** *Dasorgyia grumi* (juxta destroyed). **32.** *Dasorgyia alpherakii* f. *staudingeri* (juxta destroyed). **33.** *Lachana kulu* sp. n.

Lachana alpherakii (Grum-Grzhimailo, 1891) comb. n. (Figs 13–18, 27, 29–32, 36)

Dasychira alpherakii Grum-Grzhimailo, 1891 25: 464. Type locality: [Qinqhai, China], Sinin-Schan.
= *Dasychira semenovi* Grum-Grzhimailo, 1891: 464. Type locality: [China], Sinin-Schan.
= *Dasorgyia grumi* Staudinger, 1901: 115. Type locality: [China], Kuku-Noor.
= *Trichosona haulberti* Oberthür, 1911: 337. Type locality: [China], Ta-tsien-Lou.
= *Dasorgyia alpherakii* f. *staudingeri* Bang-Haas,1938: 179. Type locality: [China], Kan-Tschou, Naschi Pass.

References: Kirby, 1892: 485; Staudinger 1901: 114 (*Dasorgyia*); Strand 1910: 120; Bryk, 1934: 83; Bang-Haas 1938: 179; Kozhantshikov 1950: 246 (*Gynaephora*); Ferguson 1978: 17; Chou Io & Ying Chiang-Chu 1979: 23; Zhao Xhongling 2003: 134; Spitzer 1984: 180–183 (*Gynaephora* (*Dasorgyia*)).

Material. Lectotype (here designated) with the following labels: 'Das. alpherakii | ♂ Gr.-Gr.' <white rectangle, hand-written in black ink>, 'Sinin. alp.' <white rectangle, hand-written in black ink >, 'alpherakii' <white rectangle, hand-written in black pencil>, 'Кол. б. Вел. Кн. | Николая Михайловича'[collection of Grand Duke Nikolay Mikhailovich] <white rectangle, printed> 'Origin' <blue rectangle, printed>, 'LECTOTYPUS / *Dasychira* / *alpherakii* / Grum-Grzhimailo, 1891 | T. Trofimova design. 2008' <red rectangle, printed>, ZISP. – Paralectotype: ♂ with label 'Kuku-Noor' (ZISP). – Additional material. 1♂ **China**, Qinghai, Ouest Qinghai Nan-Shan, Road Caka Tianjun, km 338–339, 4000–4300 m, 16.–19.vii.1993, J. Verhulst leg. (MWM); 1♂ Kukunor Geb., Burchan Buddha Nomohun Pass, 4000 m, July (MWM); 2♂ Kansu sept. occ., Kan-tschou, Richthofen. mont. sept. Naschi Pass, 3000 m, July (MWM); 3♂ with same data, but in ZFMK; 15♂ 37) Auf Wiesen im Buschland bei Jecundo, 97 öl 33nß, 4300 m (Tibet), 11.viii.1935 H. Höne (ZFMK); 1♂ Weynanpou, Sining Gebit, Kansu sept, 4000 m, Mitte July (ZFMK); 1♂ Kuku-Noor (ZFMK); 1♂ Kansu occ., Langow (ZFMK); 1♂ Kansu sept. Kanchow (ZFMK); 1♂ Kansu sept., Liangchow (ZFMK); 2♂ Kukunor Geb. (ZFMK), 1♂ «Pamir» [locality questionable] (ZFMK).

Redescription (Figs 13–18). Male. Wingspan 27 mm. Head, thorax, and abdomen covered with long silky hairs, mostly intense dark brown with yellowish. Legs dark brown, pilose, with rather long hairs. Antenna bipectinate with long setose branches twice as long as those of previous species. Wings of type specimens yellow with dark brown bands; basal area of forewing yellow lightly mixed with brown scales, internal bands dark brown, indistinct, medial area brown with large yellow spot in discal cell and distinct second yellow spot under discal cell, discal veins covered with dark brown scales as lunular spot, costa dark brown with scattered yellow scales, outer band zigzag on M1 and M3, curved by angle to internal band; submarginal band merged with marginal area. Hindwing yellow with dark brown marginal band, latter either narrow with clear border or broad; ome specimens with completely dark hindwing; fringe yellow with dark scales.
Male genitalia (Fig. 29). Uncus cone-shaped, slender, uncinate, as long as valva; gnathos ring-like, narrow in lower part; valva with diagnostic shape: squarish with caudal right angle, 1.2 times broader than long; juxta arcuate, slightly wider than that of previous species; tegumen almost twice as wide as vinculum; saccus not expressed; phallus robust, down-turned, distally with deeply bevelled edge.
Female (Fig. 27 a, b). I did not examine the female of *Lachana alpherakii* because there are none in the collections investigated. However, the wingless female of *L. alpherakii* has been illustrated in "Fauna Sinica" (Zhao 2003) externally resembling the female of *L. selenophora*. In addition, the female genitalia have been illustrated by Chou & Ying (1979) under the name *Gynaephora qinghaensis* Chou & Ying, 1979, which, based on the original description and illustrations, is probably a junior synonym of *L. alpherakii*.
Distribution and life history (Fig. 36). High mountains (recorded from 3000 to 4500 m) of Central Asia (Tibet, China). The host-plant recorded by Zheng et al. (2004) was *Elaeagnus angustifolia* L. (Elaeagnaceae).

