

New Noctuidae species from Asia (Lepidoptera)

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Abstract – Description of *Isochlora hoferi* sp. n. (Tadjikistan, Hissar Mts), *Metopodicha leily* sp. n. (Iran, Eastern Alborz), *Amphipyra micra* sp. n. (Iran, Zagros Mts) and *Hadula* (*Cardiostrea*) *halophila* sp. n. (Iran, Nemek lake) are given. With 21 figures.

Key words – Noctuidae, new species, *Isochlora*, *Metopodicha*, *Amphipyra*, *Hadula*, Asia.

INTRODUCTION

Since the last years of the 20th century, the exploration of the Iranian Noctuidae fauna has become remarkably more intensive, due to several new international projects and numerous expeditions led to different areas of this vast country. Hungarian entomologists took a considerable part in this process, their expeditions provided vast material the treatment of which resulted in a number of newly discovered and described species (BENEDEK & RONKAY 2001a, b, GYULAI 2002, VARGA *et al.* 2002; GYULAI *et al.* 2002, RONKAY 2002, VARGA & GYULAI 2002, 2006, GYULAI & RONKAY 2006a, RONKAY & GYULAI 1997). The present paper is the continuation of this work, containing descriptions of three new species from Iran and, as an addition to the latest synopsis of the genus *Isochlora* STAUDINGER, 1899 (GYULAI & RONKAY 2006b), description of another new *Isochlora* species, *I. hoferi* is also given below. These new records represent further additions for a comprehensive checklist of the Iranian Noctuidae fauna, together with the fundamental works of BRANDT (1938, 1941), HACKER (1990), HACKER & MEINEKE (2001), FIBIGER (2001), EBERT & HACKER (2002), etc.

DESCRIPTIONS OF THE NEW SPECIES

***Isochlora hoferi* sp. n.**

(Figs 1, 8)

Type material – Holotype: female, Tadjikistan, Hissar Mts, Karatag R., Angisht Pass, 3000–3490 m, 25–30. 07. 2003; leg. W. PEREPECHAENKO, slide No. 2071 GYULAI; coll. P. GYULAI (deposited in the Hungarian Natural History Museum Budapest = HNHM).

Taxonomy – The species content of the genus has been remarkably increased in the last fifteen years, due to the recent, intensive exploration of the fauna of the Inner Asian high mountains and the Tibetan plateau (GYULAI & RONKAY 2001, 2006b, HREBLAY *et al.* 1998, RONKAY & GYULAI 1997, 2006, etc.). The actual checklist of the genus counts more than 25 species and subspecies, but the future collectings will presumably lead to the discovery of several further taxa; some of them, like the species under discussion, may represent still unknown phyletic lineages within this complex and from a taxonomic point of view rather difficult genus.

Diagnosis – No similar *Isochlora* species is known; the black banded milky white wings are unique within this genus. The configuration of the female genitalia of the new species resembles mostly *I. metaleuca* RONKAY *et* GYULAI, 1997 but the appendix bursae of the new species is more elongated, the corpus bursae is not ovoid but saccate, the ratio of length of the apophyses anteriores and posteriores is different in the two species, as well as the shape of the ostium bursae and ductus bursae.

Description – Female (Fig. 1). Wingspan 27.5 mm (apex of right fore wing incomplete, broken), length of fore wing 15.0 mm. Pubescence of head and thorax dark brown to black; palpi greyish-ochreous, with long, sparse black hairs. Eyes almond-shaped, dark brown; antennae fine, more or less filiform, upper side dark brown with whitish scales, ventral side more reddish-brown. Legs brown, tibiae with long, bushy black hairs. Fore wings and hind wings milky white with very conspicuous black markings: inner area, broad median stripe and marginal field almost entirely black, with a few whitish-grey scales mainly in marginal area; terminal line also black. Other elements of wing pattern absent, although reniform stigma and discal spot of hind wing somewhat darker than black median stripe. Cilia also blackish but somewhat lighter than marginal area, having fine silky sheen. Underside of wings similar to upperside but generally lighter, almost entirely milky white with some ochreous shade and pale brown suffusion in basal and marginal fields. Shadows of stigmata and medial stripes conspicuous, practically same as on upperside but more intensive on hind wing; cilia as on upperside. Male unknown.

