

A contribution to the fauna of subfamilies Metoponiinae, Bryophilinae and Xyleninae (Lepidoptera; Noctuidae) in NE Iran

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The Noctuidae with more than 25,000 described species include numerous economic important crop pests worldwide. A faunistic study on this family was carried out in the years 2010 and 2011 in the Khorasan-e-Razavi province, NE Iran. A total of 33 species of the subfamilies Metoponiinae, Bryophilinae and Xyleninae belonging to 17 genera were collected. Among the collected species, two are recorded for the first time for the fauna of Iran; *Haemerosia albicomma* Ronkay, Varga and Hreblay, 1998 and *Cryphia duskeimima* Ronkay, Varga and Hreblay, 1998. Illustrations of adults and their genitalia are given with notes on the bionomy and distribution. Also, 13 species were recorded for the first time in Khorasan-e-Razavi province. An identification key for 11 collected *Caradrina* species is given, including a key to 11 collected species.

Key words: Bryophilinae, fauna, Iran, Khorasan-e-Razavi, Metoponiinae, Noctuidae, Xyleninae

INTRODUCTION

With more than 25000 included species, Noctuidae *s.l.* forms the largest family within the order Lepidoptera worldwide (Fibiger, 1990). The Noctuidae *s.l.* include numerous economic important crop pests and constitute near one quarter of the approximately 6000 Lepidoptera species noted to be of economic importance by Zhang (1994). Therefore, inventorying the noctuid fauna could be of great importance.

Great Khorasan province (including Khorasan-e-Razavi, Shomali and Jonoubi) is believed to be a transitional province included in the Irano-Turanian subregion of the Saharo-Gobian biogeographic region of the Palearctic realm and its fauna is influenced by the elements of the Central Asia region (Fet, 1994). Fauna of north-eastern Iran, especially at higher elevations of dry mountain steppes (e.g. Binaloud and Kopet-Dagh Mountains) contains high insect diversity including endemic species. Such approach motivated us to set more expeditions in relation to this study to achieve a more completed list of noctuids in this region.

Several sampling trips on Noctuidae fauna of NE Iran were previously conducted in a few projects by other authors (Brandt, 1939-1941; Kalali, 1976; Wieser and Stangelmaier, 2005; Feizpoor and Shirvani, 2011). In this research, based on two years intensive sampling in the Khorasan-e-Razavi province, fauna of Noctuidae *s.l.* family in this province were studied. Gyulai et al. (2013) and Rabieh et al. (2013a,b) included parts of the results of our expeditions in this study. At the present, we would like to report part of the results belonging to the subfamilies Metoponiinae, Bryophilinae and Xyleninae in which containing a list of the 33 collected species. Illustrations of collected adults and

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their genitalia are depicted (Figs. 4-8). Notes on the bionomy and distribution of new records: *Haemerosia albicomma* Ronkay, Varga and Hreblay, 1998, *Cryphia duskeimima* Ronkay, Varga and Hreblay, 1998, are given.

MATERIAL AND METHODS

The specimens were collected during 2010-2011, once a week on the average, in the sampling localities. Sampling localities in Khorasan-e-Razavi province were selected to cover different types of habitats and to collect maximum of the occurring species (Fig. 1). Sampling was carried out in seventeen localities with light traps powered by 12 volt batteries and 8 watt UVB light tubes. All materials were collected by the senior author. Genitalia slides of the specimens were prepared following Fibiger (1997). Identifications were done according to resources such as Hacker (2001), Fibiger and Hacker (2007), Fibiger et al. (2009) and Lödl et al. (2012). Final confirmation and/or identification was done by noctuid specialist Dr. Peter Gyulai (Miskolc-Hungary). The specimens and slides of their genitalia were deposited in the Insect and Mite Collection of Ahvaz (IMCA), Plant Protection Department, Shahid Chamran University of Ahvaz, Iran, except *Bryophila ?felina* (Eversmann, 1852) which was deposited to P. Gyulai's private collection, Hungary. Systematics and nomenclature are followed to Lödl et al. (2012), except of the genus *Caradrina* Ochseneheimer, 1819 which is according to Hacker (2004).

