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Revision of the genus *Rhyacia* Hübner [1821] 1816 (Lepidoptera, Noctuidae) Part I: The *Rhyacia junonia* species group with re-description of the subgenus *Standfussrhyacia* Hacker & Varga, 1990 (stat. nov.), with description of new subgenera and new species (plts 32-34)

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Abstract

The taxonomic definition of the genus *Standfussrhyacia* Hacker & Varga, 1990 (type species *Standfussrhyacia chimaera* Hacker & Varga, 1990 by monotypy), is changed. It is considered as subgenus within *Rhyacia* Hübner [1821] 1816 including *S. chimaera* as type species and a group of species being closely related with *Rhyacia junonia* (Staudinger, 1881). This extension is connected with the taxonomical revision of other species groups of the genus. Two new species belonging to the subgenus *Standfussrhyacia* are described from the high mountains of Central Asia: *Rhyacia unicornis* spec. nov. from northwestern China (Boro-Horo Mts.), and *Rh. horroreas* spec. nov. from North Pakistan (Kashmir: W Himalaya, Deosai plains). The genus *Rhyacia* is herewith subdivided into 15 species groups which are merged into 6 subgenera, '*inter alia*' *Standfussrhyacia*. They are defined here by some strong synapomorphies in their genital characters which support their monophyletic origin. Five new subgenera (*Lafontainea, Stenorhyacia, Dichorhyacia, Anchorhyacia, Ororhyacia*) are described. The subgenus *Anchorhyacia* consists of four species groups while others are oligotypic. Synonymy of *Rh. nyctimerides* (Bang-Haas, 1922) with *Rh. psammia* (Püngeler, 1908) is stated and several new combinations are introduced. With 57 figures and 3 photoplates.

Key words: Noctuini, subgenera, species groups, genital characters, "lock and key"

Current title: *Revision of Rhyacia*

Introduction

The genus *Rhyacia* Hübner, [1821] 1816 belongs to a larger monophyletic group of the tribe Noctuini, consisting of *Epipsilia* Hübner, [1821] 1816, *Chersotis* Boisduval, 1840, *Benschirachia* Gyulai, Varga & Ronkay, 2002, *Cyrebia* Guenée, 1852 and, according to Lafontaine (1998), also of *Standfussiana* Boursin, 1946. The genus is mostly characterised by the strongly sclerotised, often specialised clavus, being fused with dorsal margin of the sacculus, the (in some species incomplete) reduction of cucullus and corona. The strongly sclerotised carina, often with specialised "key" structures, and the long, tubular, recurved or coiled vesica, and various corresponding structures of antrum and bursa also can be listed as diagnostic characters. Furthermore, several *Rhyacia* species have shared, probably synapomorphic genital structures with species of genera *Epipsilia* Hübner, [1821] 1816, *Chersotis* Boisduval, 1840 and the recently described *Benschirachia* Gyulai, Varga & Ronkay, 2002, as well. The external appeareance and also the genital structures of the species and species groups are highly characteristic, thus practically all species can be naturally grouped into a number of species groups. Some of these species groups can be characterised by the specialised clavi with spinulose surface structures (see also in *Epipsilia* and some *Chersotis*) and/or by the strongly sclerotised "key" structures of the carina and corresponding "lock" structures of the similarly strongly sclerotised antrum and/or saccate ductus bursae. Species groups of *Rhyacia* are consequently arranged into subgenera, defined by synapomorphies in genital characters of both sexes, supporting their monophyletic origin. These predominantly newly established subgenera will be defined and discussed here with descriptions of new taxa and re-description of the subgenus *Standfussrhyacia* with revised taxonomical status.

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Species groups of *Rhyacia* with descriptions of 5 new subgenera

The genus *Rhyacia* consist of alltogether 38 species of which all but two species are Palaearctic. The exceptions are one Nearctic and one Holarctic species. They can be arranged into 15 species groups. Most of them occur in Western and Central Asiatic mountaineous areas where also all species groups are represented. There are several morphologically isolated *Rhyacia* species with peculiar autapomorphic characters, e.g. the type species of the genus *Rhyacia lucipeta* ([Denis & Schiffermüller], 1775), or the taxonomically isolated and highly polymorphic *Rhyacia helvetina* (Boisduval, 1833). The latter species has an extremely elongate tubular vesica without any significant sclerotisation (subgenus *Lafontainea*, subgen. nov.). Three species, *Rh. ledereri* (Erschoff, 1870). *Rh. quadrangula* (Zetterstedt, 1839) and also the Nearctic *Rh. clemens* (Smith, 1890) have long, tubular vesica without cornuti and they are forming a well-defined monophyletic species group. According to the similar configuration of valve, incl. clavus and harpe, also *Rh. simulans* (Hufnagel, 1766)*, Rh. arenacea* (Hampson, 1907) and *Rh. afghanidia* Boursin, 1968. belong to a further monophyletic group. Here I follow, however, the intention of Lafontaine (1998) and separate only *Rhyacia helvetina* as an own subgenus. All other mentioned species will be considered as *Rhyacia* s. str. with the type species *Rhyacia lucipeta*. There are three further smaller species groups which are described below as oligotypic subgenera based on their autapomorphic characters. Furthermore, some much more diverse species groups will be grouped into two subgenera. One of them will be described here as *Anchorhyacia* subg. n. and the subgenus *Standfussrhyacia* stat. revid. will be re-interpreted and -described.

Subgenus *Lafontainea* subgen. nov.

Type species: *Rhyacia helvetina* (Boisduval, 1833) by monotypy
Noctua helvetina Boisduval, 1833, *Annals de la Societé Entomologique de France* **2**: 376.

Description: Medium large moths with elongate forewing, ochreous-greyish colouration and obsolescent patterns. Surface of wings smooth and shiny. Monotypic subgenus with a mixture of several plesiomorphic and autapomorphic characters, as the moderately sclerotised, thin clavus with long sensory setae, the presence of cucullus and corona, the elongate, falcate harpe, the relatively weakly sclerotised carina on the one hand, and the extremely long, tubular vesica and corresponding appendix bursae on the other.

1.1. *Helvetina*-group: *Rhyacia helvetina* (Boisduval, 1833) is a widespread polytypic species with numerous distinctly coloured subspecies. Their colouration seems to be strongly substrate-dependent, thus the revision of the following infraspecific subdivision will be presented in a forthcoming publication. They are widely dispersed from Morocco and southern Spain, Sierra Nevada (*Rh. helvetina lhassen* (Le Cerf, 1932)) through the Pyrenées (*Rh. helvetina pyrenaica* (Boursin, 1928)), Alps (*Rhyacia helvetina helvetina* (Boisduval, 1833)) and high mountains in Greece (*Rh. helvetina schepleri* Fibiger, 1993) to Asia Minor (*Rh. helvetina banghaasi* Boursin, 1940), northern Caucasus (*Rh. helvetina rjabovi* Boursin, 1940) and Iran, Zaghros Mts. (*Rh. helvetina deliciosa* Brandt, 1938).

Subgenus *Rhyacia* s. str.

Type species: *Rhyacia lucipeta* ([Denis & Schiffermüller], 1775)
Noctua lucipeta [Denis & Schiffermüller], 1775, *Ankündung eines systematischen Werkes von den Schmetterlingen der Wienergegend*, p. 71.

Syn.: Antirhyacia Beck, 1992 – *Atalanta* **22**: 184.
Type species: *Phalaena simulans* Hufnagel, 1766, *Berlinisches Magazin* **3** (3): 396.

Description: Medium large or large moths with dull ochreous-brownish or ochreous-greyish colouration and often obsolescent pattern. Valve elongate-elliptical with reduced cucullus and corona; clavus strongly sclerotised, elongate and falcate or acute and recurved; harpe falcate or acutely conical. Aedeagus slender, carina without special sclerotised structures, vesica long, coiled, often saccate terminally, in *Rh. lucipeta* with a sclerotised medial diverticulum and in the *simulans*-group with subbasal fasciculate cornuti. Female genitalia with only weakly sclerotised antrum, corpus bursae with small, spot-like signa (*simulans*-group) or without signa (*ledereri*-group), and with long, tubular or rugulose appendix bursae. The subgenus consists of three mono- or oligotypic species groups.

