

A REVISION OF THE GENUS *HELIOPHOBUS* BOISDUVAL, 1828 (LEPIDOPTERA, NOCTUIDAE, HADENINAE)

SÁNDOR JENŐ SIMONYI¹, LÁSZLÓ RONKAY² and PÉTER GYULAI³

¹H-1031 Budapest, Sóvári utca 30, Hungary; E-mail: simonyisandorjeno@gmail.com

²Department of Zoology, Hungarian Natural History Museum

H-1088 Budapest, Baross u. 13, Hungary; E-mail: ronkay@zoo.zoo.nhmus.hu

³H-3530 Miskolc, Mélyvölgy u. 13/A, Hungary; E-mail: adriennegyulai@gmail.com

The taxa of the genus *Heliophobus* Boisduval, 1828 are revised, the majority of formerly described taxa of the genus, *H. reticulata* (Goeze, 1782), *H. unicolor* (Alphéraky, 1889), *H. kitti* (Schawerda, 1914), *H. texturata* (Alphéraky, 1892), and *H. nepalensis* (Plante, 1982) are redescribed; three newly discovered Central Asiatic species, *H. mongoliensis* sp. n. (Mongolia, Russia, Kazakhstan, China), *H. aequalifuscus* sp. n. (Pakistan) and *H. bulcsui* sp. n. (Pakistan, China), are described. With 86 genitalia figures and 57 colour images of adults.

Key words: *Heliophobus*, Noctuidae, Hadeninae, taxonomic revision, redescriptions, new species, Central Asia.

INTRODUCTION

Former studies on the taxonomy of the genus *Heliophobus* produced no generic revision but a number of interesting results concerning the taxonomic identity of certain species. The starting point is the work of ТУКАС (1943) who first recognised the distinctness of the two species occurring in Europe, though he considered them as two subspecies of the same species (*H. reticulata reticulata* and *H. reticulata silbernageli*), and overlooked the identity of his *silbernageli* with the taxon described by SCHAWERDA (1914) as *H. reticulata* var. *kitti*. DUFAY (1979) was the first expert who has proved the specific distinctness of *Heliophobus kitti* (Schawerda, 1914) from *H. texturata* (Alphéraky, 1892) and recognised the identity of *H. silbernageli* and *H. kitti*. Subsequently, PLANTE (1982) described a new species from the southern Himalayas, *H. nepalensis*; the taxonomic rank of this taxon has remained, however, disputable, presumably because of the great similarity to its sibling species, *H. texturata* and by the absence of information about the everted vesica. In his paper, BEHOUNEK (1986) compared the genitalia of western Asiatic specimens of the *H. reticulata* species-group and recognised a new type of *Heliophobus* genitalia which he considered belonging to *H. unicolor* (Alphéraky, 1889). This taxon was subsequently described as *H. dalmae* by SIMONYI in 2010.

Despite these results and the rising new problems, the genus *Heliophobus* seems to be rather neglected during the last two decades, although the examination of the everted vesica has become essential and widespread, and several

successful expeditions provided considerable new material from large areas of Central and Inner Asia.

The genus has long been considered to contain four species and this view was widely accepted before 2010. The investigations on the external and especially on the genital morphology on a large Asian *Heliophobus* material preserved in Hungarian Lepidoptera collections provided the firm base for the revision of the genus. The species content of *Heliophobus* has been considerably increased; the present paper contains the characterisation of the genus, the detailed comparisons of its six formerly known taxa and the descriptions of three new species. The subspecific splitting of the polytypical species (e.g. *H. unicolor* and *H. kitti*) will be discussed in a later article.

SYNOPSIS

Genus *Heliophobus* Boisduval, 1828

H. reticulata group:

H. reticulata (Goeze, 1781)

H. unicolor (Alphéraky, 1889)

H. dalmae Simonyi, 2010

H. mongoliensis Simonyi **sp. n.**

H. texturata group:

H. texturata (Alphéraky, 1892)

H. kitti (Schawerda, 1914)

H. nepalensis Plante, 1982

H. bulcsui Simonyi **sp. n.**

H. aequalifuscus Gyulai & Simonyi **sp. n.**

Abbreviation – BMNH = Natural History Museum, London (formerly British Museum, Natural History); HNHM = Hungarian Natural History Museum, Budapest; NHMG = Natural History Museum, Geneva; NHMW = Naturhistorisches Museum, Vienna; ULB = Újpesti Lepkémúzeum (Lepidopterological Museum, Újpest), Budapest; ZISP = Zoological Institute, Russian Academy of Science, St. Petersburg; ZMHU = Zoological Museum, Humboldt University (actually Museum für Naturkunde), Berlin.

SYSTEMATIC PART

Genus *Heliophobus* Boisduval, 1828

Heliophobus Boisduval, 1828, *Europaeorum Lepidopterorum Index Methodicus*: 69. Type-species: *Phalaena saponariae* Borkhausen, 1792, by subsequent designation by Duponchel, 1829.

Taxonomy. The genus *Heliophobus* appears as a compact and clearly defined, monophyletic lineage within the *Sideridis* Hübner, 1821–*Conisania*

Hampson, 1905 clade of the subfamily Hadeninae. The entire clade can be characterised by several shared features of the male genitalia, e. g. the almost symmetrical valvae, the reduced harpe, the well developed saccular extensions, and the distal fascia of cornuti in the vesica, etc. This common basic structure of the male genitalia (the “*Sideridis*-type” clasping apparatus) is the main reason of the different evaluation of the supraspecific categories within the generic complex. The different – lumping or splitting – concepts about the taxonomic interpretation of the main lineages (*Sideridis*, *Colonsideridis* Beck, 1991, *Aneda* Sukhareva, 1973, *Heliophobus*, *Conisania*, *Luteohadena* Beck, 1991, *Saragossa* Staudinger, 1900 and *Dianthivora* Varga et Ronkay, 1991) led to the frequent changes of their rank. The *Heliophobus* lineage appears as clearly monophyletic, and represents a rather basal branch on the phyletic tree of the generic complex. Its supposed sister-group is none of the above-mentioned supraspecific taxa but an unnamed lineage represented by a single species, “*Polia*” *costirufa* Draudt, 1950. Thus, in the opinion of the authors, is better interpreted as a distinct genus than a subgenus of *Sideridis*.

The genus includes two main species-groups, the *reticulata*–*unicolor* and the *texturata*–*kitti* groups. There are conspicuous differences between the two main lineages in the wing pattern and some other external features, and the differences in the structure of the genitalia of both sexes are essential. It can be stated, based on the „ground plan” of the genitalia of the two different groups, that the clasping apparatus of the *H. texturata*–*H. kitti* lineage has partly lost its ability for fixing the female body, but this function has been taken over by the winding and sclerotisation of the female ductus bursae and the stronger vesica of the males.

Diagnosis. The external appearance of the adults is very characteristic and easily recognisable. This forewing pattern with the contrasting, whitish or ochreous-white filling of the antemedial and postmedial crosslines, the similarly white or whitish subterminal line, the pale covering on the veins and the white or whitish outlines of the orbicular and reniform stigmata on a dark brown or grey ground is a group feature of the genus. Similar colouration may appear in certain other noctuid groups like the not very closely related, subtropical hadenine *Dictyestra* Sugi, 1982 or the xylenine *Genoveva eximia* Zilli, Varga, Ronkay et Ronkay, 2009).

The diagnostic features of the male genitalia are the well developed cucullus with mostly slender neck, the reduction of the digitus on at least one side, the large, flattened, falciform or moon-shaped saccular extension, and the long, axis-like sclerotized ribbon of the proximal half of the vesica. The vesica is long, tubular, helicoid or recurved (not T-shaped); the armature of the vesica is variable, displaying two main types. The vesica in the *reticulata*-group is helicoid, without basal and medial cornuti but with long brush-like distal field of cornuti; that of the taxa of the *texturata*-group is reclinate dor-

sally and armed by groups and rows of fine spinules in the basal and medial sections while the distal brush-like field is reduced, short and weak.

The female genitalia show the main features of the "*Sideridis-Conisania*" ground plan with the medium-long and conical ovipositor, the sclerotised antrum and ductus bursae, the well-developed appendix bursae and the sacculiform corpus bursae with long, interrupted signum-stripes. The female genitalia of the two species-groups are easily distinguished by the structure of the ductus bursae and the appendix bursae; the ductus bursae of the *reticulata*-group is short and straight, and the appendix bursae is helicoid, while the ductus bursae of the members of the *texturata*-group is considerably longer and rather S-shaped, and the appendix bursae is shorter but stronger sclerotised.

The detailed characterisation of the two main species-groups and their species is given in the following section.

Heliophobus reticulata species-group

External morphology. Medium-sized moths (wingspan 32–46 mm) with usually vivid colouration and sharply defined noctuid pattern. Forewing ground colour varies from ochreous shaded pale grey (usually with violet hue) to deep brown and dark brown-grey; vestiture of head and thorax corresponds to ground colour of forewing; collar and tegulae ornamented by light and dark stripes. Veins regularly paler than ground colour but less prominently than in the taxa of the *H. texturata* species-group. Light parts of crosslines and outlines of stigmata bordered by dark scales forming fine stripes and annuli; dark elements of pattern usually do not dominate over the shade of ground colour of forewing, therefore, the entire pattern appears somewhat mottled. Hindwing rather contrasting, inner area whitish-grey to pale grey with some ochreous shade; marginal area suffused with dark brown to brown-grey.

Male genitalia. Clasping apparatus strongly built, often slightly asymmetrical, left valva often broader than the right one. Sacculus and saccular extensions heavily sclerotised; apex of saccular extension pointed. Clavus and costal edge serrated. Left digitus always stronger than the rather reduced right one; left digitus may be long and well developed or remarkably shorter and weaker, depending on the given species. Aedeagus tubular, dorso-ventrally slightly bent, with carinal thorn. Vesica tubular, slightly tapering distally, being either reclinate towards the aedeagus or coiled with one or two coils; a sclerotised area with sclerosetae (in the further text: sclerosetose area) appears at proximal end of vesica. A strongly sclerotised, costa-like, recurved ribbon (in the further text: recurving costa) starts besides sclerosetose area. Recurving costa followed usually by tapering, sclerotised ribbon (in the further text:

accessory ribbon), that can be reduced or rather long, sinuous. Distal part of vesica possesses variably long, brush-like cornuti field.

Female genitalia. Ovipositor medium-long (length of ovipositor corresponds one and half width of ostium bursae), relatively weakly sclerotised; papillae anales short, more or less quadrangular; intersegmental membranous section rather long. Both pairs of gonapophyses relatively short, basal plates of apophyses posteriores flattened triangular. Length of ovipositor-ostium complex more or less equal with that of ductus bursae; ostium bursae wide, sclerotised, antrum short. Ductus bursae bent dorso-ventrally and divided into distal, sclerotised and proximal membranous parts. Appendix bursae situated dorsally, membranous, with one or two coils; neck of appendix bursae conjoined with ductus bursae; internal side of proximal part of coil usually slightly sclerotised. Corpus bursae membranous, rounded, with four rows of small, rounded signum-patches.

Heliophobus reticulata (Goeze, 1781)
(Figs 1–4, 55–56; 58–72)

Phalaena reticulata Goeze, 1781, *Entomologische Beyträge zu des Ritter Linné Zwölften Ausgabe des Natursystems* 3: 254. Type-locality: no locality given.

Synonymy:

Phalaena reticulata Villers, 1789, *Caroli Linnaei Entomologica* 2: 254 (nom. preocc.). Type-locality: Europe.

Noctua calcatrippae Vieweg, 1790, *Tabellarisches Verzeichniss der in der Churmark Brandenburg einheimischen Schmettlinge* 2: 71. Type-locality: [Germany] Brandenburg region.

Phalaena saponariae Borkhausen, 1792, *Der Phalaenen zweite Horden, Eulen. Naturgeschichte der Europäischen Schmetterlinge nach Systematischer Ordnung* 4: 370. Type-locality: no locality given.

Noctua marginosa Haworth, 1809, *Lepidoptera Britannica; sistens Digestionem novam Insectorum Lepidopterorum quae in Magna Britannia Reperiuntur, Larvarum Pabulo, Temporeque Pascendi; Expansione Alarum; Mensibusque Volandi; Synonymis atque Locis Observationibusque Variis* 2: 193. Type-locality: England, Norfolk.

Heliophobus lohi Noel, 1906, *Le Naturaliste* 28: 227. Type-locality: [France] Doubs.

Heliophobus saponariae hibernica Cockayne, 1944, *Entomologist's Record and Journal of Variation* 56: 55. Type-locality: Ireland, County Cork. Holotype: male.

Material examined. Hungary. 1 male, Tiszakécske, 23.VI.1962, leg. S. J. Simonyi, slide No. 170 SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Monorierdő, 15.VI. 2006, leg. S. J. Simonyi, slide No. 161 SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Monori-erdő, 28.V.1983, leg. S. J. Simonyi, slide No. 165 SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Monorierdő, 21.VI.1980, leg. S. J. Simonyi, slide No. 171 SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Sósokút, Fundoklia, 3.VI.2000, leg. S. J. Simonyi, slide No. 162 SJ. Simonyi (coll. S. J. Simonyi, Budapest); 3 males, 1 female, Epöl, 21.V.2009, leg. S. J. Simonyi, slide Nos 330m, 331m, 334m, 325f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 2 males, 7 females, Epöl, 19–21.VI.2009, leg. S. J. Simonyi, slide Nos 333m, 455m, 327f, 328f, 329f, 332f, 339f,

404f, 406f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 female, Bakonykúti, 5.VII.1994, leg. G. Rácz, slide No. 178 SJ. Simonyi (coll. HNHM); 1 male, Bakonykúti, 29.VI.2002 leg. G. Rácz, slide No. 239 SJ. Simonyi (coll. HNHM); 1 male, Vászoly, Öreg-hegy, 8.VII.1978, leg. S. J. Simonyi, slide No. 166 SJ. Simonyi (coll. S. J. Simonyi Budapest); 1 male, Vászoly, Öreg-hegy, 10.VI.1979, leg. S. J. Simonyi, slide No. 172 SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 female, Vászoly, Húvös-völgy, 3.VI.1983, leg. L. Szécsényi, slide No. 179 SJ. Simonyi (coll. L. Szécsényi, Budapest). **Romania.** 1 male, Transylvania, Balan, 1450 m, Pietra Singuratica, 7–8.VII.1983, leg. Peregovits L., slide No. 241 SJ. Simonyi (coll. HNHM); 1 male, MT Vrancea, Cheile Tisitei, 30.VI.2007, leg. L. Székely, slide No. 275 SJ. Simonyi (coll. L. Székely, Romania, Sačeale). **Switzerland.** 1 male, 1 female, Wallis (Simplon) Gabi, 10.VII.1968, leg. J. Wettstein, slide Nos 184m, 185f SJ. Simonyi (coll. HNHM); 5 males, Wallis, Chandolin, 2000 m, 10–20.VII.1984, slide Nos 446, 454 SJ. Simonyi, coll. A. Saldaitis (coll. S. J. Simonyi Budapest); 1 female, Wallis, Soussillon, 1400 m, 15.VII.1981, slide No. 456 SJ. Simonyi, coll. A. Saldaitis (coll. S. J. Simonyi, Budapest). **Italy.** 1 male, 2 females, South Tyrol, Sesvenna Mts, vicinity of Mals, 1550–1600 m, between Premajur and Lutaschg, 7–10.VII.2004, leg. A. Kun & L. Ronkay, slide Nos 230f, 231f SJ. Simonyi (coll. HNHM). **Montenegro.** 1 male, Durmitor Mts, Zmijnic Jezero, 6.VII.1958, 1500 m, leg. Dr. Gozmány, slide No. 192 SJ. Simonyi (coll. HNHM); 1 female, Durmitor Mts, Zmijnic Jezero, 29.VI.1958, 1500 m, leg. Dr. Gozmány, slide No. 193 SJ. Simonyi (coll. HNHM); **Bulgaria.** 1 male, Sofia, Kostinbrod, 15.VII.2005, leg. L. Székely, slide No. 274 S.J. Simonyi (coll. L. Székely Romania, Sačeale); 1 male, Central Balkan Mts, Kaldterska Planina, 1700 m, (coll. L. Székely, Romania, Sačeale); **Russia.** 2 males, 1 female, S. Russia, Selyavnoe, Don river, Voronezh distr. 15–18.VI.1989, leg. A. Belyalov, slide Nos 196m, 225f, 279m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 3 males, Russia, Baskiria, Alkino, 100 m, 17–18.VI.2001, leg. M. Danilevsky, slide Nos 434, 447, 448 SJ. Simonyi (coll. S. J. Simonyi, Budapest); 2 males, 2 females, S. Ural, Orenburg region, 5 km W of Donskoe village, 7–12.VII.2004, leg. V. Višinskas, slide Nos 450m, 451m, 453f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 2 males, Orenburg region, Podgornoe, 10 km W 16–19.VII.2004, leg. V. Višinskas, slide Nos 430m, 452m S J. Simonyi (coll. S. J. Simonyi, Budapest). **Kazakhstan.** 1 male, Kustonaj reg., Toguzak river, 170 m, 19.VI.2001, leg. M. Danilevsky, slide No. 300 S.J. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Kustonaj reg., Toguzak river, 170 m, 15.VI.2001 leg. M. Danilevsky, slide No. 449 SJ. Simonyi (coll. S. J. Simonyi, Budapest).

Redescription. Wingspan 34–46 mm. Head brownish grey, collar chequered with light and dark stripes. Tegulae brownish grey, their border light with dark stripe. Metathoracic tuft brownish-grey, bordered by whitish; abdomen and abdominal ridges coloured by brownish-grey; dorsal crest well-developed. Forewing rather broad, broader than the other species of the *reticulata*-group; apex slightly rounded; costa almost straight; outer edge slightly arcuate. Ground colour violaceous brown, sometimes brownish-grey or dark grey with violaceous gloss; costal margin chequered by light and dark spots. Veins appear as thin whitish lines, except in the terminal area where they covered by dark brown. Crosslines pinkish-white to greyish-white, defined by dark lines; median fascia dark brown, often rather blurred; postmedial line oblique below cell. Orbicular and reniform stigmata encircled by blackish and whitish lines and filled by ground colour; reniform stigma with whitish internal stripe; claviform stigma large, dark brown outlined and filled with ground colour. Subterminal line whitish, most parts slightly waved; W-mark at medial veins sharply defined; arrowhead spots dark, long, and sometimes obsolescent. Terminal line fine, pinkish-ochreous, followed inwards by a row of small, dark, flattened triangles; fringes striolate by light and dark stripes. Hindwing greyish-white with some ochreous shade; veins and broad marginal area covered by brown; discal spot and transverse line

obsolescent but discernible. Terminal line brown; fringes pinkish or ochreous, with brownish stripes. Underside of forewing greyish-brown, reniform stigma, crossline and marginal area darker than ground colour. Underside of hindwing lighter, whitish-grey with ochreous shade; veins and costal area suffused with brownish; discal spot, transverse line, and marginal area darkened.

Male genitalia (Figs 58–69). Claspings apparatus almost symmetrical, rather robust. Uncus moderately wide or slender, spearhead-like, its apex pointed; fultura inferior broad, deltoidal; vinculum V-shaped. Valva broad and evenly arched towards narrow neck of cucullus; sacculus wide, sclerotised, with heavily sclerotised, pointed extension; clavus roughly serrated. Costal margin with large, more or less triangular subapical lobe, ventral part of costal plate folded. Both digituses reduced, left one usually stronger and more developed. Cucullus large, broadened distally and rounded terminally, its shape rather variable individually; corona well-developed, coronal setae relatively short, subapical area covered densely with longer setae. Aedeagus tubular, slightly arcuate; distal end with large, flattened ventro-lateral carinal plate and terminal thorn. Vesica tubular, slightly tapering, usually recurved towards dorsal end of aedeagus, only rarely coiled medially. Sclerosetose area and recurving costa present, accessory ribbon long, tapering, only occasionally reduced or absent; distal cornuti field long.