RESULTS AND DISCUSSION

A total of 33 species from subfamilies Metoponiinae, Bryophilinae and Xyleninae were collected and identified. Among them, two species were new to the fauna of Iran: *Haemerosia albicomma* Ronkay, Varga and Hreblay, 1998; and *Cryphia duskeimima* Ronkay, Varga and Hreblay, 1998. Species denoted with asterisk are new to the fauna of Khorasan-e-Razavi province.

List of species

Subfamily Metoponiinae Herrich-Schäffer, 1851

They are mostly small noctuids which lack the foretibial claw and the fields of enlarged cornuti in the vesica, and the larvae do not specialized on seeds of Asteraceae. They differ from the Acontiinae in having a raised nodular sclerite (epaulette) on the tympanic membrane and the hindwing venation is usually quadrifine; and by lacking the setae on scaphium, the enlarged alula and reduced hood of the ear and the saccular dorsal crest (Fibiger et al., 2009).

Haemerosia albicomma Ronkay, Varga and Hreblay, 1998

Adult male (Fig. 2: 2); male genitalia (Figs. 3: 1-2).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 2 Males, 27.V.2011.

Identification. Wingspan 21-22 mm. Head vivid red-brown. Antenna shortly bipectinate. Forewing short, broadly triangular with apex pointed. Ground colour pale, pinkish brown, median area strongly suffused with deep, pinkish red-brown. It differs from its Holo-Mediterranean-Anatolian sister species, *H. renalis* (Hübner, [1813]) by its narrower, apically more pointed forewing with essentially darker coloration, especially the narrower median area is deep red-brownish, the cross-lines are sharper, less sinuous, the reniform stigma is narrower, finer and the hindwing is paler, more ochreous in both sexes. In the male genitalia, uncus medium-long, curved, pointed tegumen high, rather strong, with small tubercular, densely setose subapical processi, penicula lobes reduced. Fultura inferior broad, medium-high, quadrangular plate, veniculum short, strong, V-shaped. Valva short, broad, elliptical with rounded finely setose apex, corona absent. Valvae are distally broader, more rounded than of *H. renalis*. Aedeagus short, distally tapering, everted ventrally, recurved dorsally and directed forward. Aedeagus is broader, less curved subapically than of *H. renalis* (Fig. 3: 1-2). The female genitalia of two related taxa differ by the shape of the ostial appendage which is bigger, cordiform in *H. albicomma* but narrow, pendulous in *H. renalis* (Ronkay et al., 1998).

Bionomics. This species is on the wing from mid-July to mid-September in Turkmenistan (Ronkay et al., 1998), but, we collected the adults at late-May in Khorasan-e-Razavi province of Iran. The collection site was a mountainous area with sparse bushes and shrubs. Early stages and food plants are unknown.

Distribution. SW Turkmenistan (Ronkay et al., 1998) and Iran (this study).

***Tyta luctuosa* (Denis and Schiffermüller, 1775)**

Adult male (Fig. 5: 3); male genitalia (Figs. 6: 19, 7: 18).

Material examined: Iran, Khorasan-e-Razavi prov., West Mashhad, Toos area, 1030m, 36°29'58"N 59°31'11"E, 2 Males, 2 Females, 11.VII.2010; 1 Male, 15.V.2011; 1 Male, 10.VI.2011; Iran, Khorasan-e-Razavi prov., Kalat-e-Nader city, 1087m, 36°58'48"N 59°44'46"E, 1 Male, 1 Female, 10.VIII.2010; Iran, Khorasan-e-Razavi prov., Fariman city, 1407m, 35°43'56"N 54°41'01"E, 2 Males, 05.X.2010; 1 Male, 14.IV.2011.

Subfamily Bryophilinae Guenée, 1852

Members of this subfamily have a plate-like, free pleural sclerite between the tegumen and vinculum which is flat curved and sickle-like. The bullae, the two air-sacs at the dorsal, distal side of the metascutellum, connected to the tympanum system of pockets and flaps are completely fused laterally. The hindwing venation is trifine with a strongly reduced M2 (Fibiger et al., 2009).