Fig. 34. Distribution of *Dicallomera pumila* (△).

Fig. 35. Distribution of *Lachana kulu* sp. n. (△), *L. ladakensis* (□), *L. selenophora* (○) and *L. sincera* (□).

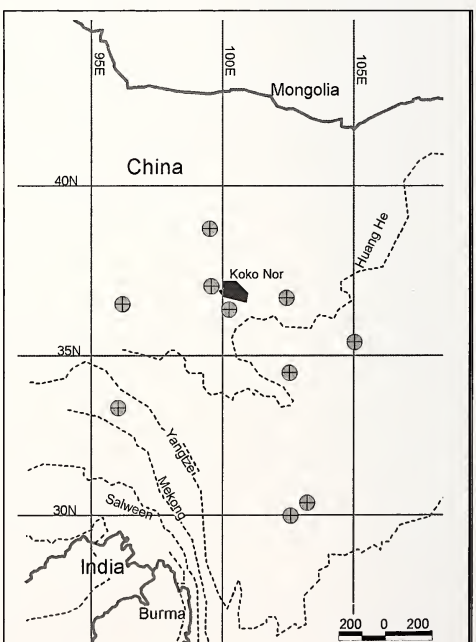


Fig. 35. Distribution of *Lachana alpherakii* (⊕).

Remarks. *Lachana alpherakii* is a very variable species (Figs 13–18, 29–32) with a wingspan of 22–27 mm. Males occur in several forms as shown by the many described synonyms (see below).

New species of the complex under consideration were described from China by Chou & Ying (1979) as: *Gynaephora qinghaensis*, *G. aureata*, *G. ruoergensis*, and *G. minora*. These species are similar to *L. alpherakii* as noted in original descriptions and they were described from localities inhabited by *alpherakii*. The keys to define these species is based on the comparative sizes and shapes of the valvae and phallus, which are figured by Chou & Ying (1979). However, these species have the very characteristic shape of the phallus typical for *L. alpherakii*. The figured shape of the valva is unclear because the basal part is shown schematically. Nevertheless, it resembles that of *L. alpherakii* for which the valva is rather irregular in shape. Unfortunately, it was impossible to study the type materials of Chou & Ying in spite of special requests. These types are probably deposited in the Institute of Biology of Xining, Qinghai (China). Surprisingly these little known taxa from Tibet are not included in "Fauna Sinica" (Zhao 2003) while *alpherakii* is included. The short and schematic English diagnoses and strong phenotypic variability of *L. alpherakii* cannot allow us to discuss the taxonomic status of this Chinese material further.

***Dasychira semenovi* Grum-Grzhimailo, 1891** **(Figs 15, 30)**

Material. Holotype ♂with labels: 'Sinin. alp.' <white rectangle, hand-written in black ink>, 'Orig.' <blue rectangle, printed>, 'Кол. б. Вел. Кн. | Николая Михайловича' [collection of Grand Duke Nikolay Mikhailovich] <white rectangle, printed>, ZISP.

Remarks. Holotype with wingspan of 28 mm; forewing dark, less yellow than in the type of *alpherakii*; hindwing dark brown, fringe yellow. The species name was treated by Bang-Haas (1938) as a colour form of *alpherakii*. Later, Kozhantshikov (1950) synonymized this name with *Gynaephora alpherakii*.