Female genitalia (Figs 70–72). Ovipositor corresponds to the „ground plan“ of the species-group. Distal, sclerotised part of ductus bursae usually ends before proximal membranous part, except strong, medial fold; sclerotised area may become weaker towards proximal membranous part of ductus bursae. Appendix bursae makes one coil, with slight sclerotisation at proximal section; corpus bursae membranous, rounded, with four row of signa.

Bionomics. *Heliphobus reticulata* inhabits grassy plains, and rather opened, wooded hilly and mesomontane areas; in the more southern parts of its range (south from the main chain of the Alps in France, Switzerland, Italy and Slovenia, Bulgaria, Greece, and NW Turkey) the species confines to the higher altitudes, up to 2000 m elevations. The moths are on the wing from the beginning of May to the end of July. The larval foodplants are carnation (*Silene*, *Melandrium*, *Lychnis*, and *Dianthus*) and related species (e.g. *Saponaria*).

Distribution. The species is widespread in Europe from the British Isles and the Iberian Peninsula to the Ural region; there are confirmed records from western Kazakhstan and Bashkiria. The eastern part of the area is less explored due to the small numbers of the available specimens with confirmed identification by genitalia dissections.

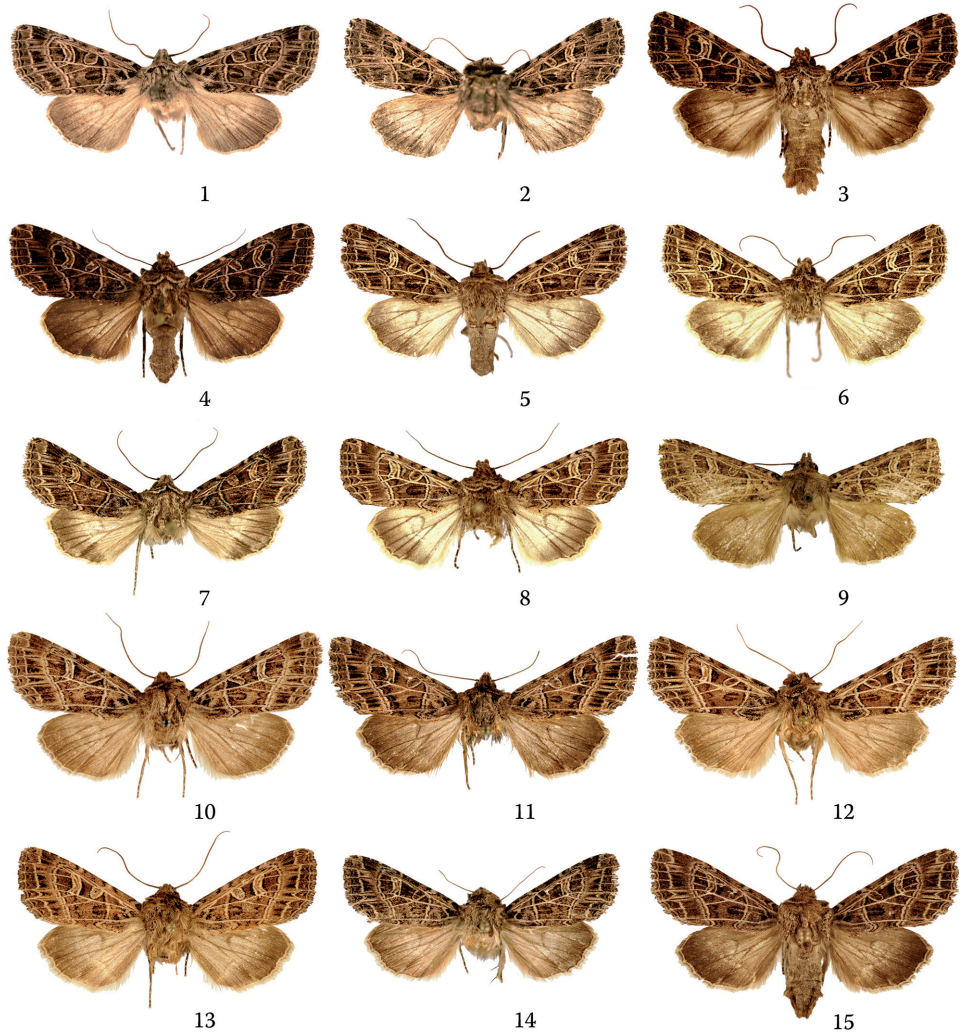
Heliophobus unicolor (Alphéraky, 1889)

(Figs 9–20; 73–83)

Mamestra reticulata var. *unicolor* Alphéraky, 1889, *Mémoires sur les Lépidoptères* 5: 147. Type-locality: [China] Tien Shan, Kuldja. Lectotype: male, here designated; in coll. ZISP.

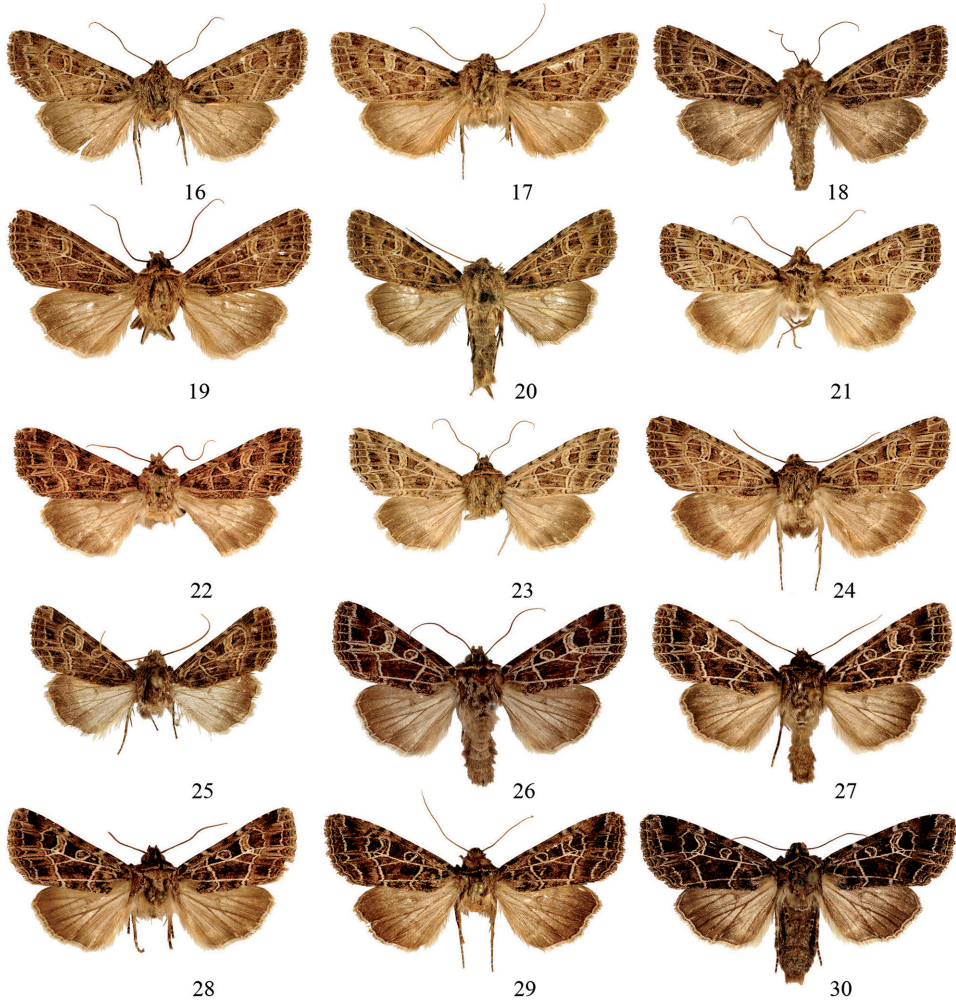
Type material examined. Lectotype male, “Tian Chian, 3.VI.1879, v. *unicolor* Stgr.”, “Kol. Vel. Kn. Nikolaia Mihailovicha” [with Cirillian letters; it means: collection of the Regent Prince Nikolai Mikhailovich Romanov]; slide No. 0322 Matov (ZISP).

Additional material examined. Kyrgyzstan. 2 males, N Tien Shan, Chon-Kurchak, 2400 m, 30–31.VII.1952, leg. Korov, slide Nos 220, 283 SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 female, Chatkal river, upper part, 2200 m, 28–29.VI.1998, leg. Plyushch, slide No. 297f SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 female, Sary-Chelek, 1900 m, 21.VI.2004,



Figs 1–15. 1–4 = *Heliophobus reticulata* (Goeze, 1781): 1 = male, Switzerland, Wallis, 2 = male, Bulgaria, C. Balkan Mts, 3 = male, Hungary, Buda Hills, 4 = female, Romania, Transylvania. 5–8 = *H. dalmae* Simonyi, 2012: 5 = holotype, male, Turkey, Prov. Agri, 6 = paratype, female, Turkey, Prov. Nevşehir, 7 = paratype, female, Armenia, 8 = paratype, male, Iran, Prov. Zangan. 9–15 = *H. unicolor* (Alphéraky, 1889): 9 = lectotype, male, Tien Shan, Kuldja, 10 = male, Tajikistan, W. Pamir Mts, 11 = female, Tajikistan, Darvaz Mts, 12 = male, Kyrgyzstan, Transalai Mts, 13 = male, Kyrgyzstan, N Tien Shan, 14 = male, Kazakhstan, Ketmen range, 15 = female, Kyrgyzstan, Fergana Mts.

leg. M. Danilevsky, slide No. 409f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 2 males, Kyrgyz Mts, 3200 m Ala-Medin, Chon-Tor valley, 10–20.VII.1991, leg. A.V. Nekrasov, slide Nos 177m, 214m SJ. Simonyi (coll. HNHM); 1 male, 1 female, Naryntoo-Mts, Ak-Muz, 2600 m, 41°12'N, 76°05'E, 5.VII.1993, leg. V. Lukhtanov, slide Nos 318m, 219f, SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 4 males, Kyrgyz Mts, Issyk-Ata-river, 1900 m, 26.VII.–7.VIII.1995, leg.



Figs 16–30. 16–20 = *Heliophobus unicolor* (Alphéraky, 1889): 16 = female, Kyrgyzstan, Susa-myrr Mts, 17 = male, Kyrgyzstan, Naryn-Too Mts, 18 = female, Kyrgyzstan, Issyk-Kul region, 19 = male, Iran, Demavend, 20 = male, China, Xinyang Uygur. 21–25 = *H. mongoliensis* sp. n.: 21 = paratype, male, Mongolia, Arkhangay aimak, 22 = holotype, male, Mongolia, Bulgan aimak, 23 = paratype, female, Mongolia, Govi Altay aimak, 24 = paratype, female, Mongolia, Bulgan aimak, 25 = paratype, male, Kazakhstan, S. Altai Mts. 26–30 = *H. kitti* (Schawerda, 1914): 26 = holotype, male, Austria, Lunz, 27 = male, France, Hautes Alpes, 28 = male, Czechia, Karlstein, 29–30 = females, Russia, Transbaikalia.

Toropov, slide Nos 313m, 335m, 337m, 383m SJ. Simonyi; 5 males, 7 females, Susamyr Mts, Kobik, 2100 m, 9–10.VII.1996, leg. Lukhtanov, slide Nos 319m, 336m, 341m, 342m, 343m, 284f, 285f, 320f, 324f, 326f, 340f, 344f SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 3 males, Terskey-Alatoo (Issyk-kul Lake area), Kara-Talaa, 1610 m, 42°18'N, 76°30'E, 2.VII.1993, leg. V. & A. Lukhtanov, slide Nos 317m, 322m, 382m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Bashi Mts, 3300 m, near Chatir-Kol Lake, 2–7.VI.1995, slide No. 296m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Alai Mts. Maidan, 2000 m, 20–21.VII.1997, leg. local collector, slide No. 175m SJ. Simonyi (coll. HNHM); 4 males, Alai Mts, Artschaty, 2400 m, 39°53'N, 73°16'E, 9–10.VII.1993, leg. V. & A. Lukhtanov, slide Nos 314m, 323m, 244m, 245m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 2 males, Transalai Mts, Aram-Kungei, 2800 m, 12–15.VII.1993, leg. V. & A. Lukhtanov, slide Nos 221m, 287m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 6 males, Osh region, Alai Mts, Kurtuk-Ata, 2383 m, 39°55,959'N, 73°24,915'E, 4.VII.2011, leg. SJ. Simonyi (coll. S. J. Simonyi, Budapest); 4 males, 2 females, Jalal-Abad region, Fergana Mts, near Urumbash, 1633 m, 41°13,188'N, 73°28,658'E, 7.VII.2011, leg. SJ. Simonyi (coll. S. J. Simonyi, Budapest); 2 males, 5 females, Jalal-Abad region, Fergana Mts, near Aral village, 1857 m, 41°21,888'N, 73°45,070'E, 8.VII.2011, leg. SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Naryn region, near Orto-Tokoy lake, 1761 m, 42°18,298'N, 75°54,154'E, 10.VII.2011, leg. S. J. Simonyi (coll. S. J. Simonyi, Budapest); 6 males, 1 female, Issyk-Kul region, E of Balikhci, 1628 m, 42°19,837'N, 76°13,088'E, 11.VII.2011, leg. S. J. Simonyi, slide No. 417f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 female, Issyk-Kul region, N of Ak-Say, 1852 m, 42°11,050'N, 76°50,219'E, 12.VII.2011, leg. S. J. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Issyk-Kul region, Terskey-Ala-too Mts, gorge of Turgen-Aksu, 2308 m, 42°31'02,15"N, 78°54'22,20"E, 14.VII.2011, leg. S. J. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Issyk-Kul region, N of Issyk-Kul lake, near Chon-Shariol, 1858 m, 42°38,403'N, 76°52,912'E, 15.VII.2011, leg. S. J. Simonyi (coll. S. J. Simonyi, Budapest); 1 female, Chuy region, Kungey-Ala-Too Mts, SW of Ak-Tüz, 1867 m, 42°51,180'N, 76°04,820'E, 17.VII.2011, leg. S. J. Simonyi, slide No. 470f SJ. Simonyi (coll. S. J. Simonyi, Budapest).

Uzbekistan. 1 female, Mt. Great Chimgan 29.V.1974, leg. V. N. Prasolov (coll. ZISP St. Petersburg); 1 female, Samarkand, 18–30.VII.1892, leg. O. Herz (coll. Gr. Pr. Nikolaj Mikhajlovich, ZISP); 1 male, W Tien-Shan Mts, Chimgan, 800–2000 m, 69°58'E, 41°32'N, 18–25.VII.1990, leg. P. Gyulai & M. Hreblay, slide No. 218m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary).

Tajikistan. 4 males, Turkestan Mts, Shakristan pass, Khushikat, 2000 m, 5–8.VI.1994, leg. Lukhtanov, slide Nos 223m, 229m, 235m, 248m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, West-Pamir, Chorog, 2300 m, 6.VI.1965, leg. Shchetkin, slide No. 282m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 female, Hissar Mts, gorge Majchura, Charamkul, 6.VII.1967 leg. Shchetkin, slide No. 286f SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Safi-Dhara, near Dushanbe, 27.VI.2005, leg. V. Gurko, slide No. 321m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 female, Darvaz Mts, area near Ganishou village, 10–20.VII.2001, leg. V. Gurko, slide No. 405f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 female, 20 km SE from Tajikabad, near Ganishou 20–25.VII.2005, leg. V. Gurko (coll. S. J. Simonyi, Budapest); 1 male, 1 female, Hissar Mts, Anzob pass, 3300 m, 15.VII.2010, leg. O. Pak, (coll. O. Pekarsky, Budapest); 1 male, 1 female Anzob pass, 3300 m, 1–6.VI.2000, leg. O. Pak, (coll. O. Pekarsky, Budapest); 4 males, 2 females, Peter I. Mts, 10 km S of Tajikabad, near Ganishob kishlak, 2100 m, 15–21.VII.2004, leg. O. Pak (coll. O. Pekarsky, Budapest); 1 male, Peter I. Mts, Garm district, Tajikabad circ., Ganishou village., 2100 m, 7.VI.2006, leg. O. Pak, slide No. 2994m PGY (coll. Dr. P. Gyulai, Hungary).

China. 2 males, 1 female Xinjiang, SW from Kashi, Teng Tau Mts, Oyttag loc., 38°54,383'N, 75°12,747'E, 2750 m, 1.VI.2013, leg. A. Florian, (coll. Dr. P. Gyulai, Hungary), 1 female, 20 km SE from Tajikabad near Ganishou 20-25.VII.2005, leg. V. Gurko (coll. S. J. Simonyi, Budapest); 1 male, 1 female Gissarsky