Female genitalia (Fig. 8): Ovipositor strong, elongated-conical, heavily sclerotized. Papillae anales scarcely setose, apophyses posteriores long, apophyses anteriores less than half long as apophyses posteriores. Lamina postvaginalis rather calyculate; ostium bursae

more or less trapezoidal, membranous. Ductus bursae medium long, narrowly tubular, with fine longitudinal wrinkles, finely twisted proximally. Appendix bursae narrow, rather finger-like, corpus bursae sacculiform, membranous, without signa.

Habitat and vegetation – The new species is a strange member of the genus, being adapted to the more continental climate of the Hissar range. The unique specimen was collected at a strongly continental, Central Asian high mountain pass above 3000 m.

Etymology – The new species is dedicated to Mr. FRANZ HOFER, the renowned Austrian lepidopterist, collector of the Palaearctic Noctuids.

***Amphipyra micra* sp. n.**
(Figs 2, 9–11)

Type material – Holotype: Male, Iran, Prov. Esfahan, Zagros Mts, Fereidun Shar, 2700–3000 m, N32°55,262', E50°06,643'; 10–12. VII. 2006, leg. T. HÁČZ; slide No. 2063 GYULAI, coll. P. GYULAI (deposited in the HNHM). Paratypes: 5 males, with the same data; 1 male, Prov. Mazandaran, Elburz Mts, 10 km W of Balade, 36°13'N, 51°36'E, 2400 m, July 2006; 1 female, Iran, Prov. Fars, Zagros Mts, Küh-e Barm Firus, between Yazd and Ardakan, 2500–3000 m, 4–6. VII. 2000, leg. B. BENEDEK; coll. P. GYULAI. Slide Nos 2044 GYULAI (male), 1495 GYULAI (female).

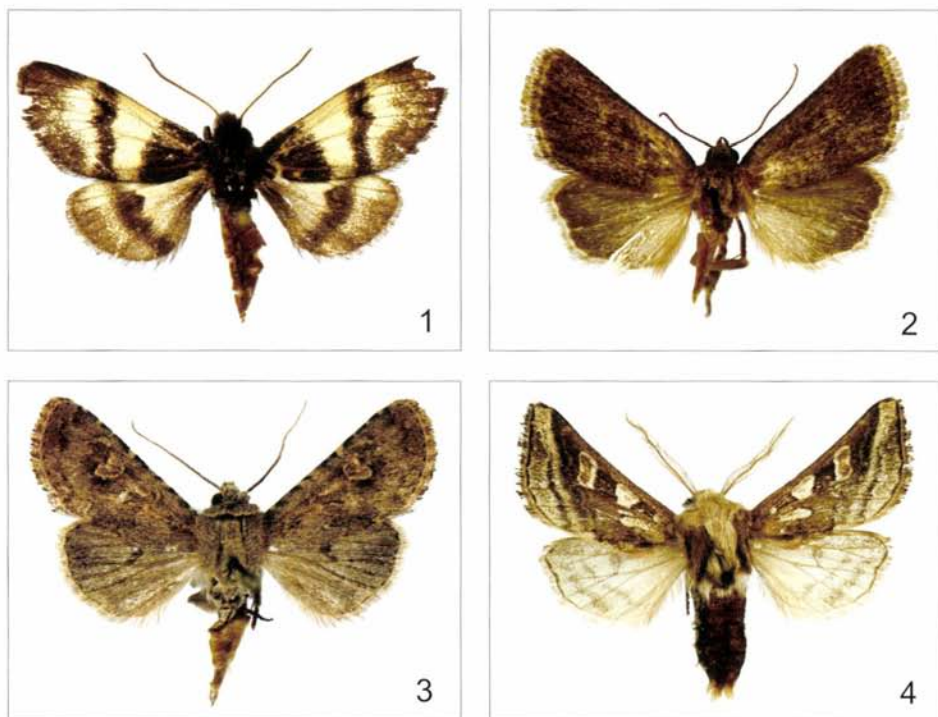
Diagnosis – This is the smallest species of the genus. As for the external features, the new species resembles only the smaller, pale forms of the recently named *A. tetra pallida* STAUDINGER, 1901 but is significantly smaller (about half as large as *A. tetra pallida*), having slenderer and unusually slim body, paler, more silky fore wings with well-visible ochreous stripe at base of the cilia (as in *A. stix* HERRICH-SCHÄFFER, 1850).