***Dasorgyia grumi* Staudinger, 1901** **(Figs 16, 31)**

Material. Lectotype (hereby designated): ♂ with the following labels: 'Das. Selenopho | ra Stgr. | ♂, 1894 | det. Thebel' <white rectangle, hand-written in black ink>, 'Alpherakii v.? | grumi Stgr.' <white square, hand-written in black ink>, 'Kuku-noor, | [18]94, Rückb[ei]l' <brown rectangle, hand-written in black ink>, 'Origin' <rose square, printed>, | 'Photo done by | A. Schintlmeister | # 2741' <yellow rectangle, printed>, 'LECTOTYPUS. | *Dasorgyia grumi* / Staudinger, 1901 | T. Trofimova design. 2008' <red rectangle, printed>, MHUB. – Paralectotypes: 2♂ with same data (MHUB).

Remarks. The wing pattern is as in *semenovi*. The male genitalia (Fig. 31) of the lectotype are in Euparal. The species name was treated by Bang-Haas (1938) as a colour form (*alpherakii* f. *grumi* Staudinger, 1901). Kozhantshikov (1950) synonymized the name with *Gynaephora alpherakii*.

***Trichosoma haulberti* Oberthür, 1911** **(Fig. 17)**

Material. Holotype ♂ with labels: 'Type' <white oval with red frame, printed>, '*Trichosoma* / *haulberti* ♂ | Obthr.' <white rectangle, hand-written in black ink>, 'Frontière orientale | du Thibet | Chasseurs indigenes | du P. Néjean, | 1905' <white rectangle, printed>, 'Ex Oberthür Coll. | Brit. Mus. 1927-3' <white rectangle, printed> (BMNH).

Remarks. The male genitalia have not been examined. Oberthür (1911) introduced this name without any description, only the type locality and a good illustration of a male, which makes the description valid. On the basis of this illustration *haulberti* Oberthür was synonymized by Kozhantshikov (1950) with *L. alpherakii*.

Dasorgyia alpherakii f. *staudingeri* Bang-Haas, 1938 (Figs 18, 32)

Material. Lectotype (here designated) ♂ *Dasorgyia alpherakii* f. *staudingeri* O. Bang-Haas, 1938, with labels: 'Kansu sept.occ. | Kan-tschou, | Richthofen. mont.sept. | Naschi Pass, | 3000 m, July' <white rectangle, printed>, *'Dasorgyia | alpherakyi |* f. *staudingeri* | Type OBH' <white rectangle, hand-written in black ink>, 'Type | O.B.-Haas' <red rectangle, printed>, *'Dasorgyia alpherakyi* f. *staudingeri* ♂ | O. Bang-Haas' <white slip of paper, printed> 'LECTOTYPUS. *'Dasorgyia | alpherakyi* f. *staudingeri* | Bang-Haas, 1938 | T. Trofimova design. 2008' (MHUB). – Paralectotypes: 5♂ with the same data but marked by Bang-Haas with labels 'Cotype' (MTD) and 1♂ with the same data (ZFMK).

Remarks. The male genitalia of the lectotype are in Euparal (Fig. 32). This taxon was described as the dark colour form of *alpherakii*. Kozhantshikov (1950) synonymized it with *Gynaephora alpherakii*. The type specimens are relatively small (wingspan: 22 mm) and are characterized by the dark colour of the forewings and a reduction of the bands to indistinct spots from lightly yellow scales (Fig. 18). The hindwing is mostly dark and the fringe dark yellowish. This form is known from the type series only. Details of the genitalia structure do not differ significantly from those of *L. alpherakii*. Probably this is a good subspecies, but the lack of additional material does not allow to confirm this with certainty.

Lachana kulu sp. n. (Figs 19, 33)

Material. Holotype ♂: 'Kulu [Kullu Valley] | Elwes' <white square with black frame, hand-written in black ink>, 'HOLOTYPUS' | *'Lachana kulu* sp.n. ♂.'| det. T. Trofimova' <red rectangle, printed> (ZISP). 'PARATYPUS' |*' Lachana kulu*, Trofimova ♂' | T. Trofimova det. 2008' <red rectangle, printed>, ZISP. – Paratype ♂, same data (ZISP).

Description (Fig. 19). Male. Wingspan 25 mm. Head, thorax, abdomen, and legs covered with long silky brown and grey hairs. Antennae bipectinate with long setose branches as in *Lachana alpherakii*. Labial palpus hairy, short, descending. Eyes ovate. Forewing triangular, with grey ground colour, without bands, scales needle-shaped with toothed edge, raised, veins well visible, with indistinct groups of white scales between discal cell and costal edge, outer half of cell, and under cell also, with dark grey scales on discal veins. Hindwing widely triangular, marginal half grey, round discal spot with white scales; fringe lightly coloured and consisting of white and grey scales.