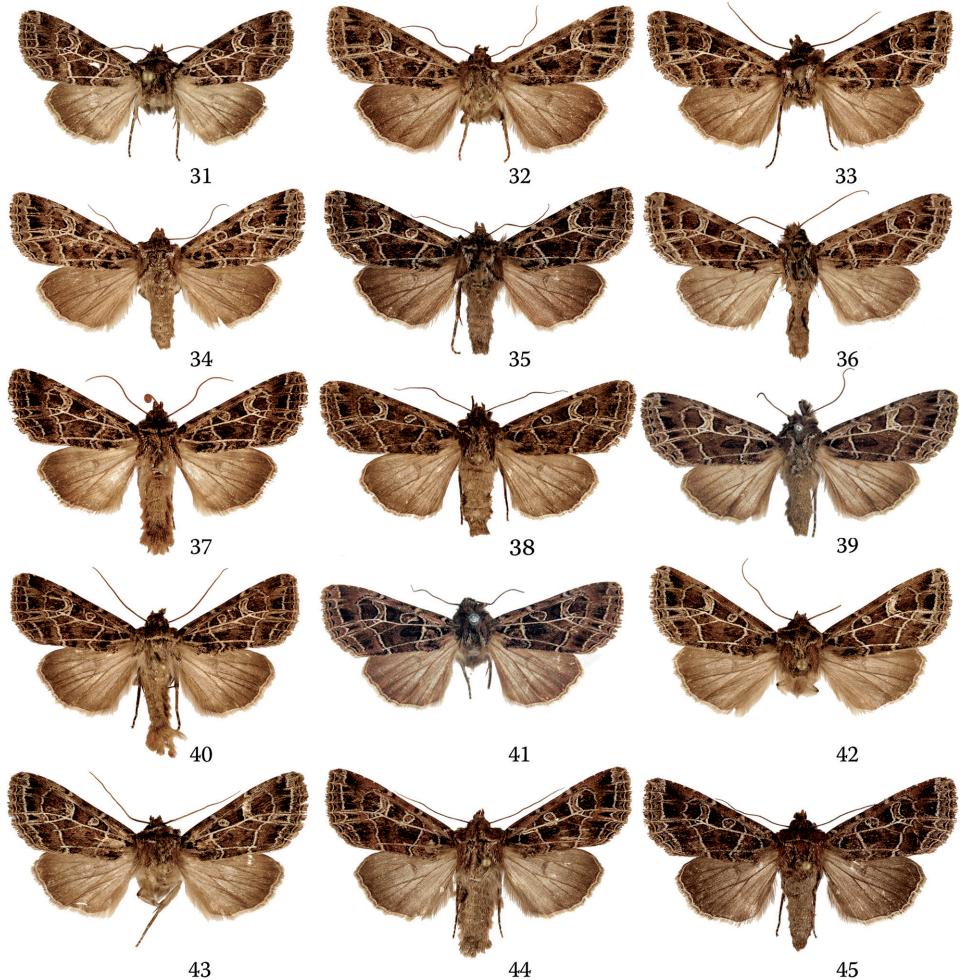
Ridge, Anzob pass, 3300 m, 15.VII.2010, leg. O. Pak, (coll. O. Pekarsky, Budapest); 1 male, 1 female Anzob pass, 3300 m, 1-6.VI.2000, leg. O. Pak, (coll. O. Pekarsky, Budapest); 4 males, 2 females, Petr I. Ridge, 10 km S of Tajikabad, near Ganishob kishlak, 2100 m, 15-21.07.2004, leg. O. Pak (coll. O. Pekarsky, Budapest); 1 male, Xinjiang, SW from Kashi, Teng Tau Mts., Oyttag loc., 38°54,363'N, 75°13,788'E, 2650m, 4.VI.2013, leg. A. Floriani slide Nos. 3625, 3683, 3816, 3817 Dr. P. Gyulai (coll. Dr. P. Gyulai, Hungary); 1 male, NW China, Xinjiang Uygur, vicinity of Balguntay, 2500 m, 7.V.1999, leg. S. Murzin, slide No. 3985m Dr. P. Gyulai (coll. Dr. P. Gyulai, Hungary). **Kazakhstan.** 3 males, 1 female, Ketmen range, 3000 m, 20-30.VI.1994, leg. V. Gurko, slide Nos 222f, 226m, 227m, 228m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 2 males, Ketmen range, Tujuk village, 2000 m, 10-15.VI.1997, leg. S. Toropov, slide Nos 301m, 302m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Taldy-Kurgan 450 m, Ili river, Borokhuasir, 7-19.VI.1996, leg. Lukhtanov, slide No. 316m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 female, Bakanas, Hir. env., 15-20.VIII.1994, leg. Saldaitis, slide No. 215f SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Prov. Almaty, Uzunbulak, Mt. Kuluktau, 1800 m, 43°08'N, 79°02'E, 29.V.1994, leg. Gy. Fábrián & I. Retezár, slide No. 380m SJ. Simonyi (coll. Gy. Fábrián, Budapest); 1 female, Boro-Khoru Mts, Sary-Bel environs, 1630 m, 44°29'45,9"N, 80°03'50,9"E, leg. S.K. Korb, slide No. OP1633f, O. Pekarsky (coll. O. Pekarsky, Budapest); 1 male, SE Kazakhstan, Dzhungarsky Alatau Mts, 1570 m, 23-27.VI.2012, 44°33,318'N, 79°51,708'E, leg. S. Rybalkin, slide No. OP2045m (coll. O. Pekarsky, Budapest). **Russia.** 2 males, Russian Altai, Chibit, 1200 m, 13.VI.2010, leg. R. Yakovlev, slide Nos. 468m SJ. Simonyi, OP1596m (colls. S. J. Simonyi, Budapest; O. Pekarsky, Budapest). **Iran.** 1 male, Prov. Zanzan, Sendan Mts, 2300 m, 20 km E of Zanzan, 36°42'N; 48°44'E, 20.V.2001, leg. B. Benedek & G. Csorba, slide No. 247m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Prov. Mazandaran, 10 km E of Valiabad, 3200 m, 22-25.VII.2000, leg. B. Benedek, slide No. 280m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 2 males, Alborz Mts, Prov. Mazandaran, Pel Pass, 3000 m, 22.VI.2005, leg. HácZ, Juhász & Petrányi, slide Nos 288m, 289m SJ. Simonyi (coll. Újpesti Lepkémúzeum and S. J. Simonyi, Budapest); 3 males, 2 females, Demavend, Polur, 2600 m, 14-16.VII.2005, leg. HácZ, Juhász & Petrányi, slide Nos 293m, 304m, 305m, 294f SJ. Simonyi (coll. S. J. Simonyi, Budapest). **Iran.** 1 female, Demavend, Polur, 2600m, 14-16. VII. 2005 leg. HácZ, Juhász, Petrányi, slide No. 299f SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Prov. Zanzan, Sendan Mts, 2300 m, 20 km E of Zanzan 36°42'N, 48°44'E, 20.V.2001, leg. B. Benedek & G. Csorba, slide No. 247m S.J. Simonyi (coll. Dr. P. Gyulai, Hungary); **Turkey.** 1 female, Prov Hakkari, Yükksekova, 2000 m, 20.VI.1986, leg. Dittrich, slide No. 174f SJ. Simonyi (coll. HNHM).

Diagnosis. *Heliophobus unicolor* resembles externally to its closely related species, *H. reticulata*, *H. dalmae*, and *H. mongoliensis*, but differs from them by the shape of the postmedial line that is mostly straight or almost straight below cell, and by the darker, brown-coloured hindwing.

The clasping apparatus of *H. unicolor* is most similar to that of *H. dalmae*, differing from those of *H. reticulata* and *H. mongoliensis* by its well-developed left digitus. The vesica has mostly weak or reduced accessory ribbon and often one coil, while the vesica of *H. dalmae* has very long waved ribbon and two coils. This ribbon is long in *H. mongoliensis* and the vesica often makes a coil, while the ribbon of *H. reticulata* is also long, but the vesica usually does not make a coil. In the female genitalia, the appendix bursae of *H. unicolor* has one coil, as those of *H. reticulata* and *H. mongoliensis*, while the appendix of *H. dalmae* has two coils.

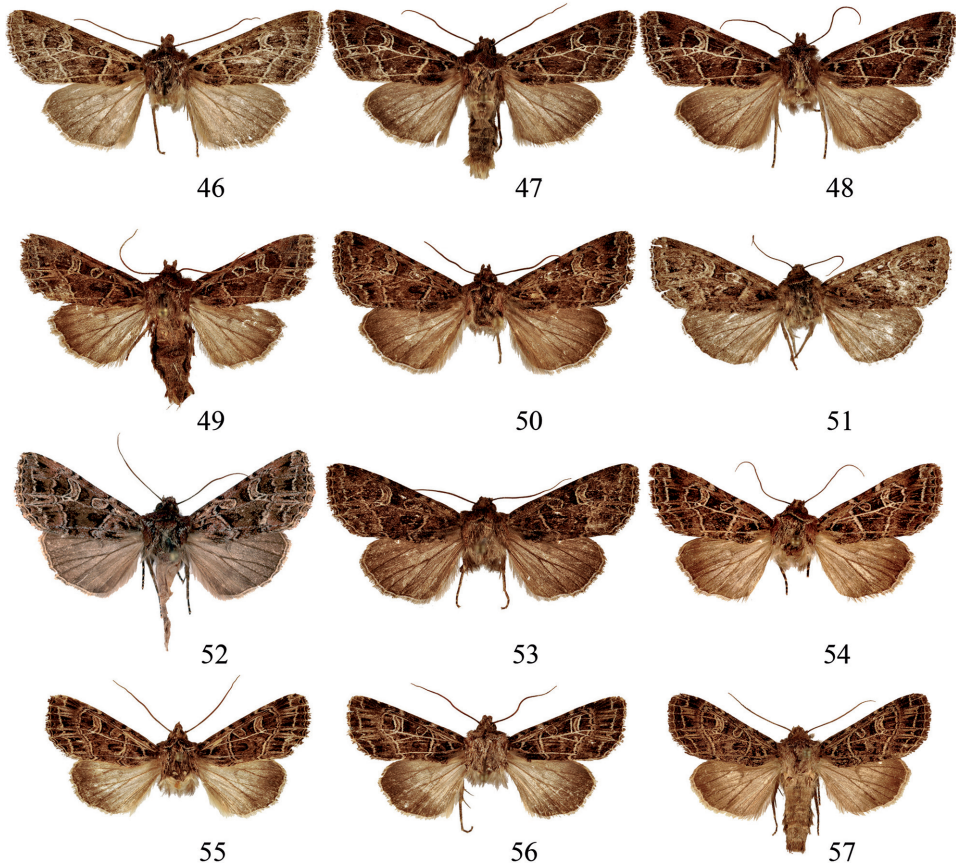
The sclerotised part of ductus bursae of *H. unicolor* has wedge-shaped extensions on the anterior, membranous part while in the other, sibling species there is a border between the sclerotised and the membranous parts.

Redescription. Wingspan 34–40 mm. Head greyish-brown to dark brown; collar marked by light and dark stripes; tegulae and metathoracic tuft greyish-brown to brown



Figs 31–45. 31 = *Heliophobus kitti* (Schawerda, 1914): female, Mongolia, Central aimak. 32–36 = *H. nepalensis* Plante, 1982: 32–33 = males, 34–35 = females, all from Nepal, Annapurna Himal, 36 = male, Tibet, Gyantse. 37–41 = *H. texturata* (Alphéraky, 1892): 37 = male, China, Big Chingan Mts, 38 = female, China, Gansu, 39 = lectotype, female, China, Tibet, Amdo, 40 = male, Mongolia, Töv aimak, 41 = paralectotype, male, China, Tibet, Amdo. 42–45 = *H. bulcsui* sp. n.: 42 = holotype, male, N. Pakistan, Karimabad, 43 = paratype, male, Pakistan, Karimabad, 44 = paratype, female, China, Yunnan, 45 = paratype, female, China, Yunnan.

and bordered by dark and light stripes; abdomen greyish-brown to brown. Forewing elongated triangular, with apex slightly pointed. Ground colour pale greyish-brown to brown, with violaceous sheen; veins pale brown, except in marginal area where they covered by dark brown and accentuated with light spaces. Filling of crosslines light brown, bordered by dark lines on both sides; postmedial line usually straight or only slightly oblique below cell; median fascia sinuous, dark brown. Reniform and orbicular stigmata encircled by thin dark and light brown stripes; filling of reniform stigma consisting of lighter and darker stripes; orbicular stigma filled with ground colour. Claviform stigma represented by its obsolescent dark outline and filled with ground colour. Arrowhead spots of subterminal



Figs 46–57. 46–49 = *Heliophobus bulcsui* sp. n.: 46 = paratype, male, China, Qinghai, 47 = paratype, male, China, Gansu, 48 = paratype female, China, Gansu, 49 = paratype male, China, E. Tibet, Qamdo. 50–53 = *H. aequalifuscus* sp. n.: 50 = paratype, male, Pakistan, Kaghan valley, 51 = paratype, female, Pakistan, Hindukush Mts, 52 = paratype, male, Pakistan, Azad Jammu & Kashmir, 53 = holotype, male, Pakistan, Kaghan valley. 54 = *H. texturata* (Alphéraky, 1892), male, China, Beijing. 55–56 = *H. reticulata* (Goeze, 1781): 55 = male, Russia, Bashkiria, 56 = male, Kazakhstan, Kustanaj region. 57 = *H. mongoliensis* sp. n.: paratype, male, Russia, Transbaikalia.

area thin and rather diffuse but mostly well discernible. Subterminal line strongly marked, light brown, zigzagged; terminal line very thin, dark brown, wavy, most often only a row of tiny wedges or triangles. Fringes ornamented by light and dark brown, wavy longitudinal stripes. Hindwing brownish-grey with broad dark marginal area or greyish-brown to dark brown with paler inner area; veins brown, transverse line and discal spot blurred, hardly discernible; fringes chequered by light and dark stripes. Underside of forewing suffused with greyish-brown to brown; base of wing, inner margin, outlines of orbicular and reniform stigmata and ghosts of postmedial, subterminal and terminal lines paler, yellowish-brown. Underside of hindwing light yellowish-brown to brown; costal margin, transverse line and broad marginal area suffused with brown; discal spot dark brown.

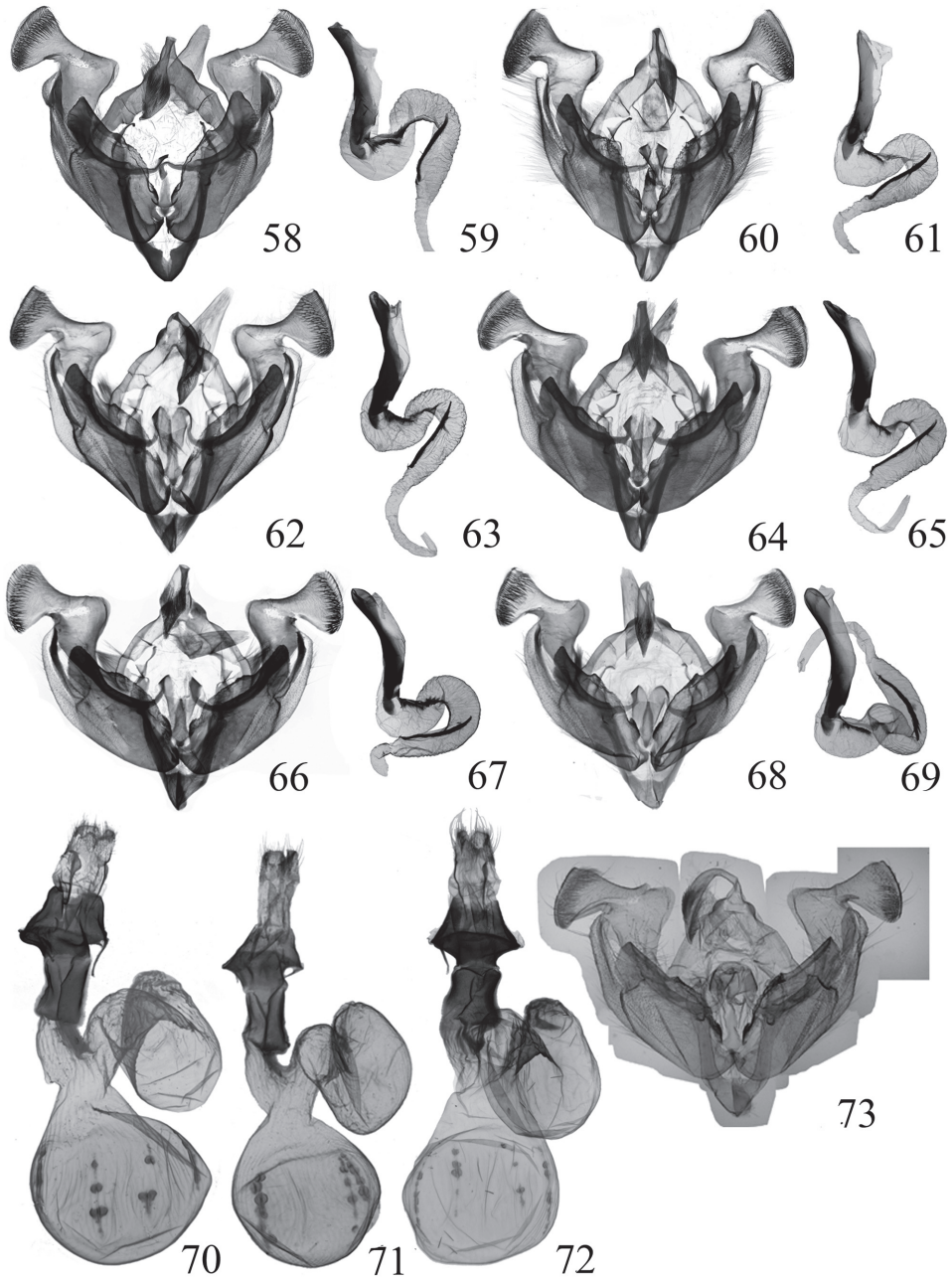
Male genitalia (Figs 73–80). Clasp apparatus asymmetrical, left valva broader than right one; left digitus well developed, often extending beyond edge of cucullus, right digitus reduced. Uncus usually medium-broad, apically pointed; fultura inferior slender, elongated deltoidal; vinculum V-shaped. Cucullus axe-shaped, rather small, comparing with width of valva; right cucullus often somewhat larger than left one. Sacculus slender, with sclerotised extension; clavus and costa slightly serrated. Aedeagus slightly bent, with variably sized carinal thorn. Vesica tubular, slightly tapering, recurved or (mostly) makes a coil; shape of the sclerose area slightly variable; accessory ribbon mostly reduced, short and weak; cornuti field long.

Female genitalia (Figs 81–83). Ovipositor large and broad (the largest within this group). Ductus bursae bent dorso-ventrally, without definite border between sclerotized posterior and membranous anterior parts, due to the wedge-shaped extensions of sclerotised part into the membranous part. Appendix bursae membranous, with one coil, its neck conjoined with ductus bursae; corpus bursae membranous, drop-shaped, rounded, with four rows of signa.

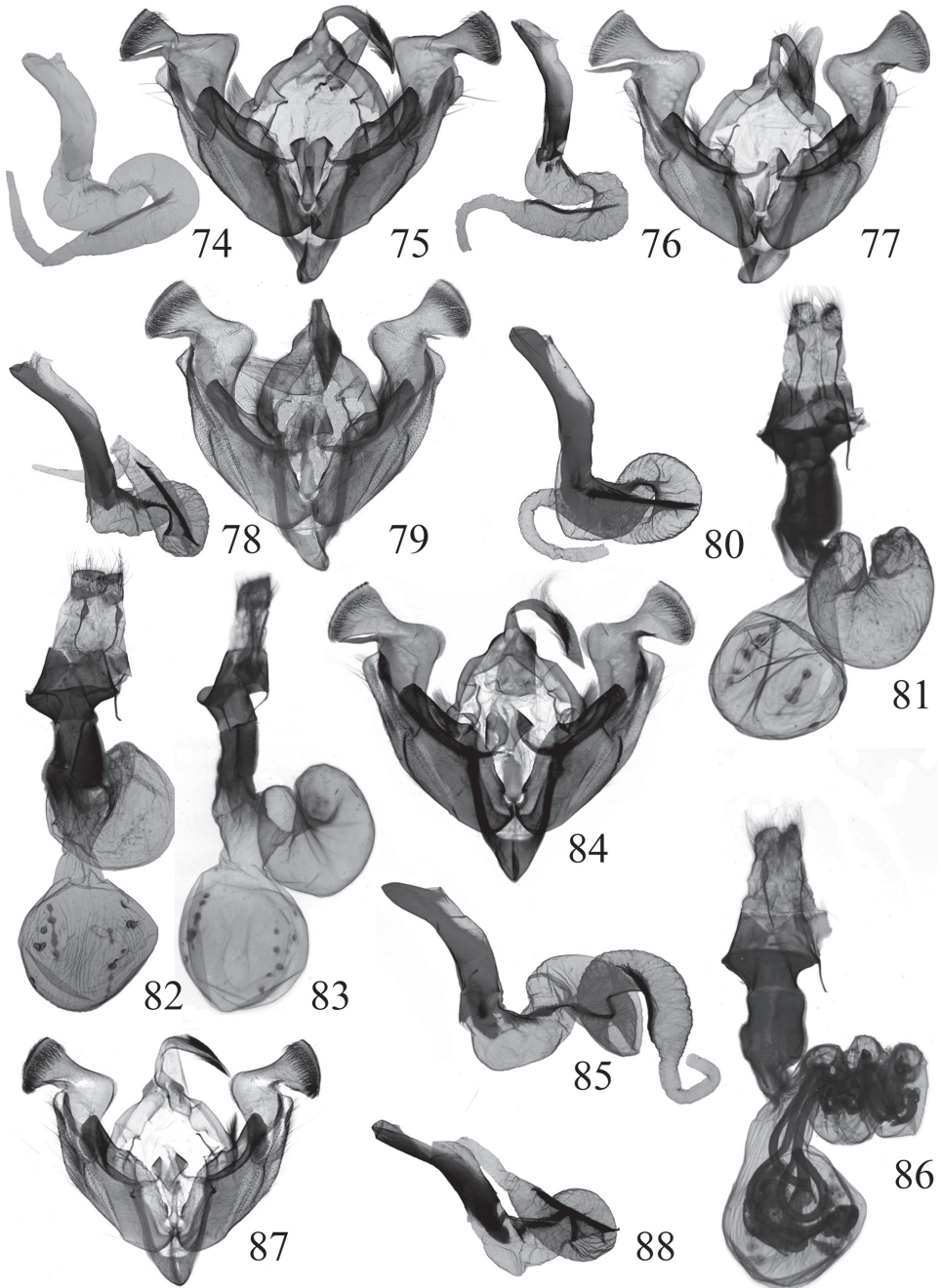
Bionomics. The species has been collected in grassland habitats of the Central Asiatic high mountains, between 450–3200 m elevations. It is frequent above all on fresh meadows of mountain climate and was found only sparsely in dry places. The moths are on the wing, depending on the climate of the actual locality, from end of May to beginning of August.