2.1. *Lucipeta*-group: *Rhyacia lucipeta* ([Denis & Schiffermüller], 1775).
2.2. *Ledereri*-group: *Rh. ledereri* (Erschoff, 1870); *Rh. quadrangula* (Zetterstedt, 1839); *Rh. clemens* (Smith,

1890).
2.3. *Simulans*-group: *Rh. simulans* (Hufnagel, 1766); *Rh. arenacea* (Hampson, 1907); *Rh. afghanidia* Boursin, 1968.

Subgenus *Stenorhyacia* subgen. nov.

Type species: *Rhyacia electra* (Staudinger, 1888)
Agrotis electra Staudinger, 1888, *Stettiner entomologische Zeitung* **49**: 6.

Description: Medium-sized or small species with slender body and simple brownish-ochreous-greyish colouration. Wings relatively short and broad, rounded. Valve elongate with reduced corona. Clavus strongly sclerotised, short quadrangular with spinulose distal surface. Harpe elongate, straight or slightly S-shaped, acute. Carina strongly sclerotised, acute but without specialised "opener" structures. Vesica moderately long, tubular, recurved, with small submedial diverticulum and more or less sclerotised terminal diverticulum, without cornuti. Ductus bursae moderately sclerotised, rugulose; appendix bursae slightly recurved, corpus bursae without signa.

3. *Electra*-group: *Rh. electra* (Staudinger, 1888); *Rh. caradrinoides* (Staudinger, 1896).

Subgenus: *Dichorhyacia* subgen. nov.

Type species: *Rhyacia ignobilis* (Staudinger, 1888)
Agrotis ignobilis Staudinger, 1888, *Stettiner entomologische Zeitung* **49**: 7.

Description: Medium-sized or large moths with concolorous brownish or ochreous colouration and faint pattern. Surface of wings smooth and shiny. Wings broad and rounded. Valve broad, spatulate distally, cucullus and corona completely reduced. Clavus reduced, harpe strongly sclerotised, thick, pointed. Aedeagus with strong lateral processus ("dichotomic"), vesica tubular, coiled and completely recurved. In females the proximal margin of the 8. segment with bilateral conical incisions. Ductus bursae short, rugulose and strongly saccate. Appendix bursae and corpus bursae short, globular, without signa.

4. *Ignobilis*-group: *Rh. ignobilis* (Staudinger, 1888); *Rh. fabiani* Varga, 1996.

Subgenus *Anchorhyacia* subgen. nov.

Type species: *Rhyacia psammia* (Püngeler, 1906)
Agrotis psammia Püngeler, 1906, *Deutsche entomologische Zeitschrift Iris* **19**: 88.

Description: Medium-sized or large moths (5.1.), with exception of two small sister species (5.2.). Antennae finely pectinated and ciliated in males, filiform in females. Colouration usually dull ochreous-brownish-greyish, highly substrate-dependent (especially in the widely distributed *Rh. psammia*), without any colourful patterns. Surface of wings smooth and shiny. In the male genitalia, uncus strong, falcate and acute; valve elongate, often with angulate costal extension and with more or less incompletely reduced cucullus and corona. Clavus conical or tubercle-like, often covered by spines; harpe strongly sclerotised, often falcate and acute. Juxta shield-shaped or triangular, often with sclerotised, acute dorsal extension. Aedeagus long, straight or slightly arcuate, often with a spinulose medial extension, correlated with the medial extension of the juxta. Carina usually strongly sclerotised with anchor- or horn-shaped extension, vesica recurved with a subbasal and medial diverticulum. Subbasal diverticulum often bifurcate, sclerotised and covered with small spines, the medial one often with a bulbed cornutus. Female genitalia with rugulose structures of antrum, and pouched and rugulose ductus bursae, appendix bursae recurved, corpus bursae globular without signa.

5.1. *Psammia*-group: *Rh. psammia* (Püngeler, 1906) = *Rh. nyctymerides* (Bang-Haas, 1922), **syn. nov.** with several subspecies from W to E: (*Rh. psammia stavroitiacus* Touleshkoff, 1951, **comb. nov.**; *Rh. psammia alagesica* Boursin, 1962, **comb. nov.**; *R. psammia rehnensis* (F. Wagner, 1937), **comb. nov.**; *Rh. psammia roseoflava* (Corti, 1933), **comb. nov.**; *Rh. psammia nyctymerides* (Bang-Haas, 1922), **comb. nov.**; *Rh. psammia* ssp. ex Pakistan); *Rhyacia nyctymerina* (Staudinger, 1888); *Rh. evartianae* Varga, 1990; *Rh. oxytheca* Boursin, 1957; *Rh. gabori* Varga, 1996; *Rh. subdecora* (Staudinger, 1887); *Rh. scythropa* Boursin, 1961.
5.2. *Diplogramma*-group: *Rhyacia diplogramma* (Hampson, 1903), *Rh. oromys* Varga, 1990.
5.3. *Similis*-group: *Rhyacia similis* (Staudinger, 1888), = *Agrotis decorata* Staudinger, 1881; homonym with *Agrotis decorata* Butler, 1879, **syn. nova, stat. revid**.

Subgenus: *Ororhyacia* subgen. nov.

Type species: *Rhyacia hampsoni* (Bang-Haas, 1910)
Agrotis (*Epipsilia*) *hampsoni* Bang-Haas, 1910, *Deutsche entomologische Zeitschrift Iris* **24**: 34.

Description: Smaller moths (wingspan 29–33 mm) with narrow wings, dusky fuscous colouration and obsolescent pattern. Valve elongate elliptic with fully reduced cucullus and corona. Clavus conical, harpe thick, acute or slightly falcate. Carina strongly sclerotised with spine-like, acute extension, vesica recurved with slightly sclerotised, pouch-like medial diverticulum, without cornuti. Female genitalia not studied. Both species are strictly localised and typical for rather high altitudes.
6. *Hampsoni*-group: *Rh. hampsoni* (Bang-Haas, 1910); ? *Rh. tenera* (Hampson, 1911), stat. provis.

Subgenus: *Standfussrhyacia* Hacker & Varga, 1990 **(stat. revid.)**

Type species: *Rhyacia chimaera* Hacker & Varga, 1990 by monotypy.
Standfussrhyacia chimaera Hacker & Varga, 1990, *Esperiana* **1**: 288

Standfussrhyacia Hacker & Varga, 1990 (*Esperiana* **1**: 288) was established for the single species *Standfussrhyacia chimaera* having rather peculiar male genital characters, superficially resembling on some structures of *Standfussiana* species. The relatively thin, digitiform clavus can be considered as synplesiomorphy, and the triangular costal extension of the valve as an autapomorphic modification showing some superficial similarity to the costal extension of some *Rhyacia* species, e.g. members of the *Rh. psammia* group, only (Lafontaine 1998). Several other characters of external appeareance and of the male genitalia demonstrate the close relationship of this species with a larger species group of the genus, characterised by the extremely strongly sclerotised acute, often bifide extension of the carina in males and corresponding structures of the strongly sclerotised antrum and ductus bursae in the females. Thus, *Standfussrhyacia* is downgraded here as subgenus of *Rhyacia*.

Redescription and diagnosis of the subgenus *Standfussrhyacia* stat. revid.

Medium large or large moths with apically elongated forewings with characteristic mixture of ochreous, reddish and bluish colouration and often colourful patterns. Male antennae finely pectinated. Frons bulged but smooth. Body without tufts of hairs. Abdomen relatively long and slender. Male genitalia strongly sclerotised, valve elongate with reduced cucullus. Clavus conical or exceptionally thin, plesiomorphic (*Rh. (S.) chimaera*), in a very peculiar species fused with the juxta (*Rh. (S.) horroreas* sp. n.), harpe onion-shaped or digitiform. Aedeagus with extremely strongly sclerotised carina with simple or bifid horn-shaped extensions, vesica projected dorso-laterally, upturned ventrally with a small, often sclerotised submedial diverticulum and several fine, acute cornuti. Female genitalia with strongly sclerotised antrum with bilobate ostium, ductus strongly sclerotised, pouched or saccate, corpus bursae semiglobular with four small elliptic signa, appendix bursae short, elliptic.