Male genitalia (Fig. 33). Uncus cone-shaped, slender, narrow apically; gnathos ring-like, narrowed distally; valva almost squarish, 1.5 times wider than long, ventro-caudal angle expressed, ventral edge longer than dorsal, caudal edge depressed; juxta widely V-shaped, ribbon-like; saccus rather expressed; phallus robust, rather straight, with apex oblique; vesica without cornuti.

Female. Unknown.

Distribution and life history (Fig. 35). Kullu Valley of Southern Himalayas, Himachal Pradesh, India. Nothing is known about the life history and immature stages.

Diagnosis. The new species is closely related to *L. alpherakii*, externally somewhat resembling its form *staudingeri* B.-H. in wing pattern. It clearly differs from other species of the genus by the following characters: grey color of wings with light fringe; valva with depressed caudal edge and expressed ventro-caudal angle.

Etymology. The species name is derived from that of the type locality.

Remarks. The species was collected by the famous traveller and naturalist Henry John Elwes, probably during his journey to India and Nepal in 1913.

Tab. 1. Differential characters of *Dicallomera*, *Gynaephora*, and *Lachana*.

Characters	***Lachana***	***Gynaephora***	***Dicallomera***
External features			
Venation hindwings	Sc and R joined, M3 and Cu1 originating from top of discal cell.	Sc and R joined, M3 and Cu1 on stalk at 1/4 of M3+Cu1 (Kozhantshikov 1948, 1950; Tschistjakov 2003).	Sc and R joined or anastomosed, M3+Cu1 on short stalk or long stalk (at 1/2 of M3+Cu1 as in *punila*).
Hindtibia	with one pairs of spurs	with one pairs of spurs (Kozhantshikov 1948, 1950; Ferguson 1978)	with two pairs of spurs (Tschistjakov 2003)
Male genitalia			
Uncus	triangular or cone-shaped, apically pointed, ventrally flexed.	short, almost triangular, rather inflated at base with medial depression dorsally (Kozhantshikov 1948, 1950; Ferguson 1978; Tschistjakov 2003)	wide, rounded, with small depression apically (Bacallado et al. 1981; Tschistjakov 2003)
Valva	squarish and short, as wide or wider than long	short and broad (Kozhantshikov 1948, 1950; Ferguson 1978; Tschistjakov 2003)	extending angulate (Bacallado et al. 1981; Lukhtanov et al. 1989; Tschistjakov 2003)
Juxta	arcuate, slender	platelike (Kozhantshikov 1948, 1950; Ferguson 1978)	large and platelike (Bacallado et al. 1981; Tschistjakov 2003)
Phallus	robust	slender, almost straight (Kozhantshikov 1948, 1950; Ferguson 1978; Tschistjakov 2003)	stout and curved (Bacallado et al. 1981; Tschistjakov 2003)
Larva			
Larva	Arctiid-like – on thoracic segments with no distinct dorsal brushes and hair-pencils (Černy & Spitzer 1981; Spitzer 1984) (known for *alpherakii* and *selenophora* only)	with five dorsal hair brushes with hair-pensil on anal segments (Kozhantshikov 1948, 1950; Ferguson 1978)	wth same characters as *Gynaephora selenitica* (Esper, 1789) (Ferguson 1978)
Female			
Sexual dimorphism	female wingless (known for *alpherakii* and *selenophora* only)	females with fully developed wings (Ferguson 1978)	females with narrower wings or brachypterous (Tschistjakov 2003)

Discussion

Dicallomera, *Gynaephora*, and *Lachana* form a close group of genera characterized by the following similarities in the adult: forewing venation, stout body, uncus symmetrical and consisting of fused lateral processes, ring-like gnathos, simple valva without processes and lobes, and phallus without cornuti. *Lachana* differs from the related genera more clearly as discussed above. *Dicallomera* is characterized by the relatively uniform genital structures. In Table 1 I suggest some morphological characters to distinguish these three genera. The characters of *Lachana* are given in conformity with the diagnosis provided above. The characters of *Gynaephora* and *Dicallomera* are from authors who discussed these genera and their diagnoses are based on the type species: *Gynaephora selenitica* and *Dicallomera fascelina*. For *Dicallomera* I also include some additional remarks based on my examination of the type specimens of *Dicallomera angelus*, *D. kusnezovi*, and *D. pumila*. Some specimens of other members of *Dicallomera* were also examined. Note that all characters mentioned in the table will have to be confirmed or revised because no type specimens have been examined for *Gynaephora* and *Dicallomera*.

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