Distribution. *Heliophobus unicolor* occurs in the large mountain systems of Tajikistan, Kyrgyzstan, East Uzbekistan, West China, South-East Kazakhstan, SE Turkey and Iran; it was found also in the Russian Altai Mts. The area of the Iranian population of *H. unicolor* is overlapping with that of *H. dalmae*.

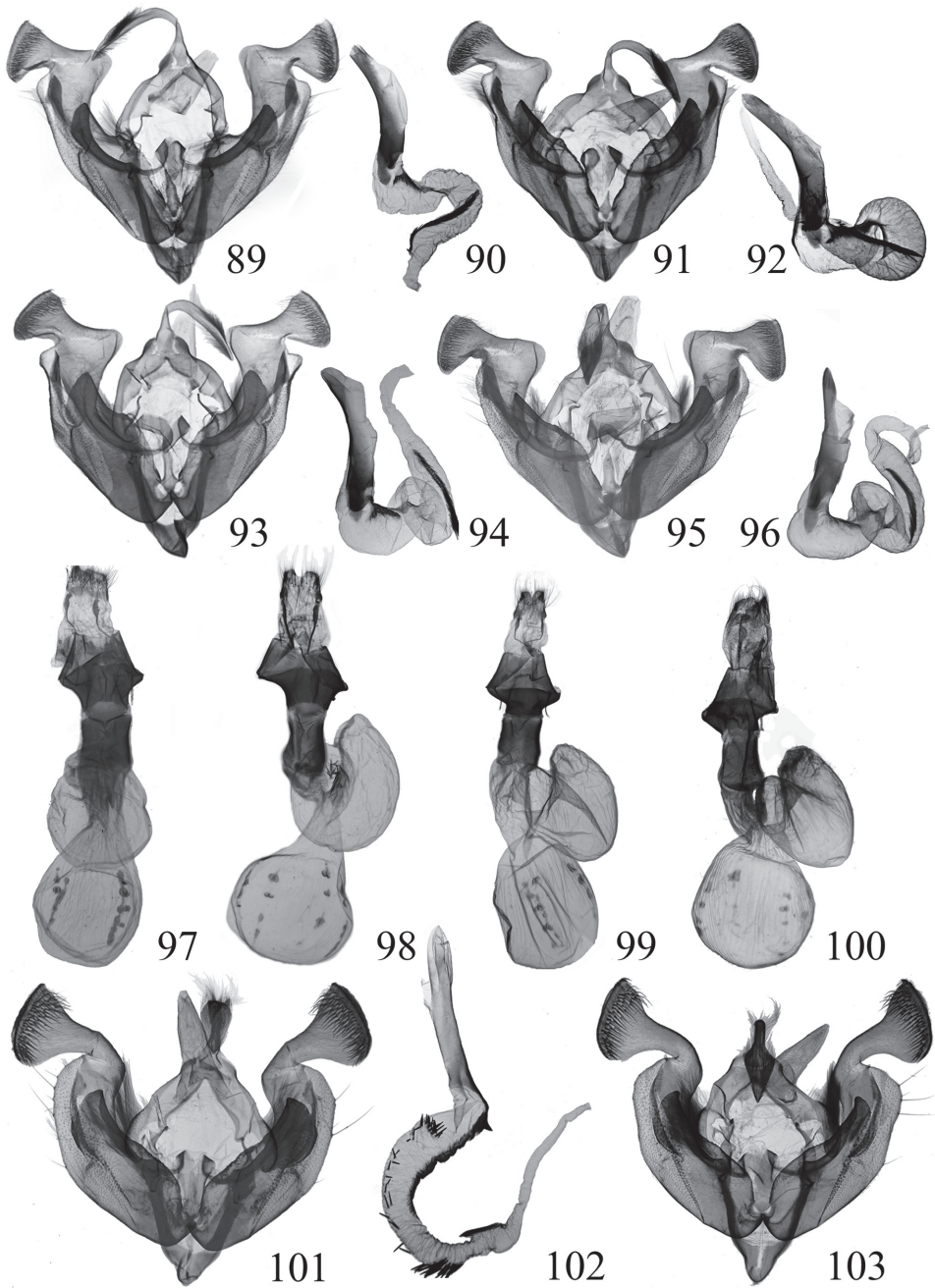
Remarks. Alphéraky provides the description as follows: "54. Mamestra Reticulata Vill. var. Unicolor Stgr. C'est à cette variété plus pâle et grisâtre, qu'appartient l'unique pris par Mr. Groum-Grshimaïlo à Sarykol. L'individu pris par moi à Kouldja en 1879, ainsi que plusieurs individus d'autres endroits du Turkestan, prouvent que cette forme y remplace toujours le type d'Europe." The only specimen preserved in the Romanov collection from the above-mentioned localities is the male from Kuldja (though the label does not show explicitly the locality „Kouldja”), therefore it is designated here as the lectotype of the species. It means also that the type-locality of the species is to be changed from „Pamir, Sarykol” to „Tien Shan, Kuldja”.



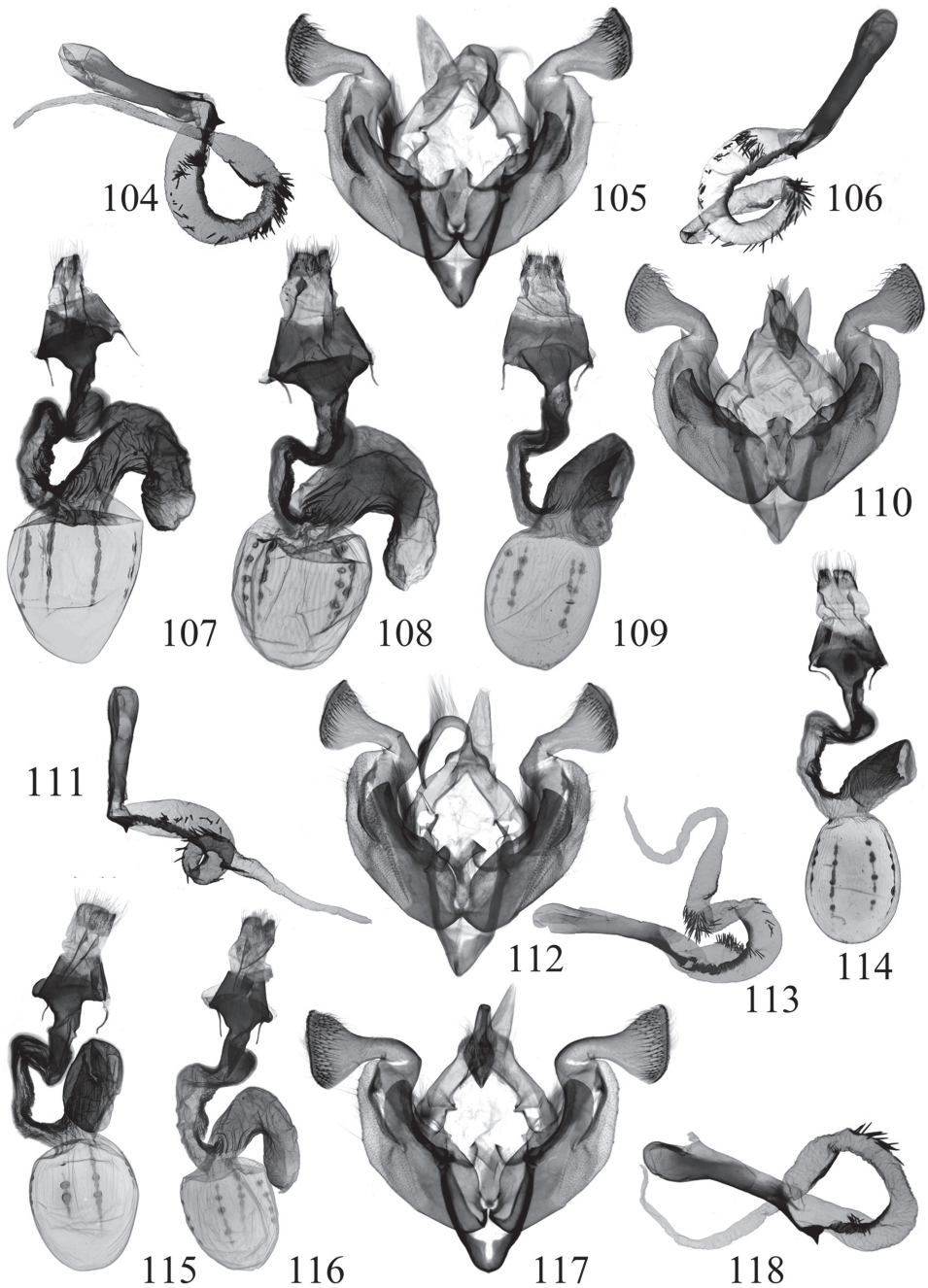
Figs 58–73. Genitalia of *Heliophobus* species: 58–72 = *H. reticulata* (Goeze, 1781), 73 = *H. unicolor* (Alphéraky, 1889), clasper apparatus of the lectotype.



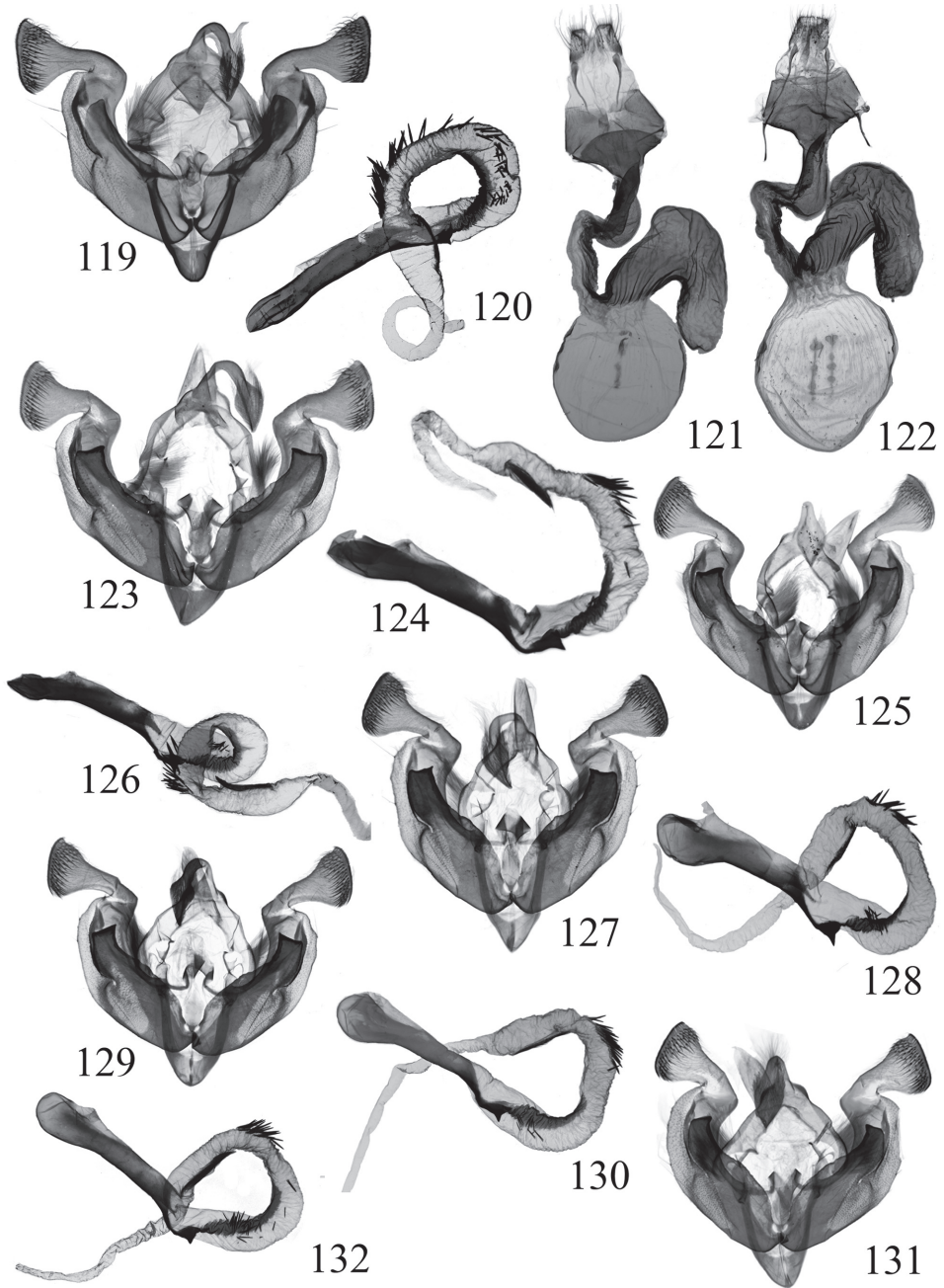
Figs 74–88. Genitalia of *Heliophobus* species: 74–83 = *H. unicolor* (Alphéraky, 1889), 74 = aedeagus and everted vesica of the lectotype, 84–86 = *H. dalmae* Simonyi, 2012, 87–88 = *H. mongoliensis* sp. n..



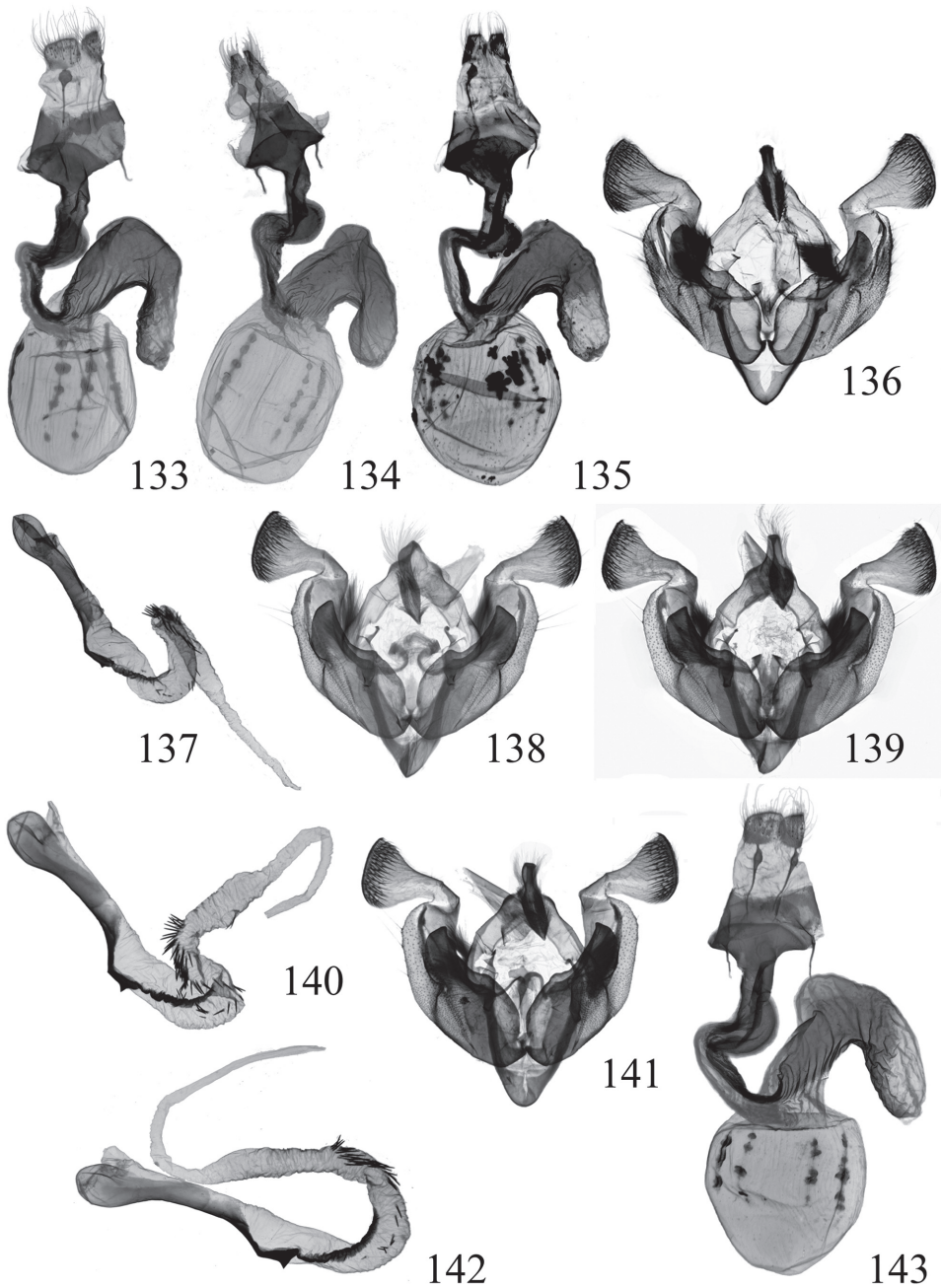
Figs 89–103. Genitalia of *Heliophobus* species: 89–100 = *H. mongoliensis* sp. n. 101–103 = *H. texturata* (Alphéraky, 1892).



Figs 104–118. Genitalia of *Heliophobus* species: 104–109 = *H. texturata* (Alphéraky, 1892), 110–116 = *H. kitti* (Schawerda, 1914), 117–118 = *H. nepalensis* Plante, 1982.



Figs 119–132. Genitalia of *Heliophobus* species: 119–122 = *H. nepalensis* Plante, 1982,
123–132 = *H. bulcsui* sp. n.



Figs 133–143. Genitalia of *Heliophobus* species: 133–135 = *H. bulcsui* sp. n., 136–143 = *H. aequalifuscus* sp. n.

Heliophobus dalmae Simonyi, 2010
(Figs 5–8, 84–86)

Heliophobus dalmae Simonyi, 2010, *Noctuidae Europaeae* 12: 185, pl. 14, figs 16–20. Type-locality: Turkey, Prov. Agri, Cakmak Dagh. Holotype: male, in coll. HNHM.

Type material examined. Holotype male, Turkey, Prov. Agri, Çakmağ Dağı, 2250 m, 3 km NE of Hayrangöl, 39°46'44,8"N; 42°27'40.30"E, 16–17.VI.1994, leg. S.J. Simonyi; slide No. 168 SJ. Simonyi (coll. S. J. Simonyi; deposited in the Hungarian Natural History Museum, Budapest). A long series of paratypes from Turkey, Azerbaijan, Armenia, Iran and the Russian side of the Caucasus range, listed in the original description.

Diagnosis. *Heliophobus dalmae* was recently described in the Noctuidae Europaeae, Vol. 12 (pages 185–187), following the standard of the present publication. Thus, there is no need to repeat the details of the diagnosis and description, and only the most distinctive features are summarised below.

The forewing of *H. dalmae* is narrower than those of *H. reticulata* and *H. unicolor*, having the apex more pointed, than in *H. mongoliensis* and *H. reticulata* (the apex of the latter species is rather rounded). *Heliophobus dalmae* differs from these three closely related species by its pale greyish-whitish suffused brown forewing ground colour with ochreous hue, and by the narrower and paler, brownish-grey marginal suffusion of the hindwing. Wingspan 34–42 mm.

The diagnostic features of the genital apparatus of *H. dalmae* are the biggest and broadest aedeagus within this species-group, the long and coiled vesica with two full coils, long and waved sclerotised ribbon and with short cornuti field in the males; and the two coils of the appendix bursae in the females, in correspondence with the configuration of the male vesica. The well-developed left digitus of *H. dalmae* is similar to that of *H. unicolor*.

Bionomics. The habitats of *H. dalmae* are dry meadows, hillsides and xerothermic grasslands of the high mountains, between 1100–2800 m altitudes. The adults can be found from mid-May to beginning of August.

Distribution. *Heliophobus dalmae* occurs in the Crimean Peninsula, the Caucasus range, Turkey and NW Iran.

***Heliophobus mongoliensis* Simonyi sp. n.**
(Figs 21–25, 57; 87–100)

Holotype. Male, Mongolia, Bulgan aimak, 5 km W von Somon Dashinchilen, 1140 m, Exp. Dr. Z. Kaszab, 1964, No. 253, 3.VII.1964, slide No. 199m S.J. Simonyi (coll. HNHM).

Paratypes. Mongolia. 1 male, Bulgan aimak, Namnan ul Mts, 23 km NW of Somon Chutag, 1150 m, Exp. Dr. Z. Kaszab 1968, No. 977; 17.VI.1968, slide No. 204m SJ. Simonyi (coll. HNHM); 1 male, Bulgan aimak, 11 km W of Somon Bayannuur, at lake Bayan, No.

1144, Exp. Dr. Z. Kaszab, 24.VII.1968, slide No. 212m SJ. Simonyi (coll. HNHM); 4 males, Bulgan aimak, 63 km W of Erdenecant, 1500 m, 47°20'35"N, 103°39'96"E, 12.VI.1997, leg. L. Lőkös & L. Peregovits, slide Nos 236m, 238m, 242m, 243m SJ. Simonyi (coll. HNHM); 3 males, Central aimak, 12 km S of Somon Bayanbarant, 1380 m, Exp. Dr. Kaszab, 1967, No. 776, 8.VI.1967, slide Nos 176m, 173m, 202m SJ. Simonyi (coll. HNHM); 2 males, Central aimak SE of Somon Bayanzogt, 1600 m, Exp. Dr. Kaszab, 11.VI.1966, slide Nos 182m, 206m SJ. Simonyi (coll. HNHM); 1 male, Central aimak, Colut Tsagan Doel, 46°55'N, 107°30'E, 17–20.VII.1984, 1300 m, leg. K. Černý, slide No. 200m SJ. Simonyi (coll. HNHM); 2 males, 1 female, Central aimak, Ulaan Baatar, Mts Bogd, Zaisan valley, 1700 m 47°51'48"N, 106°54'01"E, 13.VI.1997, leg. L. Lőkös & L. Peregovits, slide Nos 187m, 240m, 186f SJ. Simonyi (coll. HNHM); 1 female, Central aimak, Uliastin am, Uliastin gol river, 30 km NE of Ulaan Baatar, 1931 m, 48°04'37,0"N, 107°04'05,8"E, 10–11.VII.2004, leg. J. Puntsagdulam & Tögs-Erdene, slide No. 233f SJ. Simonyi (coll. HNHM); 2 males, Saarga Mort, 20 km NE of Ulaan Baatar, 1400–1500 m, 48°03'N, 107°04'E, 17–19.VII.1987, leg. L. Peregovits, M. Hreblay & P. Stéger (coll. Dr. P. Gyulai, Hungary); 2 males, Central aimak, 1400–1600m Tsagaan Davaa, 20 km NW of Bayan Tsadmani, 48°17'N, 106°05' E, 18–23.VII.1988, leg. L. Peregovits & Z. Varga, slide Nos 375m, 376m SJ. Simonyi (coll. Gy. Fábíán, Budapest); 1 female, Chentei aimak, Tsenkermandal, Modoto Chomtei Mts, 1600–1800m, 47°48'N, 109°04'E, leg. K. Černý, 9–14.VII.1981, slide No. 181f SJ. Simonyi (coll. HNHM); 1 male, Central aimak, 10 km NE of Songino, at river Tola, 1250 m, 47°50'N, 106°38'E, 16.VII.1987, leg. L. Peregovits, M. Hreblay & T. Stéger (coll. Dr. P. Gyulai Hungary); 2 males, 1 female, Arkhangay aimak, Khangay Mts, 8 km W of Somon Urdtamir, 1620 m, Exp. Dr. Z. Kaszab, No. 537, 18.VI.1966, slide Nos 190m, 201m, 207f SJ. Simonyi (coll. HNHM); 2 males, Arkhangay aimak, Khangaj Mts, 2000 m, Tsetserleg, 21.VII.1996, leg. S. Farkas & I. Zs. Tóth (coll. Dr. P. Gyulai Hungary); 2 males, Övörkhongay aimak, Mts Hangay, 15 km SW Hudjirt, 2150 m, 46°44'84"N, 102°43'40"E, 9.VI.1997, leg. L. Lőkös & L. Peregovits, slide Nos 208m, 209m SJ. Simonyi (coll. HNHM); 1 male, Övörkhongay aimak, Mts Hangayn nuruu, 2150 m, Harhorin, 46°12'N, 102°49'E, 29–30.VII.1986, Exp. Gy. Fábíán, M. Hreblay, L. Peregovits & G. Ronkay, slide No. 211m SJ. Simonyi (coll. HNHM); 1 female, South Gobi aimak, Hejon nuruu, Frontier station, Ovot Chuural, 1500 m, Exp. Dr. Z. Kaszab, 20.VI.1967, slide No. 191f SJ. Simonyi (coll. HNHM); 1 male, South Gobi aimak, 10 km NNE of Dalanzadgad town, 1450 m, Exp. Dr. Z. Kaszab, No. 898, 7.VII.1967, slide No. 205m SJ. Simonyi (coll. HNHM); 1 male, Bayan Ölgii aimak, valley of Chavchalin gol river, 24 km of Somon Tsagannuur, 1890 m, Exp. Dr. Z. Kaszab, No. 1042, 29.VI.1968, slide No. 203m SJ. Simonyi (coll. HNHM); 1 male, Bayan Ölgii aimak, Mongolian Altay Mts, Bulgan village, 6–7.VIII.1986, leg. P. Gyulai; 4 males, Chovd aimak, Dzhungar Gobi, Bulgan sum (in the village) 31.VII.–1.VIII.1986, leg. P. Gyulai, slide No. 237m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 2 males, Khövsgöl aimak, 6 km WNW of Somon Tosontsengel, 1480 m, Exp. Dr. Z. Kaszab, No. 981; 18.VI.1968, slide No. 213m SJ. Simonyi (coll. HNHM); 1 female, Zavkhan aimak, 1750 m 5km SW of Tsagaan Khayrkhan Sum, 47°27'56.9"N, 96°43'25,3"E, 4–5.VII.2003, leg. J. Puntsagdulam & Tögs-Erdene, slide No. 232f SJ. Simonyi (coll. HNHM); 1 female, Govi Altay aimak, Govi Altay Mts, 6 km S of Tögrög, 1750 m, 45°51'N, 94°45'E, 6.VIII.1988, leg. L. Peregovits & Z. Varga, slide No. 379f SJ. Simonyi (coll. Gy. Fábíán, Budapest); 2 males, 5 females, Gobi Altay aimak, Mongolian Altay Mts (southern slope), Mogojin-Gol valley, 1800 m, 6–8.VII.2010, 45°39'N, 93°49'E, leg. R. Yakovlev & E. Guskova, slide No. OP2046m (coll. O. Pekarsky, Budapest); 1 male, Gobi Altay aimak, Dzhungarian Gobi, 15–20 km N Alag-Nuur lake, 1300 m, 45°19'N, 94°28'E, leg. R. Yakovlev & E. Guskova, slide No. OP1594m (coll. O. Pekarsky, Budapest); 6 males, Töv aimak, Gorki Terelj NP.,

6 km S of Terelj, 47°56'N, 107°27'E, 1660 m, 23.VI.2005, leg. B. Benedek & T. Csóvári; 1 male, Govi Altay aimak, Mongolian Altay Mts, 16 km SE of Dzuyul, 46°11'N, 94°01'E, 2070 m, 28.VI.2005, leg. B. Benedek & T. Csóvári; 1 male, Central aimak, Tsagan Davaa, 20 km NW of Bayan Tsadmani, 1440–1600 m, 48°17'N, 106°05'E, 18–23.VII.1988, leg. L. Peregovits & Z. Varga; 2 males, Övörhangay aimak, Khan Khögsin Uul, 81 km SW of Arvaykheer, 45°51'N, 101°55'E, 1890 m, 25.VI.2005, leg. B. Benedek & T. Csóvári; 1 male, Govi Altay aimak, Mts Adz Bogd, valley of Ih-gol, 2100m, 44°45'N; 95°00'E, 3–4.VIII.1988, leg L. Peregovits & Z. Varga; 1 male, Töv aimak, 46 km E of Lun, 47°90'N, 105°53'E, 1220 m, 10.VII.2005, leg. B. Benedek & T. Csóvári; 1 male, Central aimak, Saarga Mort, 20 km NE of Ulaan Baatar, 1400–1500 m, 48°03'N, 107°04'E, 17–19.VII.1987, leg. L. Peregovits, M. Hreblay & P. Stéger; 1 male, Central aimak, Mts Bogdo-uul, Yarmag, 8 km SE of Ulaan Baatar Airport, 1700 m, 47°50'N, 106°57'E, 17.VII.1988, leg. Cs. Szabóky (coll. G. Ronkay, Budapest); 1 male, Gobi Altay aimak, source Ushijn-Bulak, 30 km NW of Beger, 13.VII.1970, leg. A.F. Emeljanov; 1 male, 1 female, North Gobi aimak, lake Orok Nuur, 6.VII.1926, leg. P. Kozlov; 2 males, North Gobi aimak, lake Orok Nuur, Ikhe-Bogdo, 14–18.VI.1926, leg. P. Kozlov; 1 female, North Gobi aimak, river Kholt, 2–6.VIII.1926, leg. P. Kozlov [all written in Russian] (coll. ZISP); 1 male, Hovd aimak, near Erdene-Buren-Somon, 1250 m, sandy semidesert, 4.VII.2007, leg. R.V. Yakovlev & E. Guskova, slide No. AV0818 Volynkin; 1 male, Govi Altay aimak, Adzh-Bogdo Mts (NE slope), near Khalba-Khayrkhan Mt., 1700 m, 45°03'N; 94°59'E, 3–4.VII.2011, leg. R.V. Yakovlev, slide No. AV0814 Volynkin; 1 male, 1 female, Hovd aimak, Uenchin-Gol valley, 50 km N of Uench village, 1500 m, 6.VII.2007, leg. R.V. Yakovlev & E.V. Guskova, slide Nos AV0819m, AV0816f Volynkin (coll. A. Volynkin, Russia, Barnaul); 1 male, Mongolia, Chentei aimak, Belgerhaan obo, 90 km N from Öndörhaan, 13.VI.1986, light trap (coll. P. Gyulai); 6 males, from the same locality, 22.V.–25.VIII.1986, light trap (coll. P. Gyulai); 1 male, Mongolia, Chovd aimak, Khovd, in the town, 9–10.VIII.1986, leg. P. Gyulai (coll. P. Gyulai); 2 males, Mongolia, Chovd aimak, Dshungar Gobi, Bulgan sum, in the village, 31.VII.–1.VIII.1986, leg. P. Gyulai (coll. P. Gyulai); 1 male, Mongolia, Bayan Ölgii aimak, Mongol Altai, Bulgan village, 6–7.VIII.1986, leg. P. Gyulai (coll. P. Gyulai); 1 male, Mongolia, Arhangaj aimak, Hangaj Mts, Tsetserleg, 21.VII.1996, leg. S. Farkas & Zs. Tóth (coll. P. Gyulai). **China.** 1 male, Nei Mongol, Altan-Xirel, 20–24.VII.2009, leg. E. Kucera (coll. P. Gyulai); **Kazakhstan.** 4 males, 2 females SE Altay Mts, Kulbinsky Mt., Ognovka village, 16.VI.2000, leg. Klimenko, slide No. 407m SJ. Simonyi (colls S. J. Simonyi, Budapest; A. Saldaitis, Lithuania); 1 female, 40 km S of Ust-Kamenogorsk, Siblinka river, 500 m, 8.VI.2005, 49°35'N, 82°30'E, leg. M. Danilevsky, slide No. 408f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, SE Kazakhstan, Dzhungarsky Alatau Mts, 1570 m, 23–27.VI.2012, 44°33,318'N, 79°51,708'E, leg. S. Rybalkin, slide No. OP2045m (coll. O. Pekarsky, Budapest); 1 male, Altai Mts, Ulansky district, near Verkhnyaya Tainta village, Kalbinsky Ridge, Shybyndy-Kol lake, 20.VI.2010, leg. R.V. Artemjev, slide No. AV0817 Volynkin; 1 female, Zaisan district, Saur Mts, Tas Mt., 2350–2600 m, 47°15'N, 85°04'E, 20–22.VII.2011, leg. R.V. Yakovlev, slide No. AV0818 Volynkin (coll. A. Volynkin, Barnaul). **Russia.** 1 male, Russian Altay Mts, Chibit, 1200 m, 13.VI.2010, leg. R. Yakovlev, slide No. 467m SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Transbaikalia, Chita, slide No. 188m SJ. Simonyi (coll. Jul. Isaac, in coll. Ulbrich; coll. HNHM); 2 males, Altay Mts, Ongudai district, Khabarovka, 900 m, 18.VI.2010, leg. R. Yakovlev, slide Nos. OP1595m, OP1596m (coll. O. Pekarsky, Budapest); 2 males, Yablonovy hrebet, 19 km N of Burgen, 19.VI.1995, leg. I. Kostyuk (coll. G. Ronkay, Budapest); 1 male, Altai Rep., Kosh-Agach district, Chuya steppe, 6 km SE of Chagan-Uzun vill., 1800 m, 50°04'N, 88°24'E, 12.VII.2009, leg. A. Volynkin, M. Černila & A.N. Nakonechny, slide No. AV0821 Volynkin; 1 male, Altai Rep., Ust'-Kan district, Kan

hollow, 8 km NE of Ust'-Kan, 1090 m 50°57'24"N, 84°51'36"E, 10.VI.2008, M. Černila leg., slide No. AV0822 Volynkin; 2 males, Altai Rep., Ulagan district, 3 km W Aktash village, Chibitka river valley, 1300 m, 23.VI.2007, leg. A.V. Volynkin, slide Nos AV0823, AV0827 Volynkin; 1 male, Altai Rep., Ust-Koksa district, Uimon steppe, 5 km NE Multa village, 1000 m, 50°12'30"N, 85°58'59"E, 22.VI.2006, leg. A.V. Volynkin, slide No. AV0824 Volynkin; 1 male, Altai Rep., Ulagan district, 26 km N Balyktuyul village, Chulyshman river valley, 500 m, 51°00'N, 88°01'E, 8.VII.2009, leg. A. Volynkin & M. Černila, slide No. AV0825 Volynkin (coll. A. Volynkin, Barnaul); 2 males, 1 female, Buryatia, near Mondy, Kuliuguisha Mts, 2-7.VII.2012 (colls S.J. Simonyi, Budapest; A. Saldaitis, Lithuania).

Diagnosis. *Heliophobus mongoliensis* sp. n. is the smallest member of the *H. reticulata*–*H. unicolor* group with its wingspan 32–38 mm; it differs externally from the three closely related species, besides the measures, by its most often rather mottled colouration of forewing. The dark spots of the basal and terminal areas are comparatively smaller than in the other sibling species, and the arrowhead spots are the shortest, in comparison with the width of the marginal area. The light marginal area with mostly blurred markings may resemble the marginal field of *H. unicolor* but the postmedial line is considerably more oblique (that is mostly straight or almost straight below cell in *H. unicolor*). The hindwing colouration resembles only that of *H. reticulata* but the dark marginal area is broader and usually more accentuated at inner side by a narrow light line.

The clasping apparatus of *H. mongoliensis* sp. n. resembles those of *H. unicolor* and *H. dalmae* due their small cucullus and the only slightly serrated clavus and costa but differs from them by its rather short digitus. The configuration of the aedeagus and the everted vesica with long cornuti field resemble mostly *H. reticulata* and *H. unicolor*, the differences between them are as follows. The vesica of *H. mongoliensis* sp. n. often makes a coil like in *H. unicolor*, while *H. reticulata* usually has no coil; the accessory ribbon is long, similarly to *H. reticulata*, while this ribbon is mostly reduced in *H. unicolor*. The third related species, *H. dalmae* has, on the contrary, large and thick aedeagus with long and twice waved accessory ribbon, two full coils of the vesica and short cornuti field.

The female genitalia of *H. mongoliensis* sp. n. differ from those of the three related species by the comparatively smaller corpus bursae; in addition, there is a distinct border between the membranous anterior part and sclerotized posterior part of ductus bursae (like in *H. reticulata*) while there are sclerotised, wedge-shaped extensions at this area in *H. unicolor*. The appendix bursae of *H. mongoliensis*, *H. unicolor* and *H. reticulata* are single coiled, while that of *H. dalmae* has two coils.

Description. Wingspan 32–38 mm. Forewing rather flattened triangle-shaped, with apex slightly rounded or sometimes pointed. Head yellowish-grey, sandbrown or brown;

collar striolate by light and dark stripes, having paler edges; tegulae and metathoracic tuft same coloured as the head and marked by dark and light stripes. Abdomen sandbrown or brown; lateral abdominal ridges similarly coloured. Forewing ground colour ochreous-grey, yellowish-grey, or sandbrown, sometimes dark brown or even violaceous brown; costal margin chequered by short dark and light stripes. Veins somewhat lighter than ground colour, being darker in marginal area, covered by dark brown scales and partly accentuated by paler spaces. Crosslines lighter yellowish-brown, defined by dark lines; median fascia obsolescent, dark and waved; postmedial line oblique below cell; subterminal line conspicuous, vivid yellowish or light brown, zigzagged. Reniform and orbicular stigmata encircled by rather strong light greyish-brown lines, outside accentuated by dark lines and spots; reniform stigma filled with light and dark stripes, orbicular stigma filled with ground colour. Claviform stigma marked only by its dark frame and filled with ground colour. Marginal area rather pale, arrowhead spots narrow and relatively short, mostly blurred, only partly and hardly discernible. Terminal line consists of a row of small, dark brown triangles. Fringes marked by dark and light stripes; outer edge dark. Hindwing yellowish-grey or brownish-grey, with broad greyish-brown marginal area; transverse line and discal spot usually well discernible; transverse line mostly accentuated by narrow, pale streak between the line and the dark marginal field. Fringes coloured by light and dark stripes, outer edge pale yellow. Underside of forewing light yellowish-grey; costal and marginal areas suffused by brown, filling of reniform stigma, and postmedial line also darkened; veins covered by brown. Underside of hindwing light yellowish-grey, costal area suffused by brownish; transverse line and discal spot sharply defined, marked by brown.

Male genitalia (Figs 87–96). Uncus medium-broad, sometimes rather slender, with apex pointed; fultura inferior slender and high deltoidal; vinculum wide, V-shaped. Valvae comparatively broad; sacculus slender, saccular extensions sclerotised; clavus and costa slightly serrated. Both digituses reduced, left one rather strong, often well-developed. Aedeagus slightly bent; carinal thorn small. Everted vesica recurved or (more often) has one coil; accessory ribbon and cornuti field long.

Female genitalia (Figs 97–100). Corpus bursae small, in comparison with the entire female genitalia. Appendix bursae has one coil that can be slightly sclerotised on its internal side. Ductus bursae with distinct border between its membranous and sclerotised sections; membranous part strengthened by thin, sclerotised folds, two of them sometimes rather strong.

Bionomics. *Heliophobus mongoliensis* sp. n. has been found mainly in the xerothermic parts of Mongolia, the preferred habitats are semi-deserts and dry steppes; between 1140–2150 m elevations. The vegetation of some affected places consists of mainly *Artemisia*, *Oxytropis*, *Anabasis*, *Rhodiola*, *Astragalus*, and *Allium* species, the foodplant of the species is, however, still unknown. In Kazakhstan, the species was found also in the lower regions, at 500 m, while in NW China it was collected in certain higher places, up to 2500 m altitude. The moths are on the wing from the end of May to end of August.

Distribution. The new species is widespread in Mongolia, additional records are known from NW China (China-Nei Mongol), Kazakhstan (South Altai Mts), and Russia (Altai Mts, Transbaikalia, Buryatia). Its area is overlapping with that of *H. unicolor* in the Altai Mountains.

Heliophobus texturata species-group

External morphology. Moths have usually dark ground colour, and mostly contrasting, light elements of wings pattern. Striolate pattern of collar absent or only hardly discernible, except light edges; head and tegulae as ground colour, edges of tegulae mostly light. Ground colour of forewing rather dark, varying from greyish-brown to dark brown; elements of light marking generally white, greyish-white or pale brownish-white, rarely light brown, defined only by a few dark scales; large dark patches and spots among light markings may dominate dark background of forewing. Hindwings mostly pale grey, brownish-grey or brown, with variably broad and dark marginal suffusion.

Male genitalia. Claspings apparatus often asymmetrical: right valva broader than left valva. Valva and sacculus broad, appearing to be almost smooth; clavus and costa mostly slightly serrated; saccular extension rather weakly sclerotised, with rounded, truncated or pointed tip (in reality, the margin of the extension is most often turned behind its dorsal plate and the edge of the bent plate produces the virtual tip of the saccular extension). Both digituses reduced, usually only their tiny remnants can be observed. Cucullus large, corona well developed, macrotrichae strong, claw-like; neck of cucullus slender. Aedeagus long, tubular, tapering distally; coecum penis broad, rounded; carinal part armed by large opening thorn. Vesica tubular, often tapering behind rather broad proximal part; distal part producing glans-like enlargement (in the further text: vesical glans) and makes a coil or turned back towards aedeagus in a wide arch. Inner curve of vesica with strong, broad, stitch-like ribbon (in the further text: vesical stitch) running from carinal thorn towards medial section of vesica, its length is a specific feature. Vesica often armed by groups of strong spines; vesical glans most often bears a cornuti field.

Female genitalia. Ovipositor medium-long, truncated conical, with quadrangular papillae anales; apophyses posteriores with triangular or broadly quadrangular, sometimes flattened oval basal plates. Ostium bursae and antrum sclerotised; antrum short, trapezoidal with rounded posterior and finely arched lateral margins. Ductus bursae long (more than half as long as the ovipositor-antrum complex), tubular, more or less S-shaped and strengthened by sclerotised folds and lobes; posterior end with lobe for carinal thorn; medial section with two deep curves at a right angle at opposite sides; proximal half of ductus bursae rather straight, cranio-caudally directed, except a short, somewhat arched proximal part at junction to corpus bursae. Appendix bursae strongly sclerotized, wide, usually hook-like, with rather oblique basal half. Corpus bursae elliptical-ovoid, membranous, with four long, more or less continuous rows of signa arranged into ribbon-like structures.

Heliophobus texturata (Alphéraky, 1892)
(Figs 37–41, 54, 101–109)

Mamestra texturata Alphéraky, 1892, *Horae Societatis Entomologicae Rossicae* **26** (3–4): 446.
Type-locality: China, Tibet, Amdo. Lectotype: female, here designated; in coll. ZISP.

Type material examined. Lectotype female, China, Tibet, Amdo, mont Sinin, leg. Alphéraky, coll. Gr. Pr. Nikolai Mikhailovich Romanoff, slide 0323 Matov (coll. ZISP); paralectotype male, with same data as the lectotype (coll. ZISP).

Additional material examined. **China.** 1 male, 1 female, Tibet, Amdo 1904 (coll. BMNH); 1 male, 1 female, Sining, Tibet, Amdo; 1 male, Sining (Tibet, Amdo) 95. Rckbl. (coll. ZMHU); 1 female, Kuku Noor, BMNH (Ex Oberthür Coll., Brit. Mus. '927–3); 2 females, Gansu, SW near Xiahe (Labrang), Sangke grasslands, 2930 m, 8.VII.2010, 35°11,968'N, 102°33,545'E, leg. Floriani & Saldaitis, slide Nos 413f, 438f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, Inner Mongolia, W slopes of the Great Chingan Mts near Dular, 1000 m, 3.VII.2008, leg. Floriani & Saldaitis, slide No. 415m SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 female, Beijing, 110 km NW Mentougou, Xialongman Forest Station, 1100 m, 1.VIII.2000. 39°38'N, 116°E, leg. A. Schintlmeister, slide No. 348f SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 female, Beijing, Mentougou district, Dong Ling Mts, 1100 m, 39°58'N, 115°26'E, 7–8.VI.1999, leg. L. Lőkös and B. Papp, slide No. 263f SJ. Simonyi (coll. HNHM); 1 female, Nei Mongol, Altan-Xirel, 20–24.VII.2009, leg. E. Kucera, slide No. 2995f PGY (coll. P. Gyulai). **Russia.** 1 male, Chita, Transbaikalia, coll. Jul. Isaak, slide No. 265m SJ. Simonyi (coll. Ulbrich, in coll. HNHM). **Mongolia.** 1 male, Central aimak, Ulaan Baatar Airport, 1350 m, 47°51'N, 106°47'E, 10.VII.1986, leg. Gy. Fábíán, M. Hreblay, L. Peregovits & G. Ronkay, slide No. 374m SJ. Simonyi (coll. Gy. Fábíán, Budapest); 1 male, Central aimak, Bogdo-uul Mts, 5 km S of Ulaan Baatar Airport, 1650 m, 47°50'N; 106°52'E 11.VII.1986, exp. Gy. Fábíán, M. Hreblay, L. Peregovits & G. Ronkay, slide No. 390m SJ. Simonyi (coll. Gy. Fábíán, Budapest); 1 male, Central aimak, Tsagaan Davaa, 20 km NW of Bayan Tsadmani, 1400–1600 m, 48°17'N; 106°05'E, 11–14.VIII.1988, leg. L. Peregovits & Z. Varga, slide No. 391m SJ. Simonyi (coll. Gy. Fábíán, Budapest); 1 male, Central aimak, 1400–1600 m, Tsagaan Davaa, 20 km NW of Bayan Tsadmani, 1400–1600 m, 48°17'N, 106°05'E, 18–23.VII.1988, leg. L. Peregovits & Z. Varga, slide No. 393m SJ. Simonyi (coll. Gy. Fábíán, Budapest); 2 males, Töv aimak, 5 km SE of Jargalant, 1231 m, 48°25,535'N, 105°43,617'E, 25.VI.2008, leg. B. Benedek, slide Nos 416m, 420m SJ. Simonyi (coll. S. J. Simonyi, Budapest); 2 males, Bulgan aimak, 15 km SSW of Erdenet, 1531 m, 48°55,405'N, 103°59,928'E, 29.VI.2008, leg. B. Benedek (coll. S. J. Simonyi, Budapest).

Redescription. Wingspan 31–40 mm. Head and collar dark brown (almost black), latter with light edges; tegulae dark brown, its „shoulder” and internal edges marked by silvery-white hair-scales; crest and metathoracic tuft variably dark brown. Abdomen greyish-brown; abdominal ridges paler brown. Forewing rather narrow, elongated-triangular, with more or less straight costal margin and finely pointed apex. Ground colour greyish-brown to dark brown-grey; veins white to light grey, with dark brown covering at marginal area, veins m_3 and cu_1 accentuated with conspicuous whitish streaks between postmedial and subterminal lines. Crosslines white to whitish-grey, defined by dark spots; upper section of postmedial line turning gradually to light brown; dark median fascia less distinct, often obsolescent, waved. Orbicular and reniform stigmata encircled by white, whitish-grey or pale brownish-grey, reniform with fine dark inner annulus, orbicular with

larger dark central patch; interstigmatal area also darkened by smaller or darker patches. Claviform stigma marked by its dark contours, filled with ground colour. Subterminal line white or whitish, slightly sinuous, with less produced W-mark at veins m_3 -cu₁; arrowhead spots partly fused, partly blurred. Terminal line very fine, ochreous, followed by a row of dark triangles at inner side. Fringes ornamented by light and dark brown stripes. Hind-wing pale ochreous-grey, with variably strong grey-brown irroration; marginal area suffused with dark brown; transverse line obsolescent or absent; discal spot also diffuse but recognisable as a small brownish patch with lighter centre. Terminal line dark brown; basal line of fringes brownish-white, median stripe dark greyish-brown, outer edge greyish-white. Underside of forewing greyish-brown, contour of reniform stigma light coloured, its filling dark; postmedial line and arrowhead spots also darkened. Underside of hind-wing light greyish-brown, costal and marginal areas suffused by dark brown; transverse line and discal spot well discernible.

Male genitalia (Figs 101–106). Clasp apparatus asymmetrical, right valva conspicuously broader than left one. Uncus spearhead-shaped with variably broad distal section, slender basal part, and pointed apex; fultura inferior broad, deltoidal; vinculum V-shaped. Sacculus broad; clavus gently serrated; sacculus extension broad, with more or less pointed apex. Both digituses reduced, appearing as tiny processes with rounded tips. Cucullus large, with arcuate neck; corona well developed, with strong macrotrichae. Aedeagus long, tubular, coecum penis broadly rounded; carina with eversible opening thorn. Vesica tubular, distally tapering towards vesical glans, then recurved back to distal end of aedeagus; everted carinal thorn projecting to right side in right angle (in correspondence with ductus bursae). Vesical stitch extends from the carinal thorn over half-length of vesica, being the longest within the species-group). Vesica armed by three larger groups of spines, one of them situated proximally, at right side, a sparse row of spines is located at middle section, on the outer surface; a group of long, thick spines appears rather distally, close to vesical glans; vesical glans bears a small cornuti field at inner curve.

Female genitalia (Figs 107–109). Ovipositor relatively large, broad, the largest within the species-group; both pairs of gonapophyses relatively short; basal plates of apophyses posteriores usually quadrangular. Antrum broad but rather short, trapezoidal, with convex posterior margin. Ductus bursae more or less S-shaped, with medium-long posterior part having large, lobate lateral extension, short medial transverse section, and long proximal half with short recurved proximal end at junction to corpus bursae. Appendix bursae hook-like, its basal part oblique, wrinkled and sclerotised; distal part of appendix bursae often turned dorsad. Corpus bursae elliptical-ovoid, membranous, with four long ribbons of variably large, rounded signum-patches.

Bionomics. *Heliophobus texturata* inhabits the dry steppes and mountain grasslands of the Asian high mountains, between 1100–3300 m altitudes. The moths are on the wing, depending on the actual climatic factors of the very different localities, from beginning of June to middle of August.

Distribution. *Heliophobus texturata* occurs in Mongolia, Russia (Transbaikalia) and China, from Nei Mongol and Great Chingan in the NW across the northern mountains of the Tibetan plateau towards the Beijing region and, according to the former records, to the SE frontier of Tibet. It is worth to note that *H. texturata* and its externally very similar sibling species, *H. bulcsui* sp. n.,

occur partly sympatrically in Tibet, therefore the proper identification of the two species requires the study of the genitalia.

Remarks. ALPHÉRAKY (1892) mentioned the sexes of the types as males: "Mamestra Texturata Alph. nov. sp. Species pulchra, simillima Mam. Reticulatae Vill. Differt: thorace fusco obscuriore, scapulis griseo-marginatis, alis anticis obscurioribus, fusco-nigris (non rubicundis), signis omnibus albidioribus, strigis postbasali posticaque albis simplicibus, angustioribus (non geminatis), alis posticis supra omnibusque subtus-obscurioribus. ♂♂ = 38–40 mm. Habitat: in montibus ad Sinin (Amdo)." The two specimens preserved in the Romanov collection (ZIN St. Petersburg) represent, however, both sexes of the species; the female of them is designated above as the lectotype of the taxon.

Heliophobus kitti (Schawerda, 1914)
(Figs 26–31, 110–116)

Mamestra reticulata var. *kitti* Schawerda, 1914, *Jahresbericht des Wiener Entomologischer Vereins* 24: 125. Type-locality: Austria, Lunz. Holotype: male, in coll. NHMW.

Synonymy:

Mamestra texturata Alphéraky, 1892 sensu auctorum nec Alphéraky, 1892;

Hadena texturata ab. *silbernageli* Tykac, 1940; *Casopis* 37: 122. Type-locality: Czechia;

Hadena texturata ssp. *silbernageli* Tykac, 1943, *Casopis* 40: 61. Type-locality: Czechia.

Type material examined. Holotype male, Austria, Lunz, Rauschmaurer, 29.5.1911, Sauruck, coll. Dr. Schawerda (coll. NHMW); paratype female, Austria, Lunz, Rauschmaurer, 7.6.1911, Sauruck, coll. Dr. Schawerda (coll. NHMW).

Additional material examined. **Czech Republic.** 2 males, Bohemia centr., Karlstein, 18.V. and 19.V.1943, ex larva, J.G. Herych, coll. Dr. Schawerda (coll. NHMW); 1 male, Bohemia, Karlstein, 1.VI.1942, leg. J. & F. Vávra, slide No. 250m SJ. Simonyi (coll. HNHM). **France.** 1 male, Les Fréaux (05), Hautes Alpes, 1320 m, Tunnel du Grand Clos, 24.V.2010, leg. Henry Philippe, slide No. 410m SJ. Simonyi (coll. S. J. Simonyi, Budapest); 1 male, 2 females, Les Fréaux (05) Hautes Alpes, 1320 m, Tunnel du Grand Clos, 4.VI.2010, leg. Henry Philippe, slide Nos 414f, 419m, 442f SJ. Simonyi (coll. S. J. Simonyi, Budapest); 2 females, France, Les Fréaux, Hautes Alpes, 1320 m, 7.VI.2011, leg. Henry Philippe (coll. S. J. Simonyi, Budapest). **Italy.** 1 male, South Tyrol, Naturns, 24.VII.1967, leg. W. Pavlas (coll. P. Gyulai); 4 males, 6 females, Italy, South Tyrol, Sesvenna Mts, Praemajur, above Lutaschg, 1700 m, 17.VII.2006, leg. L. Ronkay & M. Tóth, slide No. 9722m L. Ronkay (coll. HNHM). **Russia.** 1 female, Transbaikalia, Chita region, vicinity of Chita, Smolenka, July 1997, leg. Golovushkin, slide No. 249f SJ. Simonyi (coll. HNHM). Buryatia, Ust-Urm village, 10.VII.2012, slide No. 500f SJ. Simonyi (coll. S. J. Simonyi, Budapest). **Mongolia.** 1 male, Central aimag, Khavtsallin-gol river, 31,6 km N of Mungan-mont sum, 1571 m, 48°29'11,2"N, 108°32'52,4"E, 7.VII.2004, leg. J. Puntsagdulam & Tögs-Erdem, slide No. 234m SJ. Simonyi (coll. HNHM); 1 female, Central aimag, Ulaan Baator, Mts Bogdo-uul, Baga tener valley, 1550 m, 47°52'11"N; 106°58'37"E 14.VI.1997, leg. L. Lőkös & L. Peregovits, slide No. 254f SJ. Simonyi (coll. HNHM); 1 female, Central aimak, Bogdo-uul Mts, 5

km S of Ulaan Baatar Airport, 1650 m, 47°50'N, 106°52'E, 11.VII.1986, leg. Gy. Fábíán, M. Hreblay, L. Peregovits & G. Ronkay, slide No. 396f SJ. Simonyi (coll. Gy. Fábíán, Budapest); 1 female, Central aimak, Ulaan Baatar Airport, 1350 m, 47°51'N, 106°47'E, 10.VII.1986, leg. Gy. Fábíán, M. Hreblay, L. Peregovits & G. Ronkay, slide No. 398f SJ. Simonyi (coll. Gy. Fábíán, Budapest); 1 female, Central aimak, Tsagaan Davaa, 20 km NW of Bayan Tsadmani, 1400–1600 m, 48°12'N, 106°05'E, 11–14.VIII.1988, leg. Peregovits & Varga, slide No. 411f SJ. Simonyi (coll. Gy. Fábíán, Budapest); 1 female, Central aimak, Tsagaan Davaa, 20 km NW of Bayan Tsadmani, 1400–1600 m, 48°17'N, 106°05'E, 18–23.VII.1988, leg. L. Peregovits & Z. Varga, slide No. 421f SJ. Simonyi (coll. Gy. Fábíán, Budapest). **Japan.** 1 female, Honshu, Mt. Fuji, 5-Gome, 2300 m, Yamanashi Pref., 14.VII.1992, Y. Kishida leg., slide No. 8575 GB (coll. G. Behounek, Grafing); 2 males, 2 females, Mt. Fuji, sin-5-Gome, Shizuoka Pref., 3.VIII.1995, Y. Kishida leg., slide No. 8574 GB (coll. G. Behounek, Grafing); 1 male, 1 female, Mt. Fuji, 2370 m, 12.VII.1980, leg. Owada, slide Nos RL3236m, RL9720f (coll. HNHM); 2 males, 6 females, Mt. Fuji, 2500 m, Fujinomya, Shizuoka, 9.VII.2011, K. Eda leg. (coll. P. Gyulai).

Taxonomy. The species has long been confused with *H. texturata*. The European populations were described thrice, first by Schawerda as *H. texturata* “var. (?ab.) *kitti*”, subsequently as “ab. *silbernageli*” by TYKAC in 1940 who himself corrected the rank of the taxon as “ssp. *silbernageli*” three years later. In his comprehensive work, HEINICKE (1956) gave the priority to the name *silbernageli*; his opinion was corrected still that year by DANIEL and WOLFSBERGER (1956) who pointed out that the description of Schawerda is acceptable as a valid subspecies while in the original description Tykac indicate the rank of his *silbernageli* as “ab.”. The subspecific rank of the European *H. kitti* was first elevated to full species by DUFAY (1979). The Siberian and Mongolian *H. texturata*-like populations are recently mentioned under the name *H. kitti* (e.g. KONONENKO 2005) though *H. texturata* and *H. kitti* occur sympatrically in Mongolia and Transbaikalia while the Japanese population of *H. kitti* occurring in the Mt. Fuji is cited as *H. texturata* even in the most recent works on the Japanese fauna (SUGI 1965, 1982).

The typical populations in Central Europe are fairly isolated from the more easterly distributed ones; therefore the continental Asiatic and Ural populations and the also disjunct Japanese population may deserve subspecific rank. The micro-taxonomic analysis of *H. kitti* will be provided in a forthcoming article.

Diagnosis. *Heliophobus kitti* differs externally from all four closely related species by its well-discernible reddish gloss of the forewings, the rather whitish light elements of pattern, and the paler colouration of the hindwing. The postmedial line of *H. kitti* is whitish to brownish-white, while the postmedial line of *H. texturata* and *H. bulcsui* becomes light brown from the middle vein to the costal margin; this part of the postmedial line is brown in *H. nepalensis*, while the entire line is pale brown in *H. aequalifuscus*. The hindwing of *H. kitti* is light greyish-brown, those of both sexes of *H. texturata* and the male of *H.*

bulcsui are suffused by darker brown, while the hindwings of *H. nepalensis*, *H. aequalifuscus* and the females of *H. bulcsui* are generally brown coloured.

In the male genitalia, the uncus of *H. kitti* is broader, than in *H. texturata* and *H. aequalifuscus* but slenderer than in *H. nepalensis* and *H. bulcsui*; the vinculum is more pointed, the saccular extension is broader and more arcuate than those of the other four species of the *H. texturata* species-group. The tip of the saccular extension of *H. kitti* is "virtually pointed" (see the general characterisation of the species-group) like in most specimens of *H. texturata*, that of *H. nepalensis* is rather rounded, the extension of *H. bulcsui* is truncated, while the extension of *H. aequalifuscus* is really pointed. The vesica of *H. kitti* has broad, wide proximal part like in *H. texturata*, and twisted with one coil like in *H. aequalifuscus*, while the vesica of the other sibling species is only recurved towards the aedeagus (the "false coil" of the vesica of *H. bulcsui* in certain slides appears as a consequence of the overcurving of the recurved vesica). The vesical stitch of *H. kitti* is comparatively shorter than in *H. texturata* but longer than those of *H. nepalensis*, *H. bulcsui* and *H. aequalifuscus*. The armature of the vesica (the groups and the row of spines) is very similar to that of *H. texturata*, while the middle part of the row of spines is stronger on *H. nepalensis* since this part on *H. bulcsui* is almost spineless. The cornuti field of the vesical glans is also similar in *H. kitti* and *H. texturata*, the cornuti field is rather long and strong in *H. nepalensis* and *H. bulcsui*, while it is absent in *H. aequalifuscus*.

In the female genitalia, the ovipositor of *H. kitti* is narrower than in *H. texturata*, *H. nepalensis* and *H. aequalifuscus*; the longitudinal part of ductus bursae is as long as or even longer than the proximal section of appendix bursae, while this part is comparatively shorter in all other closely related species. The appendix bursae of *H. kitti* is often recurved to the dorsal surface of corpus bursae, similarly to that of *H. texturata*, in spite of the other members of the species-group.

Redescription. Wingspan 36–43 mm. A dark coloured species, with dark brown head, collar and tegulae, having light edges; abdomen brownish-grey, abdomen ridges are same coloured, with light greyish edge. Forewing relatively long and broad, with apex rounded; ground colour dark brown with reddish hue; costal margin chequered by white and dark spots; veins white, covered by dark brown scales in marginal area. Crosslines white to brownish-white, defined by dark spots; postmedial line tapering from edge of cell towards costa and becomes gradually more brownish; median fascia broad, blurred; median area with large, dark patches among postmedial line and reniform and orbicular stigmata, dominating in dark pattern of forewing. Reniform and orbicular stigmata encircled by whitish and filled by ground colour (sometimes with somewhat lighter scales); reniform stigma with fine whitish streak centrally; claviform stigma dark, blurred. Subterminal line sharply marked, pale brownish-white, continuous, zigzagged; arrowhead spots dark, partly fused and indistinct. Terminal line very fine, ochreous, followed by a row of small, dark, flattened triangles, and often by tiny, light spots. Fringes with vari-

ably dark longitudinal stripes, outer edge brown. Hindwing light greyish-brown, marginal area broadly darkened, without distinct inner border; transverse line and discal spot obsolescent but discernible. Fringes light greyish-brown, with dark inner stripes, outer edge whitish. Underside of forewing greyish-brown, gradually paler towards basal area; reniform stigmata, postmedial line, and outer part of marginal area towards subterminal line darker. Underside of hindwing light brownish-grey, veins brownish; costal area and marginal field dark suffused; transverse line and discal spot dark brown.

Male genitalia (Figs 110–113). Claspings apparatus almost symmetrical; right valva and cucullus sometimes slightly broader than left one. Uncus medium-broad, spearhead- or snake-head-shaped; fultura inferior broadly deltoidal; vinculum V-shaped. Valva with broader saccular part; clavus almost smooth; saccular extensions symmetrical, broad, with strongly arcuate edge and virtually pointed tips. Costal extensions (digituses) reduced, but well recognisable, pointed, symmetrical; cucullus large, corona and macrotrichae well-developed; neck of cucullus slender, arcuate with slight angle on dorsal arch. Aedeagus long, tubular, tapering, coecum penis broad, rounded; Carina with eversible ventral bar, terminated in strong opening thorn. Vesica membranous, tubular, tapering, twisted with one coil at medial section; distal vesical glans comparatively narrow; vesical stitch does not reaching half of vesica. Vesica with wide proximal part, armed by a group of spines, a sparse longitudinal row of spines on outer surface of mid-section, and a group of strong spines distally; vesical glans bearing a row of fine cornuti proximally.

Female genitalia (Figs 114–116). Ovipositor comparatively narrow, gonapophyses short; ostium bursae sclerotised, antrum broadly trapezoidal, with strongly tapering proximal part and evenly rounded posterior margin. Ductus bursae about twice as long as length of ovipositor-antrum complex; its walls sclerotised, strengthened by sclerotised folds and lobes; posterior part rather short, with lateral lobe for opening carinal thorn, medial section S-shaped, turned to right at right angle then recurved towards corpus bursae; proximal third arched again towards junction to appendix bursae. Appendix bursae strongly sclerotized, wide, hook-like, with oblique proximal and recurved distal halves, latter part turned dorsad towards corpus bursae. Ductus bursae and appendix bursae joined to corpus bursae at its distal end. Corpus bursae elliptical-ovoid, membranous, with four rows of signa.

Bionomics. A xerothermic steppe species, its main habitats in the European mountains are xeromontane grasslands with xerophyllous vegetation above the timberline. The Asiatic populations live along the taiga zone, most often in rather wet forest areas and subalpine meadows of the Asian high mountains. The known foodplants are *Astragalus* (e.g. *A. danicus*, *A. glycyphyllos*) and *Vicia* species. The moths are on the wing, depending on the given locality, between end of May and middle of August.

Distribution. *Heliophobus kitti* is a widely distributed Siberian steppe species, with a few larger, disjunct areas. In Europe it is known from the Alps (France, Switzerland, Italy, and Austria), Czechia and the Danube valley in Germany, and the Ural region (NUPPONEN & FIBIGER 2002, KONONENKO 2005). It is still questionable whether the Ural population is connected with the Asiatic range of the species which is extending from southern Siberia through Mongolia and Transbaikalia to the Amur valley (KONONENKO 2005) and Japan (SUGI 1965, OWADA 1981).

Heliophobus nepalensis Plante, 1982, **bona sp.**
(Figs 32–36, 117–122)

Heliophobus nepalensis Plante, 1982, *Bulletin de la Société Entomologique de France* **87**: 287, figs 3–4. Type-locality: Nepal, Langtang, Kyangjin Gompa. Holotype: male, in coll. Plante (coll. Museum of Natural History, Geneva).

Type material examined. Holotype male, Nepal, Langtang, Kyangjin Gompa, 3900 m, 3–5.VI.1976, leg. & coll. J. Plante; slide No. 705 J. Plante (NHM Geneva). Paratypes. 1 male, 2 females, with the same data as the holotype, slide No. VZ2429m Varga, in coll. NHM Geneva and coll. Vartian, NHMW.

Additional material examined. **Nepal.** 1 male, 1 female, Annapurna Himal, Noma pasture, 11 km SE Jomsom, 4000 m, 28°44,5'N, 83°48'E, 9–10.VII.1995, leg. G. Csorba, Gy. M. László & G. Ronkay, slide Nos RL9719m, RL9719f Ronkay (coll. G. Ronkay); 1 male, Annapurna Himal, Thadung, 5km SE Jomsom, 3450 m, 28°46'N, 83°46'E, 14.VI.1996, leg. Gy. M. László & G. Ronkay, slide No. 310m SJ. Simonyi (coll. HNHM); 1 male, 3 females, Annapurna Himal, 11 km SE Jomsom, Noma pasture, 4000 m, 28°44,5'N, 83°48'E, 9–10.VI.1966, leg. Gy. M. László & G. Ronkay, slide Nos 266m, 267f, 307f, 309f SJ. Simonyi (coll. HNHM); 4 males, 2 females, Annapurna Himal, 11 km SE Jomsom, Noma pasture, 4000 m, 28°44,5'N, 83°48'E, 9–10.VI.1996, leg. Gy. M. László and G. Ronkay, slide Nos 388m, 389m, 394m, 395m, 397f, 399f SJ. Simonyi (coll. Gy. Fábián Budapest); 1 female, Annapurna Himal, 10 km SE Jomsom, 3800m, 28°45'N, 83°48'E, 10.VII.1995, leg. G. Csorba, Gy. M. László & G. Ronkay, slide No. 315f SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Annapurna Himal, 4000 m, 11 km SE Jomsom, Noma pasture, 28°44,5'N, 83°48'E, 17–18.VII.1995, leg. G. Csorba, Gy. M. László & G. Ronkay, slide No. 308m SJ. Simonyi (coll. HNHM); 1 male, Annapurna Himal, 4000 m, 11 km SE Jomsom, Noma pasture, 28°44,5'N, 83°48'E, 17–18.VII.1995, leg. G. Csorba, Gy. M. László & G. Ronkay, slide No. 392m SJ. Simonyi (coll. Gy. Fábián, Budapest); 2 females, Annapurna Himal, 11 km SE of Jomsom, Noma pasture, 4000 m, 28°44,5'N, 83°48'E, 9–10.VI.1996, leg. Gy. M. László & G. Ronkay (coll. Gy. Fábián, Budapest); 1 female, Annapurna Himal, Thadung, 5 km SE of Jomsom, 3450 m, 28°46'N, 83°46'E, 8.VI.1996, leg. Gy. M. László & G. Ronkay (coll. Gy. Fábián, Budapest).

Diagnosis. *Heliophobus nepalensis* differs externally from the related species by the colouration of both wings and the certain elements of the forewing markings. The forewing ground colour of *H. nepalensis* is generally brown, without greyish, reddish or olive shade; the forewings of *H. texturata* have greyish hue; those of *H. kitti* and *H. aequalifuscus* are finely reddish, while *H. bulcsui* has olive shade. The distinctive features of the forewing pattern are the conspicuously broad and whitish antemedial line that is accentuated by broad dark border and the postmedial line that mostly becomes to brown, tapering and obsolescent from the middle vein towards the costal margin. The hindwing of *H. nepalensis* is usually brown like in *H. aequalifuscus*, while the hindwings of the other three sibling species are grey, except the brown coloured female hindwing of *H. bulcsui*.

In the male genitalia, the uncus of *H. nepalensis* is broader than in *H. texturata*, *H. kitti* and *H. aequalifuscus*; the apex of vinculum is broadly rounded,

despite the rather pointed vinculum of the close relatives; the tip of the sacular extension is rounded (like in a part of specimens of *H. texturata*), while the sacular extension of *H. kitti* is seemingly pointed, that of *H. aequalifuscus* is really pointed and of *H. bulcsui* is truncated. The cucullus is turned usually at a right angle, like in *H. bulcsui*, but this angle is usually blunt in *H. texturata*, *H. kitti* and *H. aequalifuscus*. The vesica of *H. nepalensis* is recurved towards the aedeagus, that of *H. texturata* is turned to the right at a right angle, the vesica is twisted with one coil in *H. kitti* and *H. aequalifuscus*, while the vesica of *H. bulcsui* is recurved or overcurved, producing a coil. The proximal part of the vesica is comparatively narrow, similarly to those of *H. bulcsui* and *H. aequalifuscus*; this part of the vesica is broad in *H. texturata* and *H. kitti*. The length of the vesical stitch extends about one-third of vesica (as in *H. bulcsui* and *H. aequalifuscus*), while the vesical stick of *H. texturata* and *H. kitti* is considerably longer. The dorsal row of spines between the two large groups of spines is strongly developed in *H. nepalensis*; this row of spines is sparse in *H. texturata* and *H. kitti*, being practically absent in *H. bulcsui*, while the proximal group of spines is absent in *H. aequalifuscus*. The cornuti field of the vesical glans is long and strong in both *H. nepalensis* and *H. bulcsui*, despite the rather short and weak cornuti field of *H. texturata* and *H. kitti*, while the cornuti field of *H. aequalifuscus* is absent.

In the female genitalia, the recurved part of ductus bursae of *H. nepalensis* is very short, much shorter than in *H. kitti*, and the appendix bursae does not turned to the backside of corpus bursae (a shared feature with *H. bulcsui*), in spite of *H. kitti* and often of *H. texturata*.

Redescription. Wingspan 35–39 mm. Head and collar dark brown, latter with light edges; tegulae dark brown, with black and silvery markings; medial crest and metathoracic tuft dark brown with light brown edges; abdomen and abdominal ridges brown. Forewing rather broad, costal margin slightly arcuate; apex finely pointed; ground colour dark brown, veins generally whitish, with stronger dark irroration in marginal area; intervenal areas with whitish or pale brown streaks. Antemedial line considerably broader and lighter than postmedial line, defined by blackish spots at inner and by thick streak at outer side; median fascia waved, diffuse or obsolescent, dark brown; upper part of postmedial line tapering towards costa, becoming more brownish and obsolescent; postmedial line defined by blackish at inner and by pale brown spots at outer side. Orbicular and reniform stigmata encircled by whitish and dark lines; former filled by light brown, latter by ground colour, with pale central streak; claviform stigma an indistinctly outlined dark patch. Subterminal line brownish-white, sharply defined, slightly zigzagged; arrowhead spots not fused but mainly obsolescent; terminal line fine, ochreous, defined by smaller or larger dark triangles. Fringes chequered by dark and light stripes, medial stripe dark brown, outer edge light brown. Hindwing brown, gradually paler towards base, costal area and marginal field broadly dark brown; veins darkened; discal spot small but well-discernible; transverse line deleted. Terminal line diffuse, dark brown; base of fringes yellowish, median stripe dark brown, outer third pale brown. Underside of forewing brown

suffused; inner margin paler brownish-grey, postmedial and subterminal lines rather dark; terminal area paler. Underside of hindwing light brownish-grey, costal and marginal areas with dark brown suffusion; discal spot and transverse line clearly marked, inner edge of marginal area followed by fine dark line.

Male genitalia (Figs 117–120). Clasp apparatus slightly asymmetrical: right valva slightly broader than left one. Uncus broad, pointed, with narrow neck; fultura inferior broadly deltoidal; vinculum almost U-shaped, with tiny prominence at ventral extremity. Sacculus broad; clavus smooth except of one small thick; saccular extension arcuate, its tip rounded or with uneven edges; right extension broader than left one. Both digituses reduced to small but well-visible remnants; cucullus large, corona and macrotrichae well-developed, right cucullus somewhat larger than left one; neck of cucullus narrow, arcuate, turned towards valval end often at right angle. Aedeagus long, tubular, distally tapering; coecum penis broad, rounded; carinal plate narrow, sclerotised, with opening distal thorn. Vesica tubular, recurved towards distal end of aedeagus, tapering only slightly from comparatively narrow proximal part to distal end; vesical glans well discernible. Vesical stitch short, extending from carinal the opening thorn to about one-third of length of vesica. Dorsal row of spines begins at wide proximal part of vesica with a rather small group of spines and extends to distal part, where becomes broad and strong; vesical glans armed by comparatively long and strong cornuti field.

Female genitalia (Figs 121–122). Ovipositor rather short, gonapophyses short; ostium bursae and antrum broad, sclerotised. Ductus bursae long (its entire length ca twice as long as ovipositor-ostium complex), with sclerotised folds and lobes; posterior section with lobe receiving opening carinal thorn, medial section rather S-shaped, with deep curve at right angle at right side, continuing in a long transverse and a further cranio-caudally directed part, anterior section very short, recurved. Appendix bursae wide, sclerotised, oblique, hook-like, joining to sclerotized distal end of corpus bursae; corpus bursae membranous, broadly elliptical, with four short rows of signa.

Bionomics. *Heliophobus nepalensis* occurs in the high altitude non-arboreal belts of the Nepal Himalaya, in between 3450–4100 m elevations. The main habitats are rich subalpine meadows with sparsely wooded patches, open rocky slopes and alpine grasslands. The moths are on the wing, depending on the actual locality, from the beginning of June to the beginning of August.

Distribution. The species is recorded only from Nepal, the Indian Sikkim and Kashmir.

***Heliophobus bulcsui* Simonyi sp. n.**

(Figs 42–49, 123–135)

Holotype. Male, N-Pakistan, 15 km SE of Karimabad, Hopar, 2700m, 36°11'N; 74°46'E, Nr.16., 14.VI.1992, leg. M. Hreblay and G. Csorba, slide No. 255m, SJ. Simonyi (coll. HNHM).

Paratypes. Pakistan. 1 male, with the same datas as the holotype, slide No. 262m S.J.Simonyi (coll. HNHM); 1 male, 15 km SE of Karimabad, Hopar glacier, 2700 m, 36°11'N, 74°46'E, No. 16., 14.VI.1992, leg. M. Hreblay and G. Csorba (coll. BMNH (E) 1994–66); 2 females, Karakoram Mts, Naltar valley, 2900 m, 36°11,08'N, 74°09,22'E, 20.VII.1998, leg. G. Csorba & L. Ronkay, slide No. 464f SJ. Simonyi (coll. G. Ronkay, Budapest). **China.** 1

male, Sinin, Kuku-Noor, 1901, collection Dr. Schawerda (coll. NHMW); 1 male, 1 female, Yunnan, Diqing Tibetan Autonomous Prefecture, 5 km SE of Deqin town, Tashi's Guesthouse, near to Rerinkha village, 3356 m, 28°28,484'N, 98°53,827'E, 5–6.VI.2008, leg. B. Benedek, slide Nos 264m, 268f SJ. Simonyi (coll. HNHM); 7 males, 2 females, from the same site, 16–20.VI.2009, leg. B. Benedek (colls Dr. P. Gyulai, Hungary, A. Floriani, Italy); 1 female, Yunnan, Diqing Tibetan Aut. Pref., 8 km NNE of Shangri La, at Nairi village, 3300 m, 21.VI.2009, leg. B. Benedek (coll. B. Benedek, Hungary); 1 female, from the same locality, 14.VI.2009, leg. B. Benedek (coll. Dr. P. Gyulai, Hungary); 1 male, Yunnan, Diqing Tibetan Aut. Pref., 8 km NNE of Shangri La, 2 km W of Nairi village, 3242 m, 27°53,713'N, 99°39,841'E, 7.VI.2008, leg. B. Benedek (coll. B. Benedek, Hungary); 1 male, Tibet, 3700 m, S-Himalaya Mts, Nyalam, 10–12.VII.2001, leg. L. Bieber, slide No. 349m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Yunnan, surroundings of Zhong Dian City, 3200–3400 m, 3–5.VII.2009, slide No. OP 1913m (coll. O. Pekarsky); 2 males, 1 female Yunnan, near Zhong Dian city, 3350 m, 27°24,800'N, 99°40,500'E, 23.V.2012, leg. Floriani (colls S. J. Simonyi, Budapest; A. Floriani, Italy; A. Saldaitis, Lithuania); 4 males, 2 females, Yunnan, Lijiang, Zhong Dian, near Tuguancun, 3200 m, 27°29,700'N, 99°53,700'E, 24–25.V.2012, leg. Floriani, slide No. 501f SJ. Simonyi (colls S. J. Simonyi, Budapest; A. Floriani, Italy; A. Saldaitis, Lithuania); 1 male, East-Tibet, Prov. Qamdo, Mekong valley, 3500 m, 22.VI.1991, leg. Willi Fickler, slide No. 457m SJ. Simonyi (coll. Dr. P. Gyulai, Hungary); 1 male, Qinghai, Heka Mts, SW of Santa la, 3610 m, 3–4.VIII.1999, leg. P. Gyulai and A. Garai, slide No. 1212 P. Gyulai (coll. Dr. P. Gyulai, Hungary); 1 male, Qinghai NE, Daban Shan Mts, N of Datong, 3800 m, 37°13,230'N, 101°46,988'E, 12.VII.2010, leg. Floriani & Saldaitis, slide No. 432m SJ. Simonyi (coll. S. J. Simonyi, Budapest); 5 males, 2 females, Gansu, SW near Xiahe (Labrang), Sangke grasslands, 3568 m, 34°59,626'N, 102°33,808'E, 7.VII.2010, leg. Floriani & Saldaitis, slide Nos 433m, 436m, 441m, 412f, 437f SJ. Simonyi, (coll. S. J. Simonyi, Budapest); 2 males, Gansu, SW road from Zoige to Lugu, 3660 m, 34°20,780'N, 102°19,938'E, 6.VII.2010, leg. Floriani & Saldaitis, slide No. 439m SJ. Simonyi (colls S. J. Simonyi, Budapest; A. Floriani, Italy).

Diagnosis. The new species is characterised by the olive hue of the forewings; the other species of the *texturata*-group have different shade: the hue of the ground colour is greyish in *H. texturata*, reddish in *H. kitti* and *H. aequalifuscus*, while that of *H. nepalensis* is clear brown. There are certain differences between the forewing pattern of *H. bulcsui* and the closely related species, which are as follows: the postmedial line of *H. bulcsui* is more tapering towards costal margin and weaker defined by darker spots than in its siblings; this line is whitish below cell and becomes pale brownish from the middle vein towards costa (like in *H. texturata*), while the entire line is white in *H. kitti*, and mostly ochreous-brown to brown coloured in *H. nepalensis* and *H. aequalifuscus*; finally, the most prominent light marking of *H. bulcsui* is the subterminal line. The colouration of the male hindwing of *H. bulcsui* resembles those of *H. texturata* and *H. kitti*, while the hindwing of the females is brown, similarly to those of *H. nepalensis* and *H. aequalifuscus*.

In the male genitalia, the key feature of the new species is the truncated saccular extension which is unique within the genus. There are several other

differences between *H. bulcsui* and the other members of the *texturata*-group which are as follows. The unculus of *H. bulcsui* is the broadest within this species-group; the vinculum is V-shaped and pointed, as in certain specimens of *H. texturata*, *H. kitti* and *H. aequalifuscus* while the vincular apex of *H. nepalensis* is always rounded; the cucullus can be turned almost at a right angle, as in *H. nepalensis*, while this angle is usually blunt in *H. texturata*, *H. kitti* and *H. aequalifuscus*; the vesica is very similar to that of *H. nepalensis* with its narrow proximal part, short vesical stitch, and the strong and long cornuti field of the vesical glans, but it is often overcurved forming a coil, and the row of spines is almost entirely absent between the two larger groups of spines. In comparison, the narrow vesica of *H. aequalifuscus* has similarly short vesical stitch, but it is twisted with one coil, and the proximal group of spines and the cornuti field are absent; the proximal part of the vesica is broad in *H. texturata* and *H. kitti*, their vesical stitch is rather long, with a full row of spines, and their vesical glans has short and weak cornuti field. The vesica of *H. texturata* is mostly turned to the right at a right angle, while the vesica of *H. kitti* is twisted with one coil.

In the female genitalia, the longitudinal part of ductus bursae of *H. bulcsui* sp. n. is the shortest in the species-group when compared with the size of corpus bursae, and the basal plates of apophyses posteriores are conspicuously broad.

Description. Wingspan 36–40 mm. Head and collar dark brown, latter with light margins; tegulae dark brown with light, silvery edges; crest and metathoracic tuft dark brown with light tips. Forewing comparatively broad, costal margin slightly arcuate; apex finely pointed. Ground colour greyish-olive brown to dark brown; veins whitish, except in marginal area where they covered by dark brown and accentuated by light streaks; crosslines whitish, with moderate dark definition by darker dots. Antemedial line oblique, almost straight, with fine angles at costal and inner margins; median fascia blurred, hardly discernible; postmedial line tapering and becoming more brownish towards costa. Orbicular and reniform stigmata encircled by whitish and filled by ground colour; reniform with light central line; both stigmata defined by dark spots on both sides; claviform stigma dark brown, less distinct, often hardly visible. Subterminal line brownish white, sharply defined, slightly zigzagged; arrowhead spots partly fused, usually not prominent. Terminal line fine, ochreous, followed by an almost continuous row of dark triangles. Fringes dark brown, with ochreous streaks at veins, light greyish-brown outer edge and fine ochreous-brown longitudinal lines. Hindwing of male light brownish-grey, with dark brown marginal suffusion; that of female dark brown, becoming paler towards base of wing; transverse line deleted, discal spot hardly discernible. Terminal line indistinct, brown; fringes ochreous-grey, chequered by ochreous at veins, and marked by brown and ochreous-brown longitudinal stripes. Underside of forewing greyish-brown, costal margin, postmedial and subterminal lines rather dark; contour of reniform stigma and inner marginal area lighter. Underside of hindwing light brown, costal and marginal areas suffused with

dark brown; transverse line and discal spot distinctly marked, dark brown. Abdomen and abdominal ridges same coloured as hindwing.

Male genitalia (Figs 123–132). Clasp apparatus usually asymmetrical, right valva broader, than left one. Uncus broad, its apex pointed; fultura inferior deltoidal; vinculum V-shaped, with finely rounded apex. Saccus broad; clavus serrated, saccular extension arcuate, its tip truncated, with pointed internal angle. Both digituses reduced, hardly visible or absent. Cucullus large, it can be turned ventrad almost at a right angle; corona and macrotrichae well-developed; neck of cucullus slender. Aedeagus long, tubular, only slightly tapering after the broad and rounded coecum. Everted vesica long, tubular, only slightly tapering, recurved or making a coil; vesical stick extending only about one-third of length of vesica; vesical glans comparatively long; proximal part of vesica with a small group of spines at right side, distal part with long group of rather strong spines; vesical glans bearing long and strong cornuti field.

Female genitalia (Figs 133–135). Ovipositor conical; basal plates of apophyses posteriores broad, more or less rhomboidal; apophyses rather short. Ductus bursae relatively short, sclerotised, with a lobe for opening carinal thorn, and sclerotised with folds; longitudinal part of short, in a comparison with length of corpus bursae. Appendix bursae large, wide, obliquely hook-like. Corpus bursae wide, elliptical-rounded, membranous, with four comparatively long rows of signa.

Bionomics. *Heliophobus bulcsui* sp. n. has been found in mountainous grasslands, grassy, stony slopes and dry meadows with diverse herbaceous vegetation, between 2700–3800 m altitudes. The moths are on the wing in May, June and July.

Distribution. The new species is known to occur in North Pakistan and China (Tibet, Yunnan, Qamdo, Qinghai, and Gansu).

Etymology. The new species is dedicated to Mr. Bulcsú Simonyi, son of the senior author.

***Heliophobus aequalifuscus* Gyulai et Simonyi sp. n.** (Figs 50–53, 136–143)

Holotype. Male, Pakistan, Himalaya Mts, Kaghan valley, Tathabaya, 2300 m, 34°36'48"N, 73°27'01"E, 7.VII.1998, leg. G. Csorba & L. Ronkay, slide No. 463m SJ. Simonyi (coll. S. J. Simonyi, Budapest, deposited in the HNHM).

Paratypes. Pakistan. 1 male, Jammu & Kashmir, NW of Junkar, 4200 m, 20–30.VII.2003 leg. V. Gurko, slide No. 1698 P. Gyulai (coll. Dr. P. Gyulai, Hungary); 1 male, Kashmir, Himalaya Mts, 30 km N of Murree, Ayubia, 2650 m, 34°01'75"N, 73°24'03"E, 5–6.VII.1998, leg. G. Csorba & L. Ronkay, slide No. 459m SJ. Simonyi (coll. G. Ronkay, Hungary); 5 males, Himalaya Mts, Kaghan valley, Saiful Muluk, 3100 m, 34°54'N, 73°42'E; 30.VI.1998, leg. Gy. Fábán & B. Herczig; slide Nos 458m, 461m, 462m SJ. Simonyi (coll. P. Gyulai, Miskolc and G. Ronkay, Budapest); 1 female, Kaghan valley, above Shogran, Siripaya, 3000 m, 4.VIII.2011, leg. B. Benedek (coll. P. Gyulai); 1 male, Kaghan valley, above Shogran, Siripaya, 3000 m, 4–5.VII.2014, leg. B. Benedek & J. Babics (coll. P. Gyulai); 1 female, Hindukush Mts, 35 km N of Dir, Lavarai pass, 3100 m, 35°27'N, 71°43'E, 10.VII.1994, leg. B. Herczig, Gy.M. László & G. Ronkay, slide No. 460f SJ. Simonyi (coll. G. Ronkay, Hungary).

Diagnosis. *Heliophobus aequalifuscus* sp. n. is the closest relative of *H. kitti*, despite the brown ground colour of both the forewing and the hindwing as those of both sexes of *H. nepalensis* and the female of *H. bulcsui* sp. n. The elements of the light forewing pattern and the sometimes well-discernible purple hue of the forewing clearly show, however, the close relationship with *H. kitti*, as well as the features of the genitalia of both sexes. The main differences, in comparison with *H. kitti*, are as follows: the light marking elements are light brown, not dominantly whitish; the postmedial line is crenellate in its entire length; the comparatively vivid coloured subterminal line also very strongly zigzagged; the postmedial line is defined by tiny dark, partly flattened arrowhead-spots at inner side, and the arrowhead-spots following the subterminal line are narrow and rather distinct, despite of the blurred and/or fused arrowhead-spots of all closely related species. The combination of the entire brown colouration of wings with weak purple hue of forewing and the strongly crenellate postmedial and subterminal lines with well-defined arrowhead-spots are the diagnostic external features of *H. aequalifuscus*.

In the male genitalia, the clasping apparatus is very similar to that of *H. kitti*. The considerable prominence of the clavus is a shared and distinctive feature of these two species in comparison with the other three members of the *H. texturata* species-group. The specific autapomorphies of *H. aequalifuscus* are the really pointed and strongly sclerotised saccular extension, and the lack of the cornuti field from the vesical glans. The vesica of the new species is tubular, tapering distally, without conspicuous enlargement in its proximal part (which is present in *H. texturata* and *H. kitti*); it is twisted in a wide arch, despite the tight arch of *H. kitti* and the only recurved or simply coiled vesica of the other allied species. The vesical stick of *H. aequalifuscus* is one of the shortest in this group with its length ca one-third of the full length of the vesica). The new species lacks the group of proximal spines (all other members of the group possess these spines), but there is a scarce row of spines on the outer side of the arch of vesica that becomes to a group of strong spines in the medial third of the vesica.

The female genitalia of *H. aequalifuscus* are almost as robust as those of *H. texturata*, this latter species has the most robust female copulatory organ within this group. The shared features of the female genitalia of these two species are the broad ostium-antrum complex, and the rates of ovipositor, appendix bursae, corpus bursae and ductus bursae. The proximal part of ductus bursae of *H. aequalifuscus* with short longitudinal and very short recurving sections differ conspicuously from the long proximal part of ductus bursae of *H. kitti*. In addition, the basal plates of the apophyses posteriores are rather narrow in of *H. aequalifuscus*, not triangular as in *H. kitti* and *H. nepalensis*, or

quadrangular as in *H. texturata* and *H. bulcsui*, and the four rows of signa on the corpus bursae are the shortest within the species-group.

Description. Wingspan 34–38 mm. Colouration of head, collar, tegulae and dorsal crest greyish-brown to dark brown; light border of collar hardly discernible; margins of tegulae marked by rather dark brown line, edges rather broad, light greyish; abdomen and abdominal ridges slightly paler than forewing ground colour. Forewing pointed, costal and outer margins somewhat arcuate; ground colour greyish-brown to dark brown with poorly visible purple hue; light marking elements of paler than ground colour. Antemedial line broad, accentuated by strong dark brown spots at medial section; median fascia waved, blurred, dark brown; postmedial line crenulate, defined by tiny, dark brown arrowhead-shaped spots at middle section. Orbicular and reniform stigmata encircled by dark brown and light annuli and filled with ground colour; reniform stigma with light central dash; contour of claviform stigma dark brown, its filling mottled brown. Subterminal line whitish-grey, zigzagged, with short W-mark medially; arrowhead spots of following subterminal line rather sharply defined, thin, dark brown. Terminal line very fine, ochreous, defined by distinct dark brown triangles. Fringes with darker and paler brown longitudinal stripes, chequered by fine ochreous streaks at veins. Hindwing greyish-brown to dark brown, becoming somewhat paler towards base; veins rather dark brown; discal spot hardly visible, transverse line obsolete; terminal line diffuse, brown. Fringes ochreous, with dark brown medial stripe and pale ochreous-brown outer edge. Underside of forewing suffused by rather large greyish-brown scales; costal margin darkened; light contour of reniform and dark postmedial and subterminal lines well discernible. Underside of hindwing irrorated by greyish-brown scales; veins, costal and marginal areas, transverse line and discal spot dark brown.

Male genitalia (Figs 136–142). Uncus narrow or medium-broad, apically pointed; fultura inferior narrow deltoidal; vinculum V-shaped, terminally finely pointed or blunt and slightly rounded. Sacculus part of valva broad; clavus slightly serrated, its prominence strong, rather tooth-like; sacculus extension broad, heavily sclerotised, its apex really pointed; cucullus broad, its neck short and slender; corona well-developed. Aedeagus tubular, tapering, with eversible ventral carinal plate, terminated in opening thorn; coecum penis broad, rounded. Vesica twisted, tubular, almost evenly tapering; vesical stitch about one-third of entire length of vesica. Medial section of vesica armed by a weak row of spines along outer arch, followed by a group of strong spines; vesical glans long, narrow, most often without cornuti field, sometimes with a small bundle of flimsy bristles.

Female genitalia (Fig. 143). Ovipositor broad, apophyses posteriores comparatively long, with more or less elliptical basal plates. Antrum broad, sclerotised; ductus bursae relatively short. Appendix bursae sclerotised, hook-like, with oblique basal part; it is very large in comparison with corpus bursae, located at distal end of corpus bursae. Corpus bursae wide, rounded, membranous with four very short rows of signa.

Bionomics. *Heliophobus aequalifuscus* lives in open Himalayan-type woodlands, consisting of patches of mixed pine and deciduous forests, grassy, stony slopes and dry meadows rich in flowering plants. The known specimens were collected in between 2300–4200 m altitudes. The flight period is the early summer, the adults fly from end of June to beginning of August.

Distribution. The species is distributed in the Pakistanian high mountains. The overwhelming majority of the specimens were found in the SW Himalayas (Kaghan valley, Murree Hills), only a single specimen is known from the Hindukush (NW Frontier Province: Lavarai Pass).

Etymology. The name “*aequalifuscus*” refers to the almost entirely brown colouration of the new species.

*

Acknowledgements – The authors are grateful to Mr. G. Behounek for his kind help and advices, to Dr A. Matov for the examination the lectotype-specimens of *Heliophobus unicolor* Alphéraky and *H. texturata*, to the late Gy. Juhász (†) (Újpesti Lepkémúzeum, Budapest), Mr. Gy. Fábíán (Budapest), Mr. O. Pekarsky (Budapest), Mr. G. Ronkay (Budapest), Mr. A. Saldaitis (Vilnius), Mr. L. Szécsényi (Budapest), Mr. L. Székely (Săcele, Romania), and Dr. A. Volynkin (Russia, Barnaul) for the loaned or given material and/or records, and to Mr. T. Csóvári, Mr. I. Retezár and Mr. G. Ronkay for the photographs. Our special thanks to the referees, G. Behounek, A. Saldaitis and A. Volynkin, for their useful comments and suggestions.

REFERENCES

- ALPHÉRAKY, S. (1889) Le Pamir et sa Faune Lépidoptérologique. Seconde partie (Spéciale). Noctuérites. IV. In: ROMANOFF, N. M.: *Mémoires sur les Lépidoptères* 5: 124–191.
- ALPHÉRAKY, S. (1892) Lepidoptera nova a Gr. Grum-Grshimailo in Asia Centrali novissime lecta. *Horae Societatis Entomologicae Rossicae* 26 (3–4): 444–459.
- BEHOUNEK, G. (1986) Beitrag zur Noctuiden-fauna der Türkei und des Iran. Neue Erkenntnisse zur Verbreitung von *Heliophobus reticulata* (Goeze, 1780). *Nachrichtenblatt der Bayerischen Entomologen* 36 (4): 115–122.
- DANIEL, F. & WOLFSBERGER, M. (1956) Zur Nomenklaturfrage *Hadena texturata* kitti Schaw. (= silbernegeli Tykac). *Zeitschrift der Wiener Entomologischen Gesellschaft* 41: 246–248.
- DUFAY, C. (1979) Redécouverte dans les Alpes françaises d'*Heliophobus kitti* (Schawerda), bona species (n. comb.) (Lépidoptères, Noctuidae Hadeninae) *Bulletin Mensuel de la Société Linnéenne de Lyon* 48 (6): 330–332, 365–370.
- FIBIGER, M., RONKAY, L., YELA, J. L. & ZILLI, A. (2010) *Rivulinae – Eutelinae and Micronoctuidae and supplement to volume 1–11. Noctuidae Europaeae. Volume 12*. Entomological Press, Sorø, 451 pp + 18 colour plates.
- HEINICKE, W. (1956) Monographie über *Heliophobus* (*Hadena* [Mamestra]) *texturata* Alphéraky, 1892 (Lep., Noctuidae). *Zeitschrift der Wiener Entomologischen Gesellschaft* 41: 145–159; 174–180.
- KONONENKO, V. S. (2005) An annotated check list of the Noctuidae (s.l.) (Lepidoptera, Noctuoidea: Nolidae, Erebiidae, Micronoctuidae, Noctuidae) of the Asian part of Russia and the Ural Region. *Noctuidae Sibiricae*. Vol. 1. Entomological Press, Sorø, 243 pp.
- NUPPONEN K. & FIBIGER, M. (2002) Contribution to the fauna of Bombyces, Sphinges and Noctuidae of the Southern Ural Mountains, with description of *Dichagyris lux* Fibiger & K. Nupponen, sp. n. (Lepidoptera: Lasiocampidae, Endromidae, Saturniidae).

- dae, Sphingidae, Notodontidae, Noctuidae, Pantheidae, Lymantriidae, Nolidae, Arctiidae). *Phegea* **30** (4): 121–185.
- OWADA, M. (1981) The subalpine noctuid fauna of Mt. Fuji, Central Japan. *Memoirs of the National Science Museum, Tokyo* **14**: 133–142.
- PLANTE, J. (1982) Quatre espèces nouvelles de Noctuidae Hadeninae de l'Himalaya. [Lep.]. *Bulletin de la Société Entomologique de France* **87**: 286–292.
- SUGI, S. (1965) Discovery of *Heliophobus texturatus* (Alpheraky) from Japan (Noctuidae). *Tyo to Ga* **16** (1/2): 50–51, 2 figs.
- TYKAC, J. (1940) *Hadena texturata* ab. *Silbernageli*. *Casopis* **40**: 61.
- TYKAC, J. (1943) *Hadena texturata* Alph. ssp. *Silbernageli* (nec. ab.). *Casopis* **37**: 122.
- VOLYNKIN, A. V. (2012) Noctuidae of the Russian Altai (Lepidoptera). *Proceedings of the Tigrék State Natural Reserve*. Vol. 5. Barnaul, 339 pp.

Revised version received December 12, 2014, accepted April 6, 2015, published May 29, 2015