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New records of two noctuid species (Lepidoptera, Noctuidae) from Iran

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ABSTRACT. The biodiversity of the Noctuidae, an economically important family of Noctuoidea which include major crop pests, is becoming well-identified nowadays in Iran due to the increased number of faunal expeditions. The two large subfamilies of Noctuidae namely Xyleninae Guenée, 1837 and Noctuinae Latreille, 1809 comprise the majority of Iran's noctuid moth fauna. Two species, *Leucochlaena hoerhammeri* (Wagner, 1931) and *Dichagyris* (*Stenosomides*) *mansoura* (Chrétien, 1911) members of Xyleninae and Noctuinae subfamilies, respectively, are recorded from Iran for the first time. This is also the first record of the subgenus *Stenosomides* Strand, 1942 from Iran. Both the external and genital characteristics of the newly recorded species are presented together with illustrations of the adults and their genitalia.

Key words: *Dichagyris,* distribution, fauna, *Leucochlaena*, taxonomy

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INTRODUCTION

The tribe Episemini Guenée, 1852 was treated by Ronkay et al. (2001) as a heterogeneous polyphyletic tribe consisting of two generic groups in the Hadeninae Guenée, 1837 subfamily. To define the monophyletic units, Fibiger and Lafontaine (2005) resurrected the subfamily Xyleninae Guenée, 1837 and placed Episemini, within. This tribe includes ten genera tentatively divided by Ronkay et al. (2001) into two groups, seven genera related to *Episema* Ochsenheimer, 1816 and three genera to *Ulochlaena* Lederer, 1857, all comprising autumnal and winter species inhabiting dry, warm and xeric biotopes. The members of the Palaearctic genus *Leucochlaena* Hampson, 1906, are known by their robust body

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and sclerotized forewings and all its seven species and eight subspecies (Fibiger et al., 2011; Hacker, 2001; Ronkay et al., 2001; Rajaei et al., 2023) are classified into two subgenera, *Leucochlaena* Hampson, 1906 and *Furcochlaena* Ronkay, Yela & Hreblay, 2001. The subgenus *Furcochlaena* was established by Ronkay et al. (2001) and is characterised by the small species (e.g., *Leucochlaena hoerhammeri* (Wagner, 1931)) that are featured by the long uncus, the large penicular lobes, the short U-shaped vinculum, the strong corona, the simplified vesica, the short and broad ovipositor, the strongly sclerotized ductus bursae and the very small appendix bursae. The worldwide distributed subtribe Agrotina Rambur, 1848, with 10 genera is known for the widely distribute genus *Agrotis* Ochsenheimer, 1816. Another important genus in this subtribe is *Dichagyris* Lederer, 1875 which includes seven subgenera, three out of them are distributed in the Palaearctic namely *Albocosta* Fibiger & Lafontaine, 1997, *Stenosomides* Strand, 1942 and *Dichagyris*, and the remaining four occur merely in North America including *Loxagrotis* McDunnough, 1929, *Pseudorichia* Lafontaine, 2004, *Pseudorthosia* Grote, 1874 and *Mesembragrotis* Benjamin, 1927. The subgenus *Stenosomides* is mainly characterised, in the male genitalia, by the cucullus that lacks corona, the thick and enlarged clasper, the lack of ampulla, a spiraled vesica with a small sub-basal diverticulum which bears a slender apical cornutus. Members of the subgenus *Stenosomides* inhabit open steppes and semi-mountainous biotopes covered with low vegetation and fly from August to October. Hitherto, this subgenus contains two known species in the Palaearctic, *D. spissilinea* (Staudinger, 1896) which occur in southern Ural, Siberia, Mongolia and Ulyasutay (Fibiger, 1990) and *D. mansoura* which is recorded, so far, from Morocco, Algeria, Tunisia and Libya (Fibiger, 1990; Hacker, 1990).

So far, one species with two subspecies of *Leucochlaena* (Ebert & Hacker, 2002; Rajaei et al., 2023) and 91 species and subspecies of the genus *Dichagyris* (Rajaei et al., 2023) are reported from Iran. This is the first record of a species belonging to the subgenus *Stenosomides* from Iran. *Leucochlaena hoerhammeri* and *Dichagyris* (*Stenosomides*) *mansoura* (Chrétien, 1911) belonging to Xyleninae and Noctuinae subfamilies, respectively, are recorded from Iran for the first time. Diagnostic characteristics of the species are provided and discussed along with illustrations of the adults and their genitalia.

MATERIAL AND METHODS

Moth specimens were collected using portable light traps (powered by 12-V batteries and 8-W black light UVB tubes) through the expeditions carried out in Markazi (in 2010) and Esfahan (in 2011) provinces. Geographic data of the collecting sites, including geographic coordinates and altitude, were recorded. The genitalia of the specimens were dissected, stained, and mounted following Fibiger (1990). Identifications, nomenclature and systematics of the species were made according to the related literature (Fibiger, 1990, 1997; Rajaei et al., 2023; Ronkay et al., 2001). Adults were photographed using a Canon digital camera (model Power Shot A710) and the photographs of the genitalia were taken by an Olympus SZH stereo-microscope with an Omax (18Mp) A35180U3 digital camera. The specimens are deposited in the Collection of Noctuidae, Department of Plant Protection, Shahid Bahonar University of Kerman, Iran.

RESULTS

Two newly recorded species are described and compared with their close relatives, their distribution and bionomics are given as well as illustrations of adults and their genitalia.

Taxonomic hierarchy

Class Insecta Linnaeus, 1785

Order Lepidoptera Linnaeus, 1785

Family Noctuidae Latreille, 1809

Subfamily Xyleninae Guenée, 1837

Tribus Episemini Guenée, 1852

Genus *Leucochlaena* Hampson, 1906

Subgenus *Furcochlaena* Ronkay, Yela & Hreblay, 2001

Leucochlaena (*Furcochlaena*) *hoerhammeri* (Wagner, 1931)

Heliophobus hoerhammeri Wagner, 1931, *Internationale Entomologische Zeitschrift*, 25:367, L.t.: Turkey, Akşehir.

Material examined. 1♂, Iran, Prov. Markazi, Saveh, 1444 m, 35˚02'50"N 50˚23'58"E, 27.IX.2010, leg. E. Dehlaghi, slide No. AS498m.

Diagnosis. The closest relative of *L. hoerhammeri* is *L. fallax* (Staudinger, 1870) recorded from Russia, Sarepta. *Leucochlaena hoerhammeri* differs, externally, from *L. fallax* by darker background, darker claviform stigma, slightly sinuous antemedial line, weak postmedial line, less prominent and poorly visible transverse lines of the hindwing, and paler ground color of hindwing. In the male genitalia, *L. hoerhammeri* differs from *L. fallax* by shorter, wider, subapically dilated valva, by a very strong costal lobe near cucullus and short wide harpe with strongly unequal arms and by the vesica bearing a strong thorn-like cornutus.

Identification (Fig. 1A)**. Male —** Wingspan 30 mm., vesture of head, thorax and collar, dense, light brown with white tips of hairs, tegulae marked with whitish hairs. Antenna widely bipectinate, with rows of long fasciculate cilia on each segment. Head small, palpi well-developed with hairy segments, eyes globular. Forewing elongate with apex slightly pointed, ground color cloudy greyish brown. Costal margin brighter than ground color with some black spots. Black basal dash short, inner margin with a rather strong ochreous stripe. Ante and postmedial crosslines thin and whitish, antemedial line slightly curved, postmedial almost straight, median area darker than ground color, veins covered thickly with milky whitish scales. Noctuid maculation distinct and encircled with black, orbicular and reniform stigmata as ground color, claviform stigma darker, orbicular stigma elongated. Subterminal line marked by dark chevrons and lighter grey inner zone, terminal line interrupted, blackish. Cilia basally white, marked with brownish medial line, terminated with creamy white to light brown. Underside of forewing ash-grey, lighter basally. Hindwing white, marginal area suffused with golden scales. Terminal line light brown, cilia white.

Male genitalia (Figs 2A, 2B)**.** Uncus long and thick, medially constricted, spatulate apically, tegumen broad and low, small penicular lobes present, valva strong, wide, stout, costal and ventral margins relatively parallel, costal margin sclerotized, with pointed triangular extension, clavus reduced, sacculus sclerotized, longer than wide, dorsal margin slightly protruded medially, harpe strong, bifurcate with unequally arms, outer one very long, widened, cucullus small, rounded, armed with strong corona, juxta sub-deltoidal with an apical processes, vinculum short, U-shaped. Aedeagus weakly sclerotized, carina elongate and heavily sclerotized, vesica very short with a strong thorn-like cornutus.

Bionomic. Univoltine species, adults of *L. hoerhammeri* fly from summer to autumn. It was collected from the xeric steppes and semi mountainous regions covered with shrubs and grasses. Adults come to artificial light, early stages and larval food plants are unknown as yet.

Distribution. Turkey, Azerbaijan (Gyulai & Ronkay, 1995), Iran (**new record**).

Subfamily Noctuinae Latreille, 1809

Tribus Agrotini Rambur, 1848

Subtribus Agrotina Rambur, 1848

Genus *Dichagyris* Lederer, 1857

Subgenus *Stenosomides* Strand, 1942

Dichagyris (*Stenosomides*) *mansoura* (Chrétien, 1911)

Agrotis mansoura Chrétien, 1911, *Annales de la Société Entomologique de France*, 79:498, L.t.: Tunisia, Gafsa.

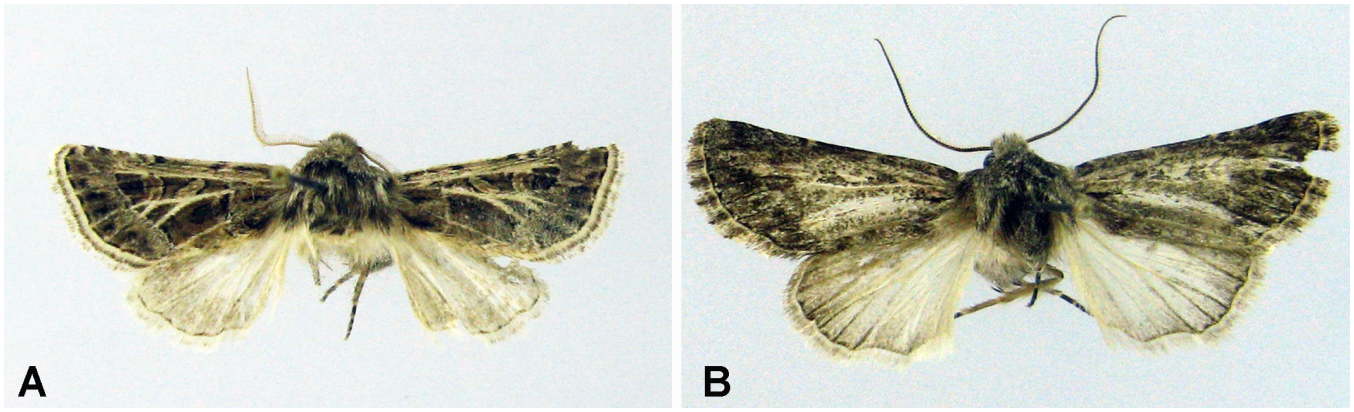

Figure 1. Adult males. **A.** *Leucochlaena hoerhammeri* (Wagner, 1931); **B.** *Dichagyris mansoura* (Chrétien, 1911).

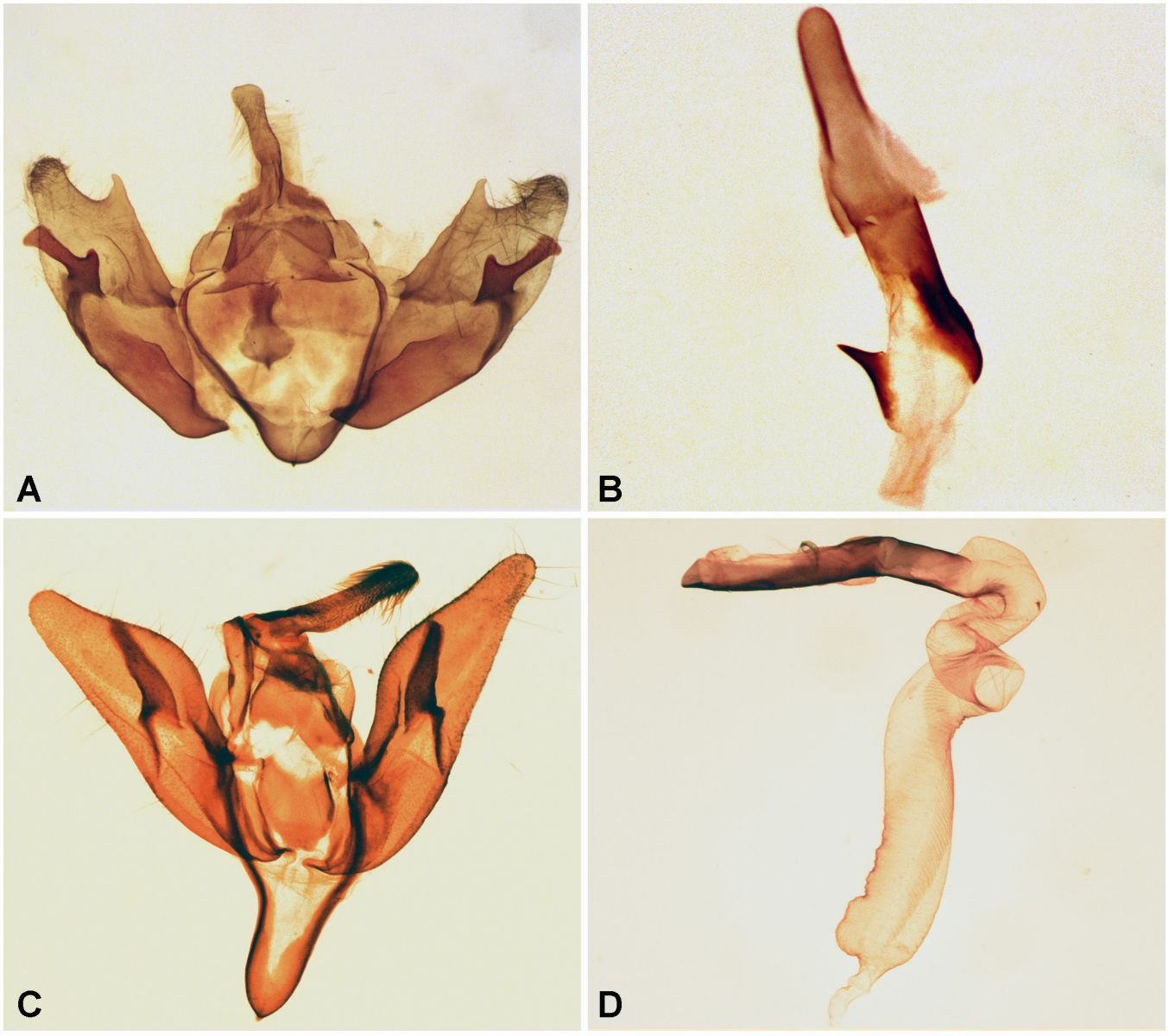

Figure 2. Male genitalia. **A–B.** *Leucochlaena hoerhammeri* (Wagner, 1931), **C–D.** *Dichagyris mansoura* (Chrétien, 1911); **A.** & **C.** Armature; **B.** & **D.** Aedeagus and everted vesica.

Material examined. 6♂♂, Iran, Esfahan, Damane, Korde Olia, 2363 m, 32°55'45"N 50°40'30"E, 10.IX.2011, leg. P. Poorshabanan, slide Nos. AS686m, AS688m, AS888m.

Diagnosis. The subgenus *Stenosomides* differs from its two other congeneric subgenera by the cucullus which lacks corona, the prominent clasper, the absence of ampulla, the hooked tip of the long, pubescent uncus, the triangular juxta and the spiraled vesica (Fibiger, 1993). *D. mansoura* differs from its close relative, *D. spissilinea* (Staudinger, 1869) externally by its brown greyish coloration and long black basal dash. In the male genitalia the very long vesica of *D. mansoura* is diagnostic.

Identification (Fig. 1B)**. Male —** Wingspan 30–35 mm., pubescence of head, thorax and collar unicolorous, dark brown and blackish with white greyish tips of hairs. Antenna fasciculate with long cilia, head small, palpi well-developed, third segment long, hairy. Forewing ground color turbid gray, mixed with light brown, crosslines rather defuse, black basal dash elongated, noctuid maculation present, paler than ground color, somehow milky white to light brown, orbicular stigma ovoid, outlined with dark posteriorly, reniform and claviform stigmata encircled by dark brown, marginal area with veins covered by dark brown, terminal line fine, cilia irrorated by smoky grayish and white. Underside of wings dusty light brown. Hindwings creamy whitish, veins marginally covered with brown, terminal line dark brown, cilia sharp white. Underside of hindwings cloudy white.

Male genitalia (Figs 2C, 2D)**.** Hairy uncus long, strong, and hooked. Valva broad, apically slightly pointed, costal area convex, ventrally almost straight, sacculus weakly sclerotized, clavus small, clasper very strong, slightly curved apically, cucullus small and corona absent, juxta heart-shaped and relatively sclerotized, saccus long and triangular. Aedeagus straight, hook-shaped processes of carina sclerotized, slightly curved, vesica very long, tubular, and helicoid in basal third, apically with small tubercle-like diverticulum, and two weak and small sub-basal cornuti present.

Bionomic. Univoltine late summer and early autumnal species, *D. mansoura* inhabits open biotopes and semi mountainous regions covered with shrubs and bushes. Adults come to artificial light, stunted plants are the reported larval food plants and the early stages were described by Chrétien (1911).

Distribution. Morocco, Algeria, Tunisia and Libya (Fibiger, 1990), Iran (**new record**).

DISCUSSION

The taxonomy of the genus *Leucochlaena* and its species is incomplete and doubtful and might be resolved by incorporating the molecular data from the forthcoming studies. For instance, the taxonomic interpretation of *L. oditis* is unresolved, moreover, there are examples of two described subspecies synchronically in different publications while their specimens have been collected from the same populations (e.g. from Greece: *L. muscosa atika* Ronkay, Yela & Hreblay, 2001 and *L. muscosa hellenica* Hacker & Fibiger, 2001; from Turkmenistan: *L. muscosa turcomanica* Ronkay, Yela & Hreblay, 2001 and *L. muscosa centralasiae* Hacker, 2001). In an attempt to make a monophyletic grouping, Ronkay et al. (2001) established the subgenus, *Furcochlaena,* for the *L. fallax* species group representing three species characterized by small, robust and hairy imagines, with thick abdomen and triangular forewings. The recorded species of the genus *Leucochlaena* inhabit open grasslands, semi-deserts and xeric steppes of different elevations up to 2000 m. from sea level with different grasses reported as their larval food plants. The species *L. hoerhammeri* has already been reported from two locations, Akşehir, Turkey (Wagner, 1931) where it is rare and flies in mid-September and Azerbaijan where it is not rare (Gyulai & Ronkay, 1995). So, based on our results, the third place in which this species inhabits, is Iran, Saveh, where one specimen was collected in late September. Revealing the distribution pattern of this species and based on the fact that the number of its collected specimens is few, it can be concluded that *L. hoerhammeri* is a stenochorous species as to its other congeners.

The taxonomy and classification of the large genus *Dichagyris* have been changing in the past three decades until reached a constant and widely accepted status. In the first three volumes of Noctuidae

Europaeae (Fibiger, 1990, 1993, 1997) the four currently Palaearctic subgenera of *Dichagyris* had been considered at the generic level including *Dichagyris*, *Yigoga* Nye, 1975, *Stenosomides* and *Albocosta* until when Fibiger and Lafontaine (2005) presented a review for the classification of Noctuoidea, initially proposed by Kitching & Rawlins (1998), and merged these subgenera to *Dichagyris*, a classification which is acceptable worldwide. The early stages of *D. spissilinea* and its food plants are unknown as yet whilst the early stages of *D. mansoura* have been described and the low plants reported as its larval food (Fibiger, 1990). Our findings on the fauna of Noctuidae reveal the great importance of biodiversity in Zagros and Alborz mountain chains (as demonstrated by the recent publications by Ahmadi et al. (2021) and Poorshabanan and Shirvani (2022), as a resource preserving life and genetic pool.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution in the paper as follows: M. Moghadaszadeh: Preparing the description of the adults and genitalia, the bionomics and distribution data; P. Poorshabanan & E. Dehlaghi: Collecting and preparation of the specimens; A. Shirvani: Identification of the specimens; A. Shirvani & R.V. Shoushtari: preparation of the draft, corrections on the final contents of the manuscript and proofreading. All authors read and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the Collection of Noctuidae, Department of Plant Protection, Shahid Bahonar University of Kerman, Iran and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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گزارش جدید دو گونه شب پره (Lepidoptera, Noctuidae) از ایران

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چکیـــده: امروزه به دلیل افزایش تحقیقات فونستیک مطالعه تنوع زیستی Noctuidae، خانواده‌ای که به دلیل وجود گونه‌های مهم آفت اهمیت اقتصادی دارد، به سمت شناسایی کامل‌تر پیش می‌رود. دو زیرخانواده بزرگ از خانواده Noctuidae با نام‌های Xyleninae Guenée, 1837 و Noctuinae Latreille, 1809 بخش عمده‌ای از شب‌پره‌های ایران را در بر می‌گیرند. دو گونه *Leucochlaena hoerhammeri* (Wagner, 1931) و *Dichagyris* (*Stenosomides*) *mansoura* (Chrétien, 1911) به ترتیب متعلق به زیرخانواده‌های Xyleninae Guenée, 1837 و Noctuinae Latreille, 1809 برای اولین بار از ایران گزارش می‌شوند. همچنین این، اولین گزارش یک گونه متعلق به زیرجنس *Stenosomides* Strand, 1942 برای کشور است. ویژگی‌های ریخت‌شناسی خارجی و دستگاه زادآوری این گونه‌ها به همراه تصاویر مربوطه شرح و نشان داده شد.

واژگـان کلیدی: *Dichagyris*، پراکنش، فون، *Leucochlaena*، رده‌بندی