The most important differential characters against other subgenera and species groups are the very specific, co-evolved “design” of carina and antrum. Most species are confined to Central Asia and they are typical for high altitudes and mostly rare, represented in the collections by few specimens (with the exception of *Rh. (S.) junonia*).

7.1. *Chimaera*-group: *Rh. (S.) chimaera* (Hacker & Varga, 1990), type species, **comb. nov., stat. revid.**
7.2. *Mirabilis*-group: *Rh. (S.) mirabilis* Boursin, 1954 (incl. *Rh. (S.) mirabilis nepalensis* Boursin, 1954); *Rh. (S.) admiranda* Gyulai & Ronkay, 2001.
7.3. *Junonia*-group: *Rh. (S.) junonia* (Staudinger, 1881) (incl. *Rh. (S.) junonia alaina* (Staudinger, 1888); *Rh. (S.) junonia alexandra* Corti & Draudt, 1933; *Rh. (S.) junonia calamochroa* Varga, 1973); *Rh. (S.) schistochroa* Varga, 1973 (**stat. revid**.); *Rh. (S.) illustris* Hacker & Kautt, 1996 (**stat. revid**.); *Rh. (S.) oreas* (Püngeler, 1904); *Rh. (S.) unicornis* **spec. nov.** (hoc loco); *Rh. (S.) karakoreas* Hacker & Varga, 1990; *Rh. (S.) peksi* Hacker & Varga, 1990; *Rh. (S.) horroreas* **spec. nov.** (hoc loco).

Check list of *Standfussrhyacia* taxa

Rhyacia (*Standfussrhyacia*) *chimaera* (Hacker & Varga, 1990) **stat. revid.**
Standfussrhyacia chimaera Hacker & Varga, 1990, *Esperiana* (Schwanfeld) **1**: 289

Type locality: India, Kashmir, Zogi-la pass, 4000 m.
Figure: Hacker (1990): *Esperiana* **1**: Tafel C 4-5.
Genitalia: Hacker (1990): *Esperiana* **1**: 290, Abb. 34: a-b.

Rhyacia (*Standfussrhyacia*) *mirabilis* Boursin, 1954.
Bonner Zoologische Beiträge **5**: 260.
Type locality: China, Batang.
Figure: Boursin (1954): *Bonner Zoologische Beiträge* **5**: Tafel 4: 20.
Genitalia: Boursin (1954): *Bonner Zoologische Beiträge* **5**: Tafel 12: 64.

Rhyacia (*Standfussrhyacia*) *mirabilis nepalensis* Boursin, 1964.
Veröffentlichungen der Zoologischen Staatssammlung München **8**: 14.
Type locality: Nepal, Mustanghbot.
Figure: Boursin (1964): *Veröffentlichungen der Zoologischen Staatssammlung München* **8**: Tafel 1: 12.
Genitalia: Boursin (1964): *Veröffentlichungen der Zoologischen Staatssammlung München* **8**: Tafel 7: 20.

Rhyacia (*Standfussrhyacia*) *admiranda* Gyulai & Ronkay, 2001.
Esperiana (Schwanfeld) **8**: 678.
Type locality: China, Prov. Qinghai, Anemaqin Mts., Haka Mts.
Figure: Gyulai & Ronkay (2001): *Esperiana* (Schwanfeld) **8**: 893, 895; Plate 32: 20-21, Plate 33:1.
Genitalia: Gyulai & Ronkay (2001): *Esperiana* (Schwanfeld) **8**: 679; Figs 28-31.

Rhyacia (*Standfussrhyacia*) *junonia* (Staudinger, 1881).
Agrotis junonia Staudinger, 1881, *Stettiner entomologische Zeitung* **42**: 415.
Type locality: “Saisan” [Tarbagataj Mts.]
Figure: Bang-Haas, O. (1922): *Iris,* (Dresden) **36**: T. 9, Abb. 1.
Genitalia: Varga (1973): *Mitteilungen der Münchner Entomologischen Gesellschaft* **63**: 204, Abb. 8. a-b.

Rhyacia (*Standfussrhyacia*) *junonia alaina* (Staudinger, 1888)
Agrotis alaina Staudinger, 1888, *Stettiner entomologische Zeitung* **49**: 5.
Type locality: [Kirghisia], Alai Mts., Osch.
Figures: Bang-Haas, O. (1922): *Iris,* Dresden, **36**: T. 8, Abb. 13, 14.
Genitalia: Varga (1973): *Mitteilungen der Münchner Entomologischen Gesellschaft* **63**: 205, Abb. 9. a-b.

Rhyacia (*Standfussrhyacia*) *junonia alexandra* Corti & Draudt, 1933
In: Seitz, A. (1933): Vol. **3**. Suppl., p. 67.
Syn.: *Rh. junonia alexandrina* Varga, 1973 (lapsus calami).
Type locality: [Kirghisia], Alexander Mts.
Figure: Corti & Draudt, 1933, In: Seitz, A. (1933): Vol. **3**. Suppl. Taf. 9e.
Genitalia: Varga (1973): *Mitteilungen der Münchner Entomologischen Gesellschaft* **63**: 205, Abb. 10. a-b.

Rhyacia (*Standfussrhyacia*) *junonia calamochroa* Varga, 1973
Mitteilungen der Münchner Entomologischen Gesellschaft **63**: 206.
Type locality: N-Afghanistan, Badakhshan, “Sarakanda”, 4200 m.
Figure: Varga (1973): *Mitteilungen der Münchner Entomologischen Gesellschaft* **63**: Taf. 7.
Genitalia: Varga (1973): *Mitteilungen der Münchner Entomologischen Gesellschaft* **63**: 207, Abb. 11. a-d.

Rhyacia (*Standfussrhyacia*) *schistochroa* Varga, 1973 **stat. revid**.
Rhyacia junonia schistochroa Varga, 1973
Mitteilungen der Münchner Entomologischen Gesellschaft **63**: 208.
Type locality: Mongolia, Uvs aimak, Ulaan Davaa.
Figure: Varga (1973): *Mitteilungen der Münchner Entomologischen Gesellschaft* **63**: Taf. 7.
Genitalia: Varga (1973): *Mitteilungen der Münchner Entomologischen Gesellschaft* **63**: 207, Abb. 12a-b.
Note: Volynkin (1911, Atalanta **42**: 233-236) already constated the validity of *Rh. schistochroa* as own species.
Figures: Volynkin (2011): Atalanta **42**: 233, figs. 13-18.
Genitalia. Volynkin (2011): Atalanta **42**: 236, figs. 2, 4.

Rhyacia (*Standfussrhyacia*) *illustris* Hacker & Kautt, 1996 **stat. revid**.
Rhyacia junonia illustris Hacker & Kautt, 1996, *Esperiana* (Schwanfeld) **4**: 402
Type locality: India, Himachal Pradesh, Spiti valley
Figure: Hacker & Kautt (1996): *Esperiana* (Schwanfeld) **4**: Tafel U: 16.

Genitalia: Hacker & Kautt (1996): *Esperiana* (Schwanfeld) **4**: 403, Fig. 6.

Rhyacia (*Standfussrhyacia*) *oreas* (Püngeler, 1904)
Agrotis oreas Püngeler, 1904, *Societas entomologica* **19**: 1922.
Type locality: [China], Altyn Tagh.
Figure: Corti & Draudt (1933), In: Seitz (1933): Vol. **3**. Suppl. T. 9e.
Genitalia: Boursin (1954): *Bonner Zoologische Beiträge* **5**: Tafel 12:

Rhyacia (*Standfussrhyacia*) *unicornis* **spec. nov.**
description below

Rhyacia (*Standfussrhyacia*) *peksi* Hacker & Varga, 1990
Esperiana (Schwanfeld) **1**: 290.
Type locality: India, Ladakh, Pensi-la pass, 4100 m.
Figure: *Esperiana* (Schwanfeld) **1**: Tafel C 6.
Genitalia: *Esperiana* (Schwanfeld) **1**: 290, Abb. 34: c-d.