In the male copulatory organ, the valva of the new species is more elongated than in *A. tetra pallida*, the distal third of aedeagus densely covered with fine spicules, and the vesica is narrower, more cylindrical. Comparing the female genitalia, the new taxon differs considerably from *A. tetra pallida* by its sinuous, not equally long and thick apophyses anteriores and posteriores, less spacious and relatively long ductus bursae, bulbous and not globular appendix bursae; in addition, the shape of corpus bursae is also somewhat different in the two related taxa.

Description – Wingspan 20.0–26.0 mm, length of fore wing 11.2–12.5 mm. Male (Fig. 2). Pubescence of head, palpi and thorax brownish-fawn coloured with silky shining; frons, ventral side of palpi and abdomen somewhat lighter. Eyes large, globular; antennae brown, more or less filiform, densely ciliate. Fore wing pale, unicolorous greyish-brown

with silky sheen, all elements of noctuid maculation deleted; cilia paler, with narrow yellowish inner line. Hind wing slightly lighter than fore wing except its dark, diffuse marginal field; cilia dark grey with paler inner stripe. Underside of wings very shiny, without any markings, only a few scattered brown scales can be seen, especially at fore wing apex and costal margin of hind wing; hind wing essentially lighter than fore wing. Cilia as on upperside but lighter, that of hind wing almost white, rather concolorous. Female. As male but bigger, antennae thinner filiform, not ciliate.

Male genitalia (Figs 9–11): Uncus robust, lanceolate, densely setose along margins; with apex rounded. Tegumen broad, relatively low; sclerites between tegumen and vinculum large, broadly lunulate; vinculum short, U-shaped. Valva rather simple, sclerotized, setose; more or less foot-shaped: asymmetrically extended proximo-ventrally, tapering distally, dorsal edge almost straight, ventrally arcuated; without process. Sacculus narrow, relatively long; cucullus more or less triangular with apex widely rounded, its ventral surface setose. Aedeagus narrowly tubular, sclerotised, its distal third covered with fields of spicules; carina somewhat more sclerotized. Vesica simple, tubular, everted forward, membranous, basal part inflated, without diverticula or spines.



Figs 1–4. 1 = *Isochlora hoferi* sp. n., holotype female, 2 = *Amphipyra micra* sp. n., holotype male, 3 = *Hadula (Cardiastrea) halophila* sp. n. holotype male, 4 = *Metopodicha leily* sp. n., paratype male