***Cryphia receptricula* (Hübner, 1803)**

Adult male (Fig. 4: 1); male genitalia (Figs. 6: 1, 7: 1).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 1 Male, 1 Female, 29.07.2010.

Cryphia algae* (Fabricius, 1775)

Adult male (Fig. 4: 2); male genitalia (Figs. 6: 2, 7: 2).

Material examined: Iran, Khorasan-e-Razavi prov., Akhلامad mountains, 1550m, 36°35'52"N 58°55'07"E, 1 Male, 1 Female, 01.09.2011.

***Cryphia duskeimima* Ronkay, Varga and Hreblay, 1998**

Adult female (Fig. 2: 1); female genitalia (Fig. 3: 3).

Material examined: Iran, Khorasan-e-Razavi prov., South Sabzevar, Shirahmad, 985m, 36°07'09"N 57°51'08"E, 2 Females, 02.05.2011.

Identification. This species is a member of the *C. plumbeola*-*C. salomonis* species group. It differ from related taxa by its narrower forewing with rather obsolescent pattern and without stronger light markings. Wingspan 26-29 mm. head and thorax dark greenish grey mixed with whitish scales. Antenna of female filiform and that of male finely ciliate. Abdomen slender, long, paler brownish grey. Forewing long, narrow, apex pointed, scaling finely reticulate. Ground colour dark metallic grey with fine bluish-greenish shine, strongly irroretd with whitish grey. Orbicular and reniform stigmata indistinct, former rather large, rounded, encircled with whitish, filled with darker greyish, reniform diffuse whitish grey patch with very pale, interrupted outline and relatively strong, fine, blackish grey inner line or lunule. Marginal area narrow, subterminal whitish grey, fine, sinuous, more or less interrupted. Terminal line row of fine blackish spoys, cilia as ground coulour, striolate with whitish at outer half. Hind wing suffused with dark greyish brown, veins even darker, discal spot often visible as diffuse, shadow-like dot, cilia pale greyish (Ronkay et al., 1998). (Fig. 2: 1).

Male genitalia. Uncus relatively long, curved at base, slightly concave at middle. Tegumen high, ppenicular lobes narrow, long, Fultura inferior deltoidal, wide, rather low sclerotized, Fultura superior regular, fine, arcuate plate; veniculum short but strong, U-shaped. Valva medium-long, narrow, with apex acute, corona missing. Sacculus long, sclerotized, with small setose depression at palce of clavus. Harpe very long, falcate, broad, flattened at base; tip pointed. Aedeagus short, thick, carina with slightly stronger ventral plate. Vesica short, tubular, basal third with large, broad, sclerotized (Ronkay et al., 1998). In the Female genitalia, ovipositor short, anterior and posterior