Rhyacia (*Standfussrhyacia*) *karakoreas* Hacker & Varga, 1990
Esperiana (Schwanfeld) **1**: 333.
Type locality: Pakistan, Karakoram Mts., Naltar valley, Shani, 4000 m.
Figure: *Esperiana* (Schwanfeld) **1**: Tafel E 13.
Genitalia: *Esperiana* (Schwanfeld) **1**: 333, Abb. 5.

Rhyacia (*Standfussrhyacia*) *horroreas* **spec. nov.**
description below

Description and diagnosis of the new species

***Rhyacia* (*Standfussrhyacia*) *unicornis* spec. nov.**
(Plate 33, fig. 16, gen. figs. 31-34)

Holotype: ♂, "China, Prov. Xinjiang-Uygur, Boro-Horo-Shan, 3000 m, 30. 7. 1996 [60 km SE of Miran city], leg. Nykl, coll. Gyulai.;

Paratypes: 8 ♂♂, from the same locality and data; 1 ♂, China, [Altun Shan, 60 km SW Miran city, 4000 m, 30. 07. – 02. 08. 1996];

Genital slides: VZ7773, RL9800 (males).

Note on the labels of the type series: The type locality, Boro Horo Mts. (44° 06' N, 83° 10' E), W of Urumqi, belongs to the Tien-Shan mountain system. This range is separated from "Altun Shan", near to "Miran city" (39° 15' N, 88° 50' E) by the Takla-Makan desert and Turfan depression. Thus the labelling of the specimens is obviously erroneous.

Description. Length of forewing 17-18 mm, alar expanse 37-39 mm. Head and thorax light grey with some bluish-greenish tint, abdomen with whitish-ochreous colouration. Forewings light grey with ochreous tint and with fine darker granulosity. Maculation indigo black with more or less sharp margins, reniform and orbicular spots rounded, marked with some dark brown scales marginally, claviform short, faint. Postmedian line double, sharply crenulate; sometimes faint. Marginal line marked with indigo black spots. Inner part of cilia brownish-grey, irrorated, outer part slightly chequered. Hind wings whitish grey basally with greyish lunula, faint postdiscal stripe and greyish margin. Female unknown.

Male genitalia: Uncus strong, pointed; valve elongate, obtuse terminally with relatively short clavus and harpe; juxta triangular. Aedeagus with strongly sclerotised carina and having single, huge extension ("*unicornis*").

Diagnosis. The new species is closely related to *Rhyacia oreas* (Püngeler, 1904). It can be externally distinguished by its more rounded shape, more pure greyish colouration and reduced dark patterns of forewings. Cilia of forewings are essentially darker and more chequered. Hind wings are more whitish than in *Rh. oreas* and with more expressed lunule. Legs are brownish-ochreous irrorated, not dark blackish brown and less contrasty ringed. Male genitalia are clearly different by the broader, distally obtuse valve, shorter clavus and harpe, but mostly by the completely different unique extension of carina.

Geographical distribution of *Rhyacia unicornis* and *Rh. oreas*. *Rhyacia unicornis* is probably a strictly localised species of the Tien-Shan system (Boro Horo Mts.), being clearly allopatric from its sister species,

Rhyacia oreas. Latter species was described from the “Altyn Tagh” (recently Altun Shan) which belongs to the Kun Lun mountain system.

Material examined. The type series of *Rh. oreas* consists of the male holotype and 3♂♂ and 2♀♀ paratypes. We also studied some recent material from the following localities: 2 ♂♂ China, Prov. Qinghai, 20 km N of Da Qaidam city, 4000 m, 20. 07. – 23. 07. 2004, leg. Kopp & Nykl; 1 ♂, China, Prov. Xinyiang-Uygur, 110 km S of Waxxari, 4100 m, 26. 07. 1999, leg. S. Nykl.

Genital slides (males): RL3800 (Holotype), 6351 (Hreblay), 2677, 2678 (Gyulai)

***Rhyacia* (*Standfussrhyacia*) *horroreas* spec. nov.**
(Plate 34, Fig. 21, gen. figs. 39-40)

Holotype, ♂: Pakistan, Himalaya Mts., Deosai plains, 3650 m, 16-18. 08. 1998, leg. G. Ronkay and Z. Varga, coll. Z. Varga, deposited in the Zoological Collection of the University of Debrecen;

Genital slide: VZ7412 (male).

Description. Length of forewing 19 mm, alar expanse 38 mm. Antenna filiform, shortly ciliate. Ground colour of the forewing light bluish grey without yellowish or reddish colouration. Discal cell whitish-bluish grey. Maculation bluish-black, postmedian line strongly crenulate, antemedian line faint, subterminal line strongly zigzaged, on the outer margin with a series of whitish-grey spots. Female unknown.

Male genitalia: Uncus obtuse terminally, slightly spatulate. Valve elongate with reduced cucullus and corona but with small, digitiform pseudopollex. Harpe small, digitiform. Clavus huge, bilaterally fused with juxta. Aedeagus long, carina with strongly sclerotised, double acute processi of nearly equal length. Vesica ample with a huge conical subbasal diverticulum, ended in a fine, needle-shaped cornutus.

Diagnosis. The new species belongs to the *Rh. junonia-Rh. oreas*-group. Externally mostly similar to *Rh. oreas*, but the male antennae are more finely and shortly ciliate, the forewing is more acute, with more whitish-bluish ground colour, a large whitish spot near to the anal angle of the forewings and with obsolescent whitish band on the postdiscal part of hind wings. The male genitalia are strikingly different from all other species of this group and shows some unique traits as the clavi are bilaterally fused to the juxta. Terminal part of valve has a short digitus, vesica has a huge subbasal diverticulum bearing a fine, needle-like cornutus.

Re-description of *Rhyacia* species with new status

Rhyacia schistochroa Varga, 1973 **stat. revid.**

Rhyacia junonia schistochroa was originally described as the mostly differentiated subspecies of *Rh. junonia.* It was compared with *Rh. junonia junonia, Rh. junonia alaina, Rh. junonia alexandra* and *Rh. junonia calamochroa*, and separated from them by its smaller size, more dull greyish colouration and smaller, obtuse ventral extension of carina.

The most important differential characters are as follows. Male genitalia: Uncus basally broader, slightly spatulate. Juxta with a strong dorsal extension. Vesica projected dorso-laterally (not ventro-laterally as in *Rh. junonia*). Female genitalia: Quadrangular incision of the antrum is deeper and more regular than in the different subspecies of *Rh. junonia*, ductus bursa with a single, relatively small sclerotised pouch (*Rh. junonia* has bilateral pouches, see figs. 51-52, 54-57).

These traits clearly demonstrate the taxonomic distinctness of this endemic species of the tundro-steppic habitats of the Altai mountain system from the much more widely distributed *Rh. junonia*.

Practically the same differential characters have been desribed and illustrated by Volynkin (2011, Atalanta **42**: 233-236). He also shows the parapatric distribution of these also ecologically differentiated sister species in the Altai Mts.

Rhyacia illustris Hacker & Kautt, 1996 **stat. revid.**

Rhyacia junonia illustris was originally compared with *Rh. junonia calamochroa* and mostly characterised by its larger size, more greyish ground colour and faint markings. Recent survey of male genitalia has shown

that both the carina and vesica show several recognisable differences against all known subspecies of *Rh. junonia* and further related species, as well.

The most important differential characters of *Rh. illustris* are as follows. Male genitalia: Both sclerotised extensions of carina are directed ventro-laterally. The longer extension is weakly sclerotised, relatively thin and nearly perpendicular to the axis of the aedeagus. The shorter extension is more strongly sclerotised, short, obtuse. Vesica projected dorsally and simply recurved.

This local species of Ladakh (Spiti valley) is also geographically completely isolated from the southernmost occurrences of *Rh. junonia* in NE Afghanistan and W China

Acknowledgements

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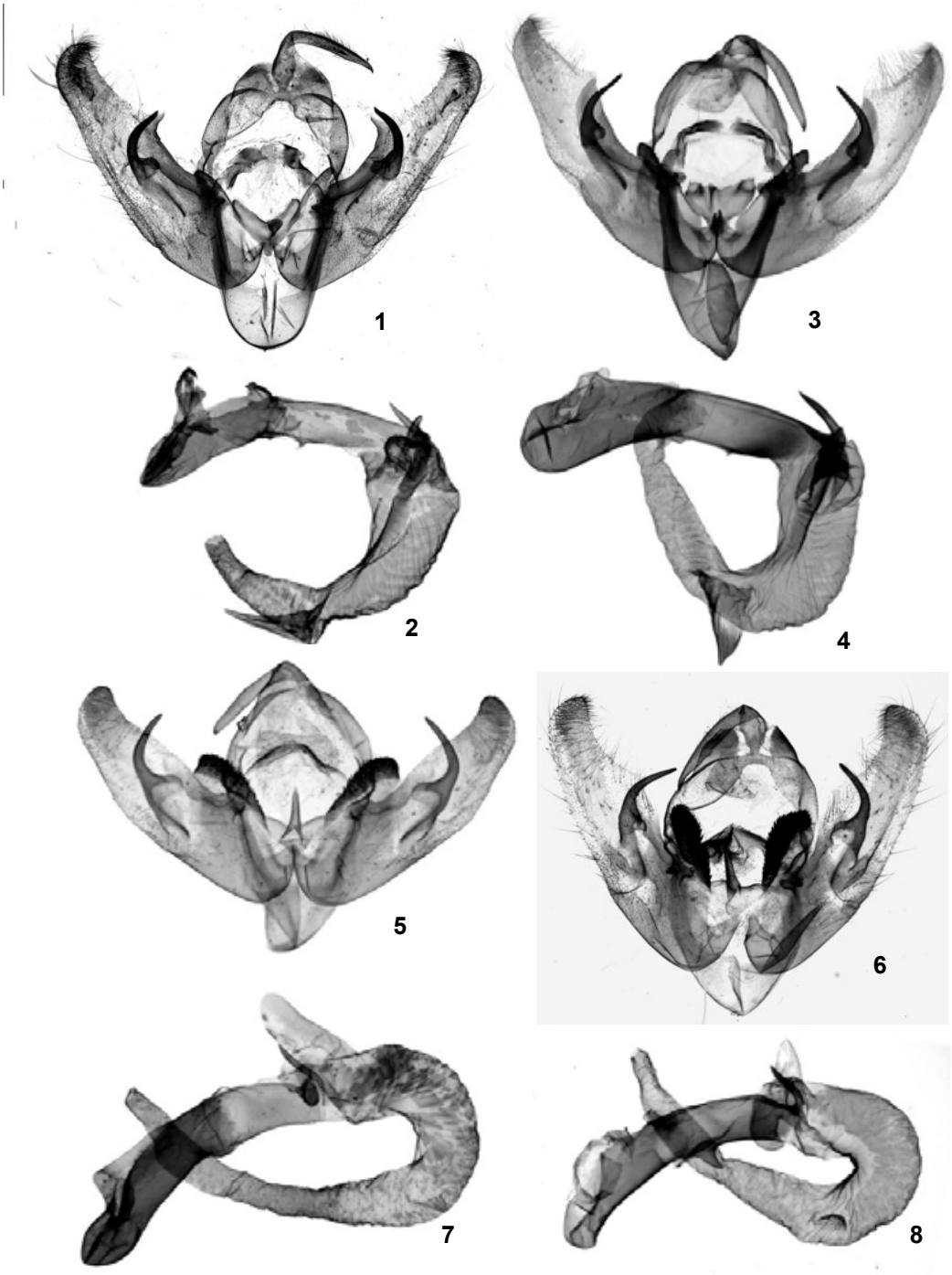
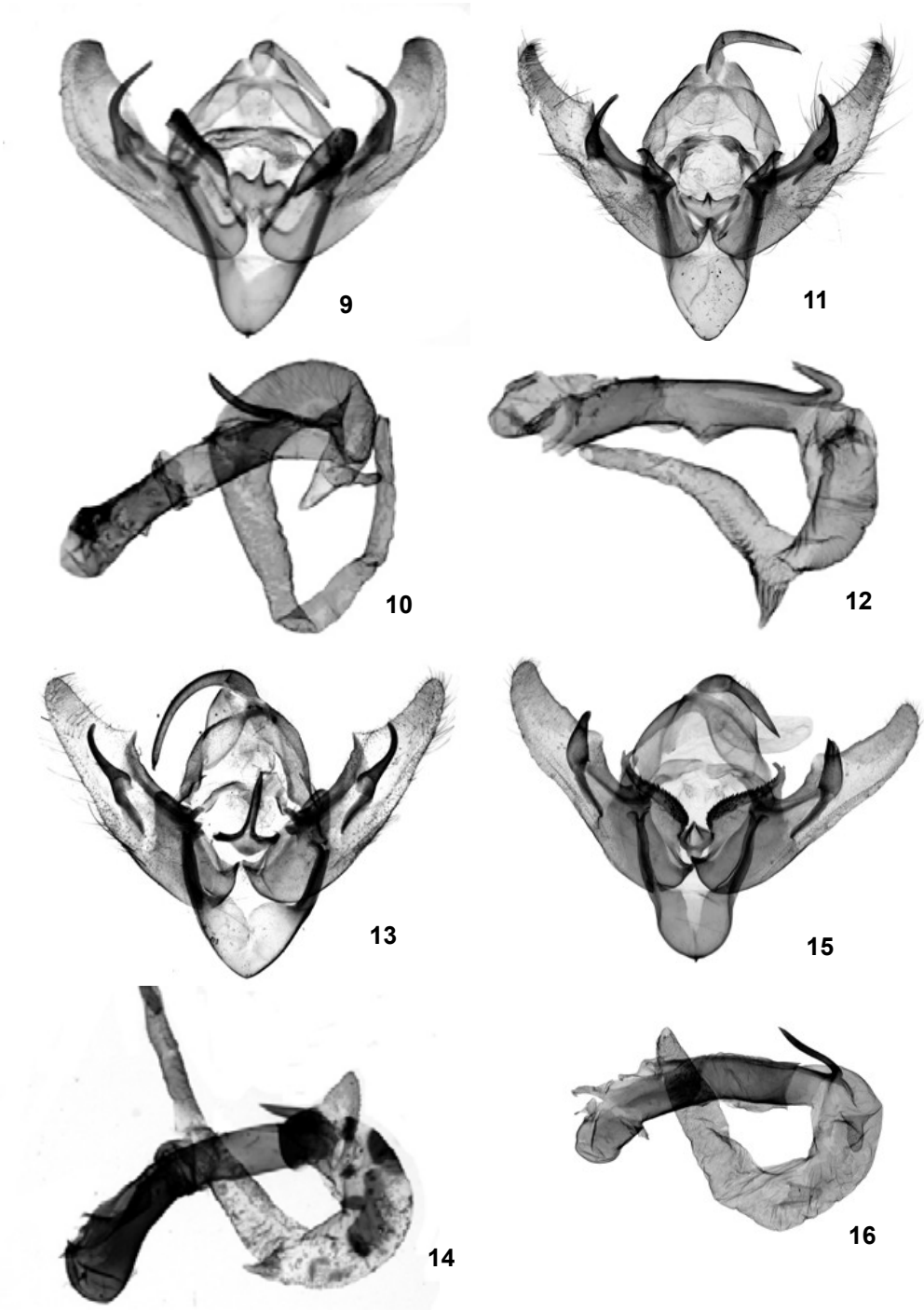
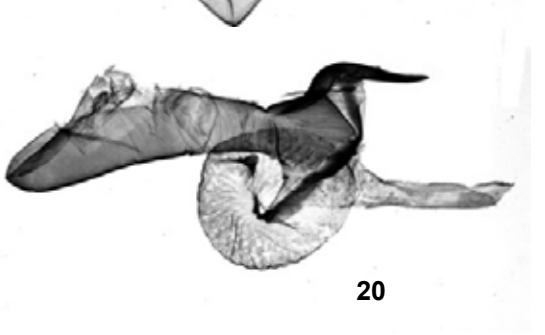
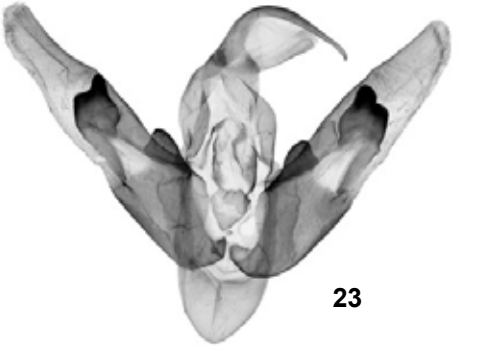


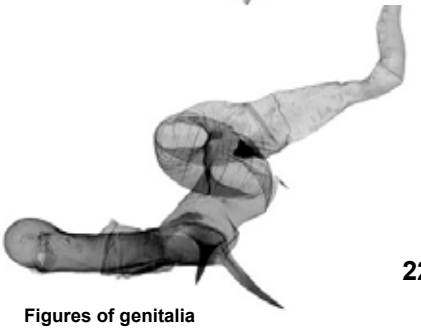
Figures of genitalia
Male genitalia, subg. *Anchorhyacia* species
Fig. 1-2 *Rhyacia nyctymerina* (Staudinger, 1888) genital capsula and aedeagus with everted vesica
Fig. 3-4 *Rh. psammia* (Püngeler, 1906) genital capsula and aedeagus with everted vesica
Fig. 5-6 *Rh. evartianae* Varga, 1990 genital capsula and aedeagus with everted vesica
Fig. 7-8 *Rh. oxytheca* Boursin, 1957 genital capsula and aedeagus with everted vesica

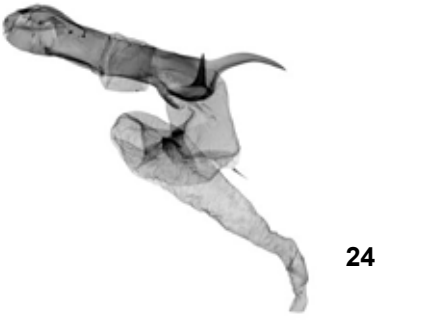


Figures of genitalia
Male genitalia, subg. *Anchorhyacia* species
Fig. 9-10 *Rh. gabori* VARGA, 1996 genital capsula and aedeagus with everted vesica
Fig. 11-12 *Rh. subdecora* (STAUDINGER, 1887) genital capsula and aedeagus with everted vesica
Fig. 13-14 *Rh. scythropa* BOURSIN, 1961 genital capsula and aedeagus with everted vesica
Fig. 15-16 *Rh. oromys* VARGA, 1990 genital capsula and aedeagus with everted vesica









Figures of genitalia
Male genitalia, subg. *Anchorhyacia* species
Fig. 17-18 *Rh. diplogramma* (HAMPSON, 1903) genital capsula and aedeagus with everted vesica
Fig. 19-20 *Rh. similis* (Staudinger genital capsula and aedeagus with everted vesica

Male genitalia, subg. *Standfussrhyacia* species
Fig. 21-22 *Rh. junonia alaina* (STAUDINGER, 1888), genital capsula and aedeagus with everted vesica
Fig. 23-24 *Rh. junonia calamochroa* VARGA 1973, genital capsula and aedeagus with everted vesica

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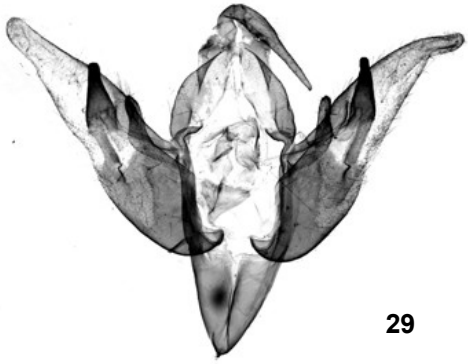

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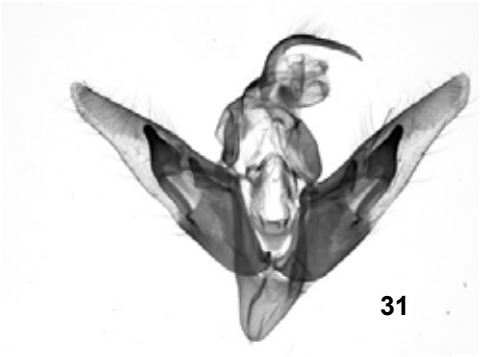

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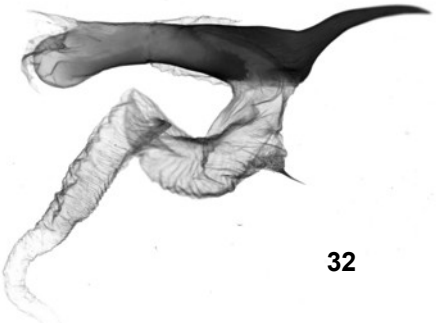

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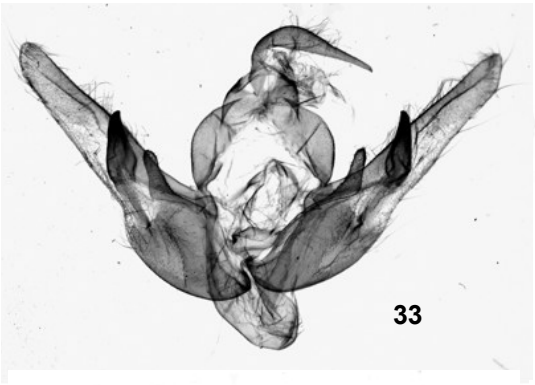
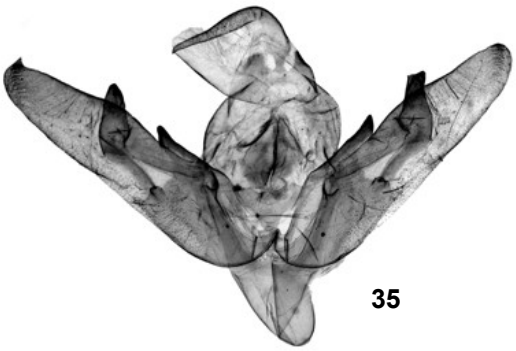
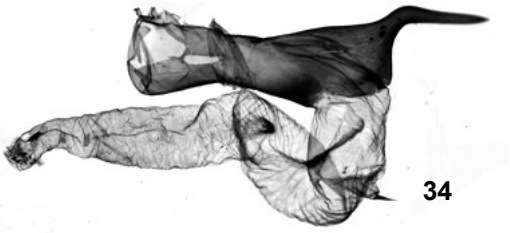
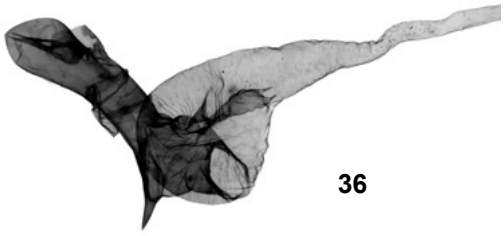
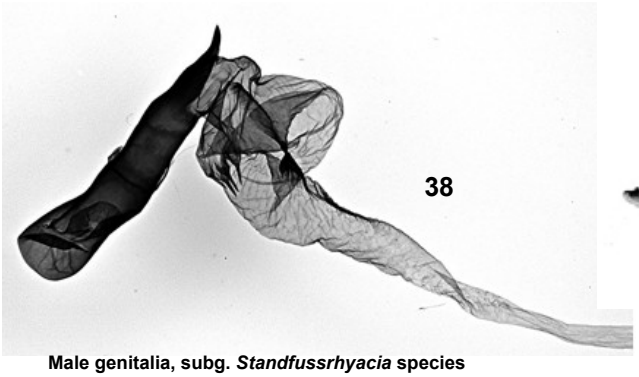
Male genitalia, subg. *Standfussrhyacia* species
Fig. 25-26 *Rh. schistochroa* Varga 1973, genital capsula and aedeagus with everted vesica
Fig. 27-28 *Rh. illustris* Hacker &Kautt, 1996, genital capsula and aedeagus with everted vesica
Fig. 29-30 *Rh. oreas* (Püngeler, 1904), genital capsula and aedeagus with everted vesica
Fig. 31-32 *Rh. unicornis* Varga, sp. n., genital capsula and aedeagus with everted vesica

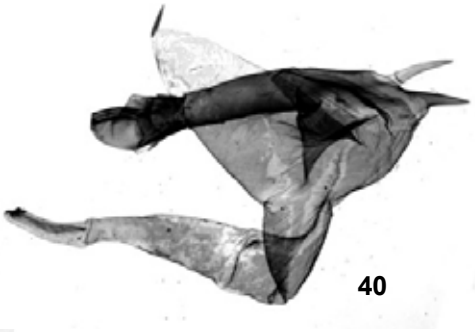




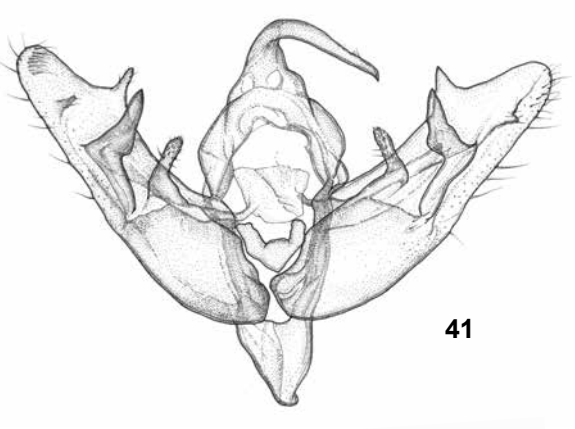


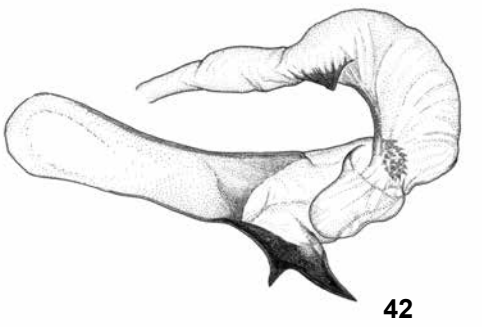


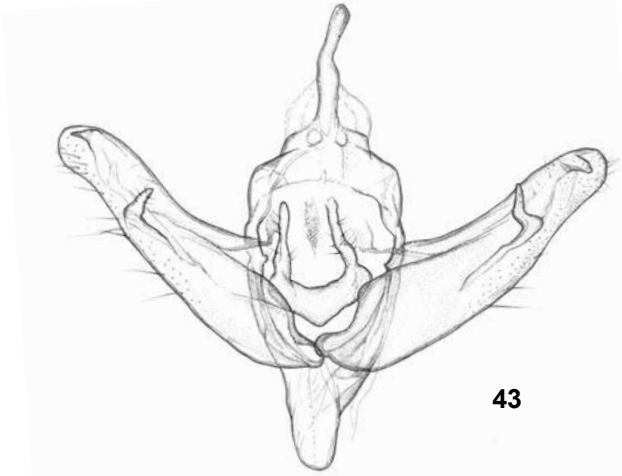


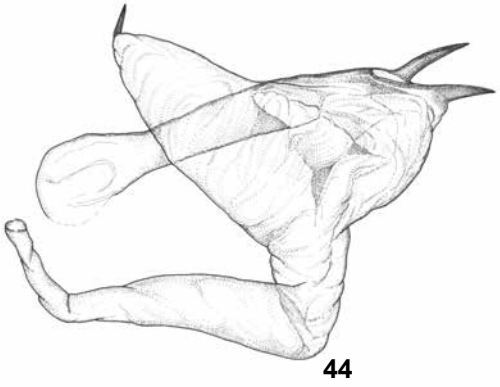


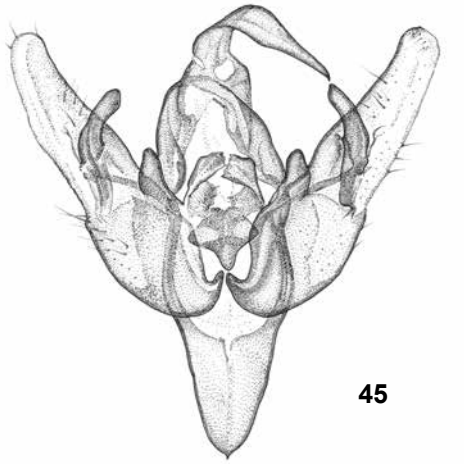
Male genitalia, subg. *Standfussrhyacia* species
Fig. 33-34 *Rh. unicornis* VARGA, sp. n., genital capsula and aedeagus with everted vesica
Fig. 35-36 *Rh. peksi* HACKER & VARGA, 1990, genital capsula and aedeagus with everted vesica
Fig. 37-38 *Rh. karakoreas* HACKER & VARGA, 1990, genital capsula and aedeagus with everted vesica
Fig. 39-40 *Rh. horroreas* VARGA, sp. n. genital capsula and aedeagus with everted vesica

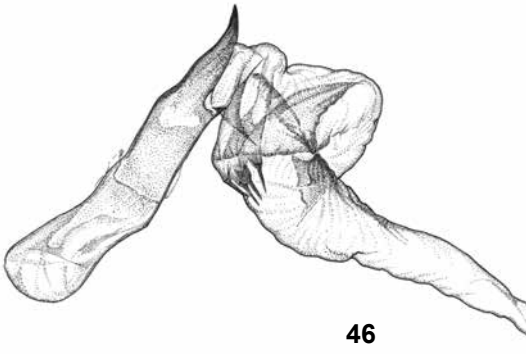




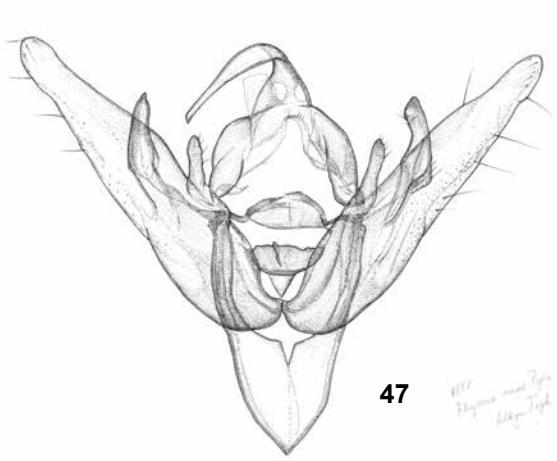


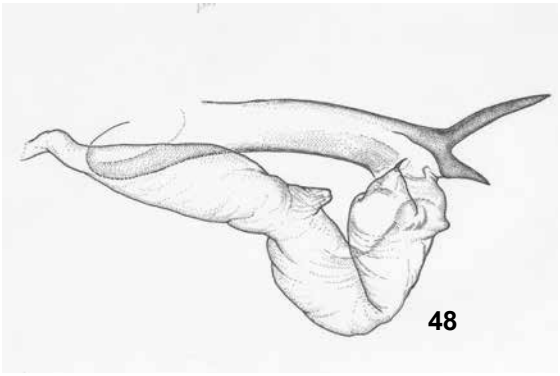


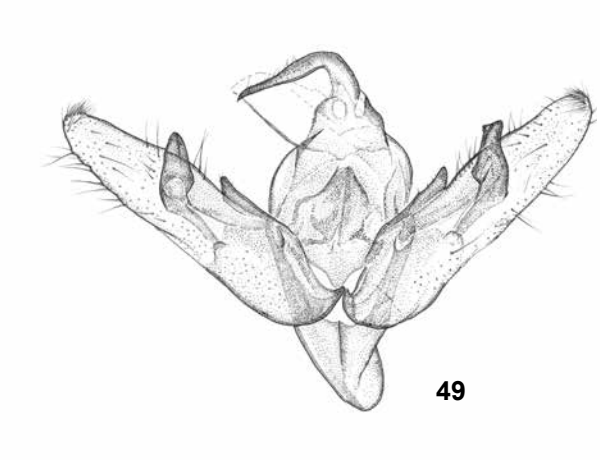


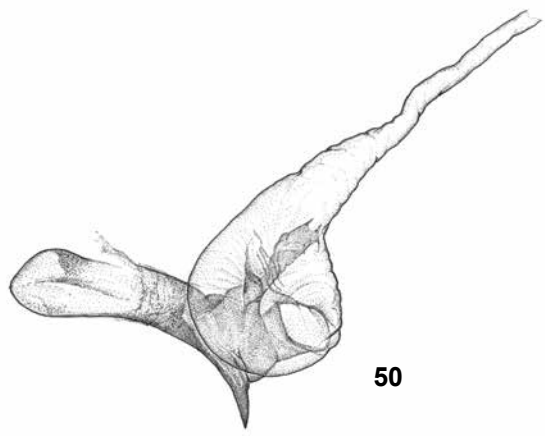


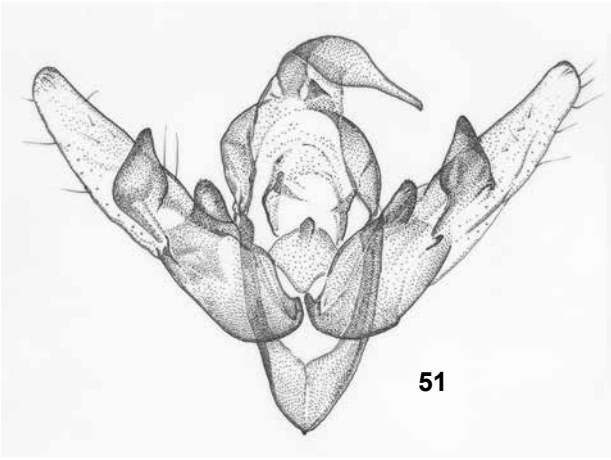
Male genitalia, subg. *Standfussrhyacia* species
Fig. 41-42 *Rh.* (*Standfussrhyacia*) *chimaera* (HACKER & VARGA, 1990), genital capsula and aedeagus with everted vesica
Fig. 43-44 *Rh.* (*Standfussrhyacia*) *horroreas* **spec. nov.**, genital capsula and aedeagus with everted vesica
Fig. 45-46 *Rh. Standfussrhyacia*) *karakoreas* HACKER & VARGA, 1990, genital capsula and aedeagus with everted vesica

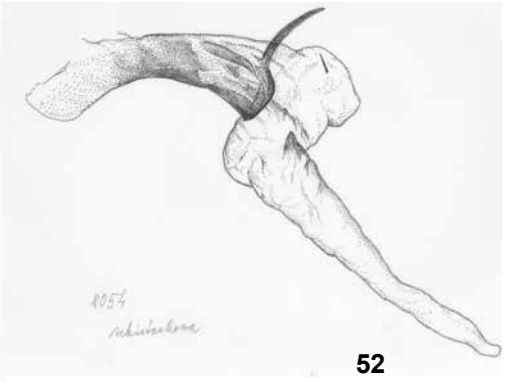




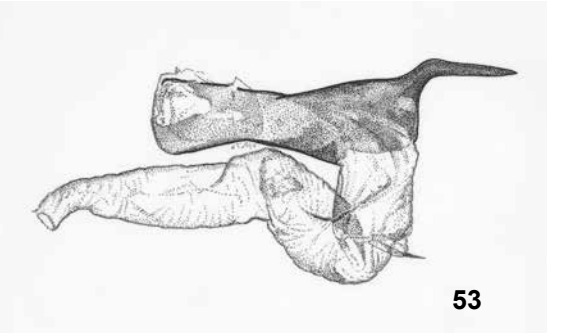


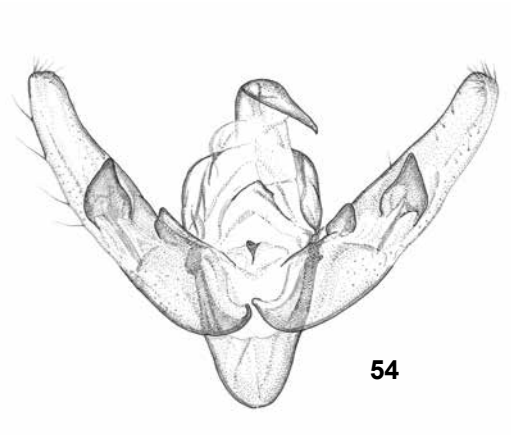


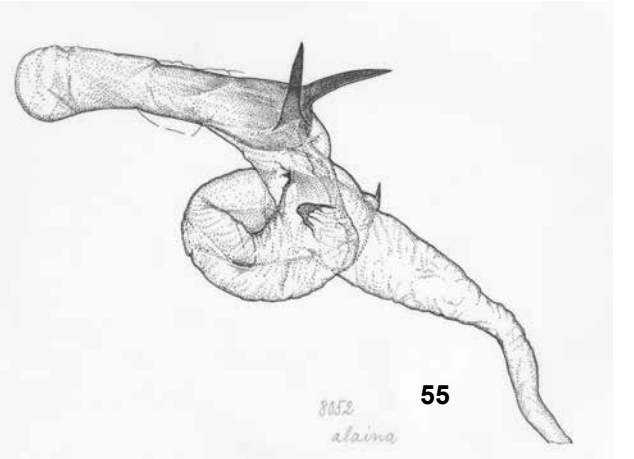


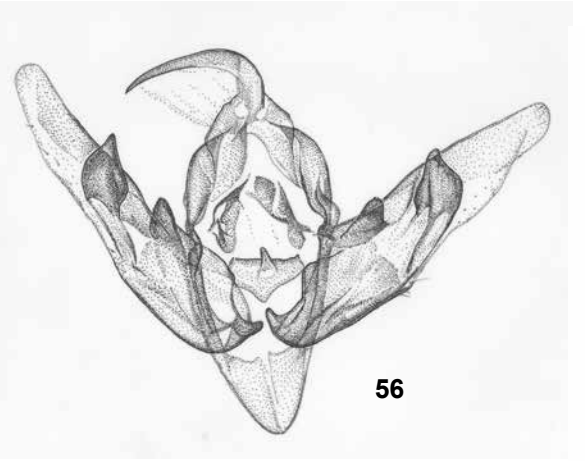


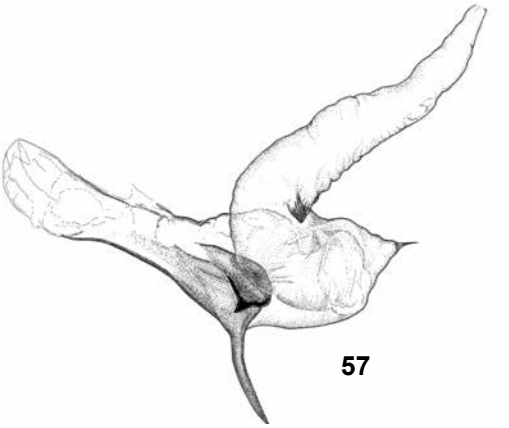
Male genitalia, subg. *Standfussrhyacia* species
Fig. 47-48 *Rh.* (*Standfussrhyacia*) *oreas* (Püngeler, 1904), genital capsula and aedeagus with everted vesica
Fig. 49-50 *Rh.* (*Standfussrhyacia*) *peksi* Hacker & Varga, 1990, genital capsula and aedeagus with everted vesica
Fig. 51-52 *Rh. Standfussrhyacia*) *schistochroa* Varga, 1973, genital capsula and aedeagus with everted vesica











Male genitalia, subg. *Standfussrhyacia* species
Fig. 53 *Rh.* (*Standfussrhyacia*) *unicornis* **spec. nov.**, genital capsula and aedeagus with everted vesica
Fig. 54-55 *Rh.* (*Standfussrhyacia*) *junonia alaina* (Staudinger, 1888), genital capsula and aedeagus with everted vesica
Fig. 56-57 *Rh. Standfussrhyacia*) *junonia calamochroa* Varga, 1973, genital capsula and aedeagus with everted vesica