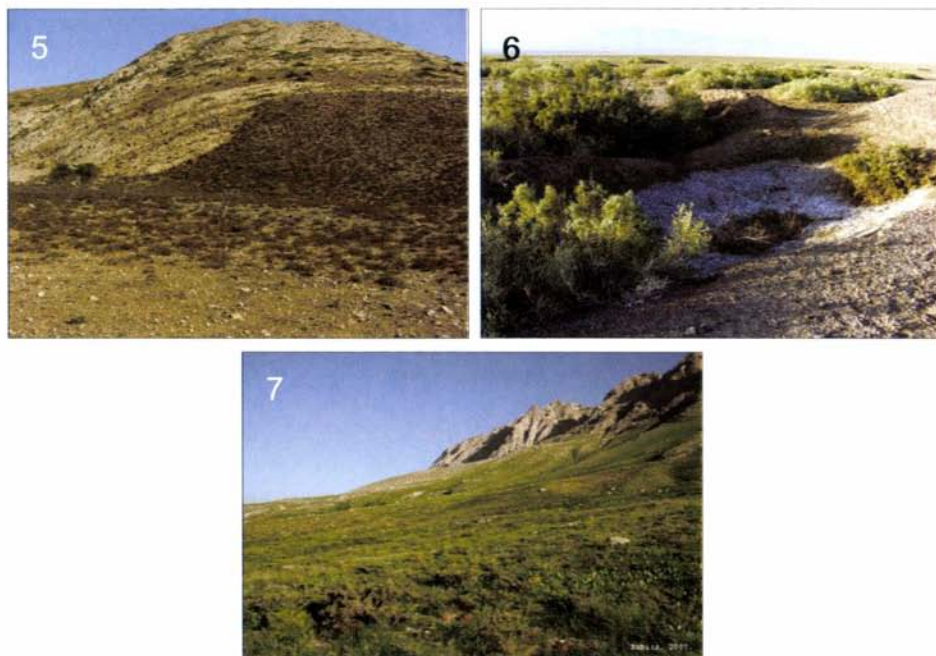
Female genitalia: Papillae anales setose, hairy. Apophyses posteriores long, sinuous, apophyses anteriores longer and weaker. Ostium bursae sclerotized, rather broad; ductus bursae long, tubular, membranous, distally spacious. Appendix bursae confluent with ductus bursae, membranous, appearing as a semibulbous bulge on ductus bursae. Corpus bursae ovoid, with sclerotized, concentric netting positioned almost at middle of the sac.

Habitat – The species lives in rocky montane steppes of the Central Zagros Mts (Fig. 7), in a rather high altitude (between 2500–3000 m).

Etymology – The specific name refers to its very small size.

***Hadula (Cardiestra) halophila* sp. n.**
(Figs 3, 12–13)

Type material – Holotype: male, Iran, Prov. Tehran, natron flat near W shore of Nemek lake, ca. 1100 m, 85 km SE of Tehran; 24–25. IX. 2006, leg. P. GYULAI & A. GARAI; slide No. 1962 GYULAI, coll. P. GYULAI (deposited in the HNHM).



Figs 5–7. 5 = Habitat of *Metopodicha leily* sp. n., 6 = Habitat of *Hadula (Cardiestra) halophila* sp. n., 7 = Habitat of *Amphipyra micra* sp. n.

Diagnosis – The new species belongs to the subgenus *Cardiestra* BOURSIN, 1963 (see HACKER 1998). It can be distinguished from all but one related species by its the reddish-brown colouration (the exception is *Hadula* (*Cardiestra*) *gobideserti* (VARGA, 1973)), the broader, less elongated, shorter fore wing and apex, the unusually rounded outer margin, the darker subterminal line, the shape of ante- and postmedial lines, the prominent dark discal spots on the underside of wings and, last but not least, the autumnal flight period as well.

The male copulatory organ is rather uniform within the subgenus, which can be divided into two species groups on the basis of the structure of the cucullus. The *eremistis* group has narrow neck connecting the long and narrow cucullus to the main part of the valva, while in the other group, comprising the new species and *H. (C.) longicucullus* GYULAI, 2002, the neck is absent and the cucullus is direct continuation of the valva. Another synapomorphy of the latter lineage is the presence of a third diverticulum of the vesica armed with a short terminal cornutus. *Hadula (C.) halophila* differs from its close relative by its significantly shorter cucullus, broad, finely bifurcate harpe and less inflated vesica with weaker third diverticulum.

Description – Male (Fig. 3). Wingspan 23.0 mm, length of fore wing 13.0 mm. Pubescence of head, palpi and thorax pale reddish brown, with fine silky pinkish shade; this shining is slightly paler on underside. Eyes globular; antennae densely ciliate, brown with whitish rings, more whitish terminally. Fore wings rather broad, apex finely triangular, outer margin evenly, rather strongly arched. Ground colour reddish brown, rather concolorous, only medial field somewhat darker. All elements of noctuid pattern except conspicuous, large reniform stigma. Costa striolate; crosslines derive with black patches on the edge of the fore wing than rather obsolescent. Basal and antemedial crosslines double, tortuous, postmedial line fine, slightly arcuated, sinuous. Orbicular stigma small, elliptical, poorly visible; reniform stigma large, finely encircled with brown line and surrounded with darker ghost, filled with ground colour; claviform stigma represented by a fine dark chevron. Subterminal line disrupted, zigzag, defined with diffuse brown patches at inner side. Terminal line interrupted, represented by a row of black dots. Cilia as ground colour, with fine ochreous line at base, spotted with darker grey-brown. Hind wing whitish, suffused with dark greyish brown; discal spot well-defined; marginal field somewhat darker; cilia pinkish-ochreous, chequered with brown. Underside of wings whitish fawn-coloured with fine pinkish shade and dark brownish irroration. Discal spots conspicuous, dark brown, that of hind wing extended towards outer margin. Fore wing cilia chequered with brown, hind wing cilia unicolorous. Female unknown.



Figs 8–15. 8 = *Isochlora hoferi* sp. n., female genitalia, 9 = *Amphipyra micra* sp. n., holotype, genital capsula, 10 = *Amphipyra micra* sp. n., holotype, aedeagus, 11 = *Amphipyra micra* sp. n., paratype, genital capsula, 12 = *Hadula (Cardiestra) halophila* sp. n., holotype, genital capsula, 13 = *Hadula (Cardiestra) halophila* sp. n., holotype, aedeagus, 14 = *Metopodicha leily* sp. n., paratype, genital capsula, 15 = *Metopodicha leily* sp. n., paratype, aedeagus

Male genitalia (Figs 12–13): Uncus large, spatulate, strongly hairy. Tegumen rather narrow, penicular lobes thin, weak; fultura inferior deltoidal, with large thorn-like, spinulose dorso-medial process; vinculum U-shaped. Valva elongated, saccular third broad, medial third slender, distally somewhat dilated, cucullus wide and relatively short, more or less subtriangular. Costal extension (digitus) with small costal peak and larger ventral plate; harpe finely bifurcate; corona appears as a well-developed, densely setose area. Saccular process rather long, only slightly asymmetrical. Aedeagus cylindrical, curved; carina with long, acute dorso-lateral and short ventral, strongly sclerotized extension. Vesica short but ample, saccate, with two wide diverticula; distal part with additional (third) long and broadly conical diverticulum armed with fine terminal cornutus.

Habitat – The unique type specimen was collected in a white natron flat at the south-western shore of a temporary saline lake (Fig. 6). This flat appears as an alkaline semi-desert with scattered halophilous vegetation (*Camphorosma*, *Artemisia*, *Tamarix*, etc.).

Etymology – The specific name is derived from the general feature of its habitat.

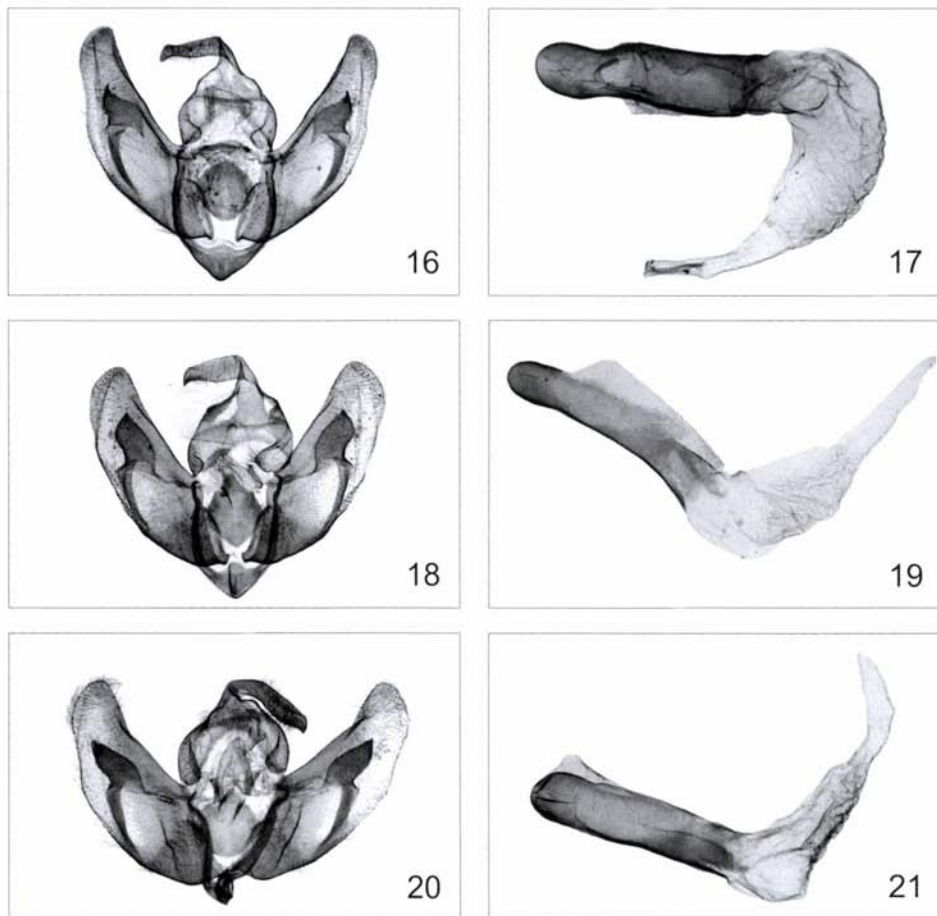
Metopodicha leily sp. n.

(Figs 4, 14–17)

Type material – Holotype: Male, Iran, Prov. Semnan, E-Alborz, 2400 m, Khoshyela, 15–16.IX.2006, leg. P. GYULAI & A. GARAI; coll. P. GYULAI (deposited in the HNHM). Paratypes: 11 males with the same data; slide Nos 2048 GYULAI, 9287 RONKAY. 9 males are in coll. P. GYULAI, one male each in the collections of the HNHM, and G. RONKAY.

Diagnosis – The new species belongs to the *M. antherici* species group, being closely related to *M. antherici* CHRISTOPH, 1884 and *M. longicornis* BOURSIN, 1957. It can be separated externally from *M. longicornis* (type locality: Afghanistan, Khinjan valley, it occurs in Afghanistan, Tadjikistan, Uzbekistan and Kirghisia) by its remarkably darker, brownish fore wing ground colour and somewhat different shape of the fore wing maculae; from *M. antherici* (type locality: Achal Tekke, Turkmenistan; occurring in Turkmenistan, Tadjikistan and in the Khorassan area of NE Iran) by the brown body vestiture and fore wing ground colour (brown coloured *M. antherici* specimens and very rare brown forms of the other species of *Metopodicha* DRAUDT, 1936 are well known, but these forms never have brown body pubescence and brown suffused fore wing marginal field despite all individuals of the new species), the direction and shape of transversal cross-lines, the very conspicuous brown stripe at inner side of subterminal line, the brown fore wing cilia and the oblique, double brown stripe of hind wing.

The male genitalia of the three species are very similar in type (see the Figs 14–21), the new species (Figs 14–17) can be distinguished from *M. longicornis* (Figs 18–19) by its weaker but slightly longer uncus, more rounded fultura inferior, more arcuated valva, longer cucullus, shorter and basally remarkably broader harpe, different carina and differently shaped and sclerotized field of vesica, without distal dilatation. Comparing with those of *M. antherici* (Figs 20–21), *M. leily* has slenderer, distally not so extended uncus, slenderer valva, slightly longer cucullus and basally broader, thicker harpe.



Figs 16–21. 16 = *Metopodicha leily* sp. n., paratype, genital capsula, 17 = *Metopodicha leily* sp. n., paratype, aedeagus, 18 = *M. longicornis* BOURSIN, 1957, male genital capsula, 19 = *M. longicornis* BOURSIN, 1957, aedeagus, 20 = *M. antherici* CHRISTOPH, 1884, male genital capsula, 21 = *M. antherici* CHRISTOPH, 1884, aedeagus

The new species can be easily distinguished from the two taxa of the other lineage of the genus, *M. ernesti* DRAUDT, 1936 (type: Turkey, Marash) and its subspecies *achaemenica* WILTSHIRE, 1941 (type: Iran, Fars) by its narrower, more pointed fore wings with differently shaped stigmata and less defined, differently shaped crosslines; the differences in the male genitalia are also remarkably larger than between the taxa of the *M. antherici* species group.

Description – Wingspan 24.0–28.0 mm, length of fore wing 12.8–15.1 mm. Male (Fig. 3). Vestiture of head, palpi, thorax and legs brown, lighter on ventral side, vertex and collar rather creamy. Eyes globular; antennae widely bipectinate. Fore wing elongated, rather acute triangular with apex pointed, costa slightly concave distally, outer margin straight from apex to tornal area. Ground colour pale tobacco-brown to fawn, stigmata and subterminal line conspicuously yellowish-ochreous. Basal area with two (sometimes one) fine ochreous spots subcostally; antemedial and postmedial crosslines fine, rather obsolescent, fawn-coloured, finely crenellate; filling of cell between stigmata darker brown, darkest part of wing. Stigmata prominent, orbicular stigma trapezoidal, reniform stigma somewhat quadrangular, with more or less circular brown marking inside, claviform stigma short, lanceolate, outlined with brown at apex. Subterminal line fine, sinuous, ochreous, followed by a brown and an ochreous stripe at inner side, both becoming continuously broader from apex to tornal area. Terminal line fine, brown; cilia brown with ochreous inner line. Hind wing whitish, discal spot fine, lunulate; transverse line and inner edge of marginal area forming two parallel, diffuse but clearly visible dark brownish stripes. Terminal line fine, reddish brown; cilia broad, white. Underside of fore wing fawn-coloured with brown suffusion, shadows of stigmata, subterminal line and dark stripes of marginal field clearly discernible. Hind wing as on upperside, but cellular lunule more visible; cilia also as on upperside. Female unknown.

Male genitalia (Figs 14–17): Uncus thick, rather beak-shaped, setose, with apex hooked. Tegumen broad, peniculus lobes small, rounded; fultura inferior large, rounded, shield-like; vinculum widely U- or V-shaped. Valva elongated, finely arcuate, evenly but only slightly tapering distally. Saccus short, more or less triangular; clavi represented by a rounded, setose surface. Harpe thick, strongly and smoothly sclerotized, basal bar broad, rather straight, erect part flattened, broad at base, slightly curved ventrad, apical third acute, thorn-shaped. Cucullus broad triangular, terminally rounded; corona represented by numerous strong setae arranged into four or five rows. Aedeagus almost straight, thick, cylindrical, smoothly sclerotized, carina stronger in sclerotisation, having short lateral and dorso-lateral sclerotised laminae. Vesica everted forward, recurved dorsally, broadly tubular, distal part strongly tapering. Its walls membranous, without diverticulum or spine but with a long medio-lateral scobinated field.

Habitat – The new species was found in the easternmost part of Alborz Mountains, in a rocky limestone slope with steppe vegetation (*Astragalus*, *Artemisia*, *Stipa*, etc.) and *Juniperus* bushes.

Etymology – The new species is named after the daughter of Mr. HOSSEIN RAVANYAR, guide of ADRIENNE GARAI and PÉTER GYULAI during their four expeditions to Iran.

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