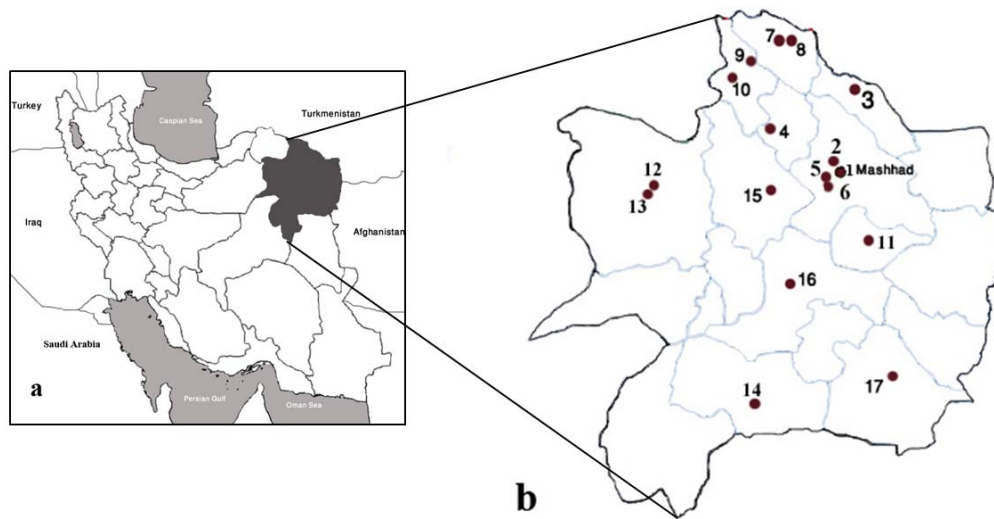


FIGURE 1. Map of the study area **a.** position of the Khorasan-e-Razavi province in the northeastern Iran (black area). **b.** Map of the Khorasan-e-Razavi province of Iran, sampling sites showed by dot; 1) Imam Reza Holy shrine; 2) Toos area; 3) Kalat-e-Nader city; 4) Akhlamad mountains; 5) Binaloud mountains (site1); 6) Binaloud mountains (site2); 7) Chelmir; 8) Dargaz city; 9) Quchan mountains; 10) Quchan city; 11) Fariman city; 12) Sabzevar city; 13) Shirahmad; 14) Gonabad city; 15) Neyshabour city; 16) Torbat-e-Heydariyeh city; 17) Khaf city.



FIGURE 2. Adults wing pattern. 1. *Cryphia duskeimima*, Female (Shirahmad); 2. *Haemerosia albicomma*, Male (Binaloud: site1).

apophyses about of the same length, long ductus bursae with small membranous corpus bursae (Fig. 3: 3).

Bionomics. This species is on the wing from mid-August to mid-September in Turkmenistan. We collected the adults in late-May in Khorasan-e-Razavi province. The collection site was a mountainous area with sparse bushes and shrubs. Early stages and food plants are unknown.

Distribution. Turkmenistan (Ronkay, Varga and Hreblay, 1998) and Iran (this study).

Note: Female genitalia of this species is shown here for the first time.

Bryophila maeonis* (Lederer, 1865)

Adult female (Fig. 4: 3); male genitalia (Figs. 6: 3, 7: 3).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 2 Males, 6 Females, 29.07.2010; 1 Female, 27.05.2011.

Bryophila raptricula* (Denis and Schiffermüller, 1775)

Adult female (Fig. 4: 6); male genitalia (Figs. 6: 5, 7: 22); female genitalia (Fig. 8: 2).

Material examined: Iran, Khorasan-e-Razavi prov., Kalat-e-Nader city, 1087m, 36°58'48"N 59°44'46"E, 1 Female, 10.08.2010; Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 4 Females, 07.09.2010, 2 Females, 31.5.2011.

***Bryophila ?felina* (Eversmann, 1852)**

Adult female (Fig. 4: 5); female genitalia (Fig. 8: 14).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 1 Female, 29.07.2010. (coll. P. Gyulai).

Note: More material is needed to confirm the identity of this species. *B. felina* has not yet been recorded from Iran. So, we keep it with question mark.

***Nyctobrya amasina* (Draudt, 1931)**

Adult male (Fig. 4: 4); male genitalia (Figs. 6: 4, 7: 4).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 4 Males, 3 Females, 29.07.2010.

Subfamily Xyleninae Guenée, 1837

The valve is more or less constricted below the cucullus; cucullus usually expanded and bears a corona of stout setae which is lost in a few groups; ampulla small and usually finger-like, except in Xylenina; dorsal surface of the sacculus is usually irregular toward the base; vesica is often short and tube-like or triangular, with 1-3 basal cornuti and an elongated patch of spines on the apical half of the vesica; antevaginal and postvaginal plates are often heavily sclerotised; ductus bursae short and heavily sclerotized; appendix bursae small and inconspicuous (Fibiger and Hacker, 2007).

Caradrina (Platyperigea) albina* (Eversmann, 1848)

Adult male (Fig. 4: 9); male genitalia (Figs. 6: 8, 7: 7); female genitalia, (Fig. 8: 8).

Material examined: Iran, Khorasan-e-Razavi prov., South Sabzevar, Shirahmad, 985m, 36°07'09"N 57°51'08"E, 1 Male, 3 Females, 02.V.2011; Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 1 Female, 27.05.2011; Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 1 Male, 07.IX.2010; Iran, Khorasan-e-Razavi prov., Gonabad city, 1706 m, 34°07'49"N 58°37'57"E, 2 Females, 05.VI.2011; Iran, Khorasan-e-Razavi prov., Neyshabour city, 1250m, 36°08'37"N 59°02'00"E, 1 Female, 11.IX.2010.

Note: The larva of this species was described and figured by Beck (2000). It probably feeds on various low plants (Fibiger and Hacker, 2007).

***C. (Eremodrina) vicina* (Staudinger, 1870)**

Adult male (Fig. 4: 17); male genitalia (Figs. 6: 14, 7: 14); female genitalia (Fig. 8: 11).

Material examined: Iran, Khorasan-e-Razavi prov., Akhلامad mountains, 1550m, 36°35'52"N 58°55'07"E, 2 Males, 4 Females, 01.IX.2011.

***C. (E.) asymmetrica* (Boursin, 1936)**

Adult male (Fig. 4: 18); male genitalia (Figs. 6: 9, 7: 15).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site2), 1560m, 36°09'03"N 59°27'20"E, 1 Male, 15.07.2010; Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 1 Male, 1 Female, 07.IX.2010.

***C. (E.) inopinata* Hacker, 2004**

Adult male (Fig. 4: 13); male genitalia (Figs. 6: 11, 7: 10).

Material examined: Iran, Khorasan-e-Razavi prov., South Sabzevar, Shirahmad, 985m, 36°07'09"N 57°51'08"E, 1 Male, 2 Females, 02.V.2011; Iran, Khorasan-e-Razavi prov., Akhلامad mountains, 1550m, 36°35'52"N 58°55'07"E, 2 males, 01.IX.2011; Iran, Khorasan-e-Razavi prov., Gonabad city,

1706 m, 34°07'49"N 58°37'57"E, 1 Female, 05.VI.2011; Iran, Khorasan-e-Razavi prov., Torbat-e-Heydariyeh city, 1130m, 35°13'30"N 59°10'17"E, 1 Male, 1 Female, 12.07.2010.

Note: This species was described from Kopet-Dagh Mountains in Khorasan-e-Razavi province of Iran and this is the second report of this species from Iran.

C. (E.) belucha* (Swinhoe, 1885)

Adult female (Fig. 4: 10); male genitalia (Figs. 6: 16, 7: 8).

Material examined: Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 1 Male, 2 Females, 07.IX.2010.

C. (E.) inumbrata* (Staudinger, 1900)

Adult male (Fig. 4: 11); male genitalia (Figs. 6: 10, 7: 9); female genitalia (Fig. 8: 10).

Material examined: Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 3 Males, 4 Females, 07.IX.2010.

C. (E.) adriennea* Hacker and Gyulai, 2004

Adult male (Fig. 4: 15); male genitalia (Figs. 6: 12, 7: 12).

Material examined: Iran, Khorasan-e-Razavi prov., Akhلامad mountains, 1550m, 36°35'52"N 58°55'07"E, 2 Males, 01.IX.2011.

Note: This species was described from Isfahan province of Iran and this is the second report of this species from Iran.

C. (E.) zernyi* (Boursin, 1936)

Adult female (Fig. 4: 14); male genitalia (Figs. 6: 15, 7: 11); female genitalia (Fig. 8: 12).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site2), 1560m, 36°09'03"N 59°27'20"E, 1 Female, 15.07.2010; Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 1 Male, 07.IX.2010.

***C. (E.) fergana* (Staudinger, [1892])**

Adult female (Fig. 4: 12); male genitalia (Figs. 6: 1, 7: 1); female genitalia (Fig. 8: 9).

Material examined: Iran, Khorasan-e-Razavi prov., Akhلامad mountains, 1550m, 36°35'52"N 58°55'07"E, 2 Females, 01.IX.2011.

C. (Levantrina) bodenheimeri* (Amsel, 1935)

Adult male (Fig. 4: 16); male genitalia (Figs. 6: 13, 7: 13); female genitalia (Fig. 8: 7).

Material examined: Iran, Khorasan-e-Razavi prov., South Sabzevar, Shirahmad, 985m, 36°07'09"N 57°51'08"E, 2 Males, 2 Females, 02.V.2011.

***C. (Paradrina) clavipalpis* (Scopoli, 1763)**

Adult female (Fig. 4: 8); male genitalia (Figs. 6: 7, 7: 6); female genitalia (Fig. 8: 13).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 1 Male, 1 female, 27.05.2011; Iran, Khorasan-e-Razavi prov., Chelmir, 1024m, 37°23'34"N 58°51'22"E, 1 Male, 1 Female, 10.05.2011; Iran, Khorasan-e-Razavi prov., West Mashhad, Toos area, 1030m, 36°29'58"N 59°31'11"E, Totally, 2 Males, 3 Females, 11.VII.2010; Iran, Khorasan-e-Razavi prov., Mashhad city, Imam Reza Holy shrine, 974m, 36°17'21"N 59°36'48"E, 1 Female, 20.VIII.2011; Iran, Khorasan-e-Razavi prov., Gonabad city, 1706 m, 34°07'49"N 58°37'57"E, 1 Male, 1 Female, 05.VI.2011; Iran, Khorasan-e-Razavi prov., Torbat-e-Heydariyeh city, 1130m, 35°13'30"N 59°10'17"E, 2 Males, 12.07.2010; Iran, Khorasan-e-Razavi prov., Khaf city, 1034m, 34°33'17"N 60°07'57"E, 1 Male, 22.06.2010.

Note: This species together with *C. (Pl.) montana* are the most widespread species of the *Caradrina*.

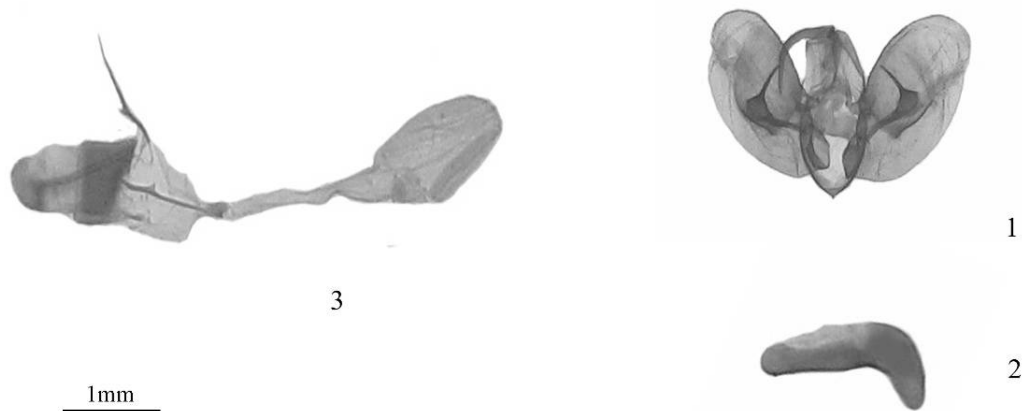


FIGURE 3. Genitalia: 1, 2. *Haemerosia albicomma* (Binaloud: site1), 1. Valva, 2. Aedeagus; 3. *Cryphia duskeimima*, female genitalia (Shirahmad).

***Hoplodrina ambigua* (Denis and Schiffermüller, 1775)**

Adult male (Fig. 4: 19); male genitalia (Figs. 6: 17, 7: 16).

Material examined: Iran, Khorasan-e-Razavi prov., West Mashhad, Toos area, 1030m, 36°29'58"N 59°31'11"E, Totally, 7 Males, 3 Females, 11.VII.2010-27.VI.2011; Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 2 Males, 27.05.2011; Iran, Khorasan-e-Razavi prov., Kalat-e-Nader city, 1087m, 36°58'48"N 59°44'46"E, 1 Male, 1 Female, 10.VIII.2010; Iran, Khorasan-e-Razavi prov., Neyshabour city, 1250m, 36°08'37"N 59°02'00"E, 1 Male, 1 Female, 11.IX.2010; Iran, Khorasan-e-Razavi prov., Khaf city, 1034m, 34°33'17"N 60°07'57"E, 2 Males, 2 Females, 22.06.2010.

***Spodoptera exigua* (Hübner, 1808)**

Adult male (Fig. 4: 20); male genitalia (Figs. 6: 24, 7: 17).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 2 Males, 1 Female, 27.V.2011; Iran, Khorasan-e-Razavi prov., Torbat-e-Heydariyeh city, 1130m, 35°13'30"N 59°10'17"E, 2 Males, 3 Females, 12.07.2010; Iran, Khorasan-e-Razavi prov., Khaf city, 1034m, 34°33'17"N 60°07'57"E, 1 Male, 2 Females, 22.06.2010; Iran, Khorasan-e-Razavi prov., West Mashhad, Toos area, 1030m, 36°29'58"N 59°31'11"E, 58 Males, 61 Females, 11.VII.2010-27.VI.2011; Iran, Khorasan-e-Razavi prov., Kalat-e-Nader city, 1087m, 36°58'48"N 59°44'46"E, 2 Males, 3 Females, 10.VIII.2010; Iran, Khorasan-e-Razavi prov., Gonabad city, 1706 m, 34°07'49"N 58°37'57"E, 1 Male, 2 Females, 05.VI.2011; Iran, Khorasan-e-Razavi prov., Neyshabour city, 1250m, 36°08'37"N 59°02'00"E, 3 Males, 2 Females, 11.IX.2010; Iran, Khorasan-e-Razavi prov., Mashhad city, Imam Reza Holy shrine, 974m, 36°17'21"N 59°36'48"E, Totally, 11 Males, 9 Females, 12.V.2011-20.VIII.2011; Iran, Khorasan-e-Razavi prov., South Sabzevar, Shirahmad, 985m, 36°07'09"N 57°51'08"E, 3 Males, 2 Females, 02.V.2011; Iran, Khorasan-e-Razavi prov., Fariman city, 1407m, 35°43'56"N 54°41'01"E, 2 Males, 5.X.2010.

***Phoebophylus veterosus* (Püngeler, 1908)**

Adult female (Fig. 5: 10); male genitalia (Figs. 6: 18, 7: 23).

Material examined: Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 1 Male, 3 Females, 07.IX.2010.

***Chloantha hyperici* (Denis and Schiffermüller, 1775)**

Adult male (Fig. 4: 7); male genitalia (Figs. 6: 6, 7: 5).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 1 Male, 27.V.2011.

Auchmis peterseni* (Christoph, 1887)

Adult male (Fig. 5: 6; male genitalia (Figs. 6: 22, 7: 21).

Material examined: Iran, Khorasan-e-Razavi prov., Kalat-e-Nader city, 1087m, 36°58'48"N 59°44'46"E, 1 Male, 10.VIII.2010; Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 1 Male, 1 female, 27.05.2011.

***Margelana versicolor* Staudinger, 1888**

Adult female (Fig. 5: 9); female genitalia (Fig. 8: 1).

Material examined: Iran, Khorasan-e-Razavi prov., Quchan mountains, 1675m, 37°14'52"N 58°28'37"E, 1 Male, 3 Females, 07.IX.2010; Iran, Khorasan-e-Razavi prov., Fariman city, 1407m, 35°43'56"N 54°41'01"E, 2 Females, 5.X.2010.

***Episema glaucina* (Esper, 1789)**

Adult female (Fig. 5: 1); female genitalia (Fig. 8: 3).

Material examined: Iran, Khorasan-e-Razavi prov., Fariman city, 1407m, 35°43'56"N 54°41'01"E, 1 Female, 5.X.2010.

***E. lederi* Christoph, 1885**

Adult female (Fig. 5: 2); female genitalia (Fig. 8: 6).

Material examined: Iran, Khorasan-e-Razavi prov., West Mashhad, Toos area, 1030m, 36°29'58"N 59°31'11"E, 1 Female, 11.VII.2010.

***Ulochlaena hirta* (Hübner, 1813)**

Adult male (Fig. 5: 11); male genitalia (Figs. 6: 23, 7: 24).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site2), 1560m, 36°09'03"N 59°27'20"E, 18 Males, 19.12.2011; Iran, Khorasan-e-Razavi prov., Binaloud mountains (site1), 1558m, 36°25'56"N 59°09'41"E, 5 Males, 10.12.2010.

Note: Several adult males of this species attracted to the light trap but no female were seen near the light trap.

Agrochola lychnidis* (Denis-Schiffermüller, 1775)

Adult female (Fig. 5: 7); male genitalia (Fig. 8: 4).

Material examined: Iran, Khorasan-e-Razavi prov., West Mashhad, Toos area, 1030m, 36°29'58"N 59°31'11"E, 1 Female, 11.VII.2010.

Brandtaxia discalis* (Brandt, 1941)

Adult female (Fig. 5: 8); female genitalia (Fig. 8: 3).

Material examined: Iran, Khorasan-e-Razavi prov., South Sabzevar, Shirahmad, 985m, 36°07'09"N 57°51'08"E, 2 Females, 02.V.2011.

***Polymixis atossa* (Wiltshire, 1941)**

Adult male (Fig. 5: 5); male genitalia (Figs. 6: 21, 7: 20).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site2), 1560m, 36°09'03"N 59°27'20"E, 2 Males, 19.12.2011.

P. rosinae* (Bohatsch, 1908) (= *paradisiaca* Boursin, 1944)

Adult male (Fig. 5: 4); male genitalia (Figs. 6: 20, 7: 19).

Material examined: Iran, Khorasan-e-Razavi prov., Binaloud mountains (site2), 1560m, 36°09'03"N 59°27'20"E, 1 Male, 19.12.2011.

Note: This species and *P. atossa* attracted to the light trap in late autumn together with *U. hirta*. The habitat was rocky slopes of the Binaloud Mountains.

Due to similarity among the collected *Caradrina* spp. in this study, we present an identification key to the collected *Caradrina* species based on the male genitalia characters described by Hacker (2004).

1- Juxta broad.....	2
1'- Juxta narrow.....	3
2- Clasper with prominent and long pollex, valva posteriorly pointed, peniculus weakly developed (Subgenus <i>Platyperigea</i>).....	<i>albina</i>
2'- Clasper without pollex, valva posteriorly rounded, peniculus very broad (Subgenus <i>Levantrina</i>).....	<i>bodenheimeri</i>
3- Sacculus without any extension, Ampulla absent, costa basally with a very strong sclerotised, semicircular vault, harpe very short and broad (Subgenus <i>Paradrina</i>).....	<i>clavipalpis</i>
3'- Sacculus with a moderately sclerotized saccular extension, ampulla well developed and harpe shaped, harpe moderately long, vertical to the clasper (Subgenus <i>Eremodrina</i>).....	4
4- Cuculli present, valvae shorter and broader than next entry (<i>vicina</i> and <i>inumbrata</i> species groups).....	5
4'- Cuculli absent, valvae slender and elongated, tapering to the tip on both sides (<i>drauti</i> and <i>roxana</i> species groups).....	10
5-Valva posteriorly closed up by various kinds of more or less broad and cucullus-shaped projections, everted vesica tubular, centrally wide and bulbous (<i>vicina</i> species group).....	6
5'- Valva posteriorly closed up by a bird-head-shaped and usually symmetrical cucullus on both sides, everted vesica short, centrally bulbous (<i>inumbrata</i> species group).....	9
6- Clasper strongly oblique and nearly horizontally positioned, harpe weakly developed, ampulla bent towards the costal margin of the valva, distal third of the valve asymmetrical and very narrow.....	<i>belucha</i>
6'- Clasper slightly oblique and not horizontally positioned, harpe well developed.....	7
7- Subbasal diverticulum d1 short, distal part of valve shorter and broader with compressed tips.....	<i>asymmetrica</i>
7'- Subbasal diverticulum d1 large and spacious.....	8
8- Spine field sf2 of vesica triple, right cucullus with an elongated tip.....	<i>inopinata</i>
8'- Spine field sf2 of vesica not triple but with a few short cornuti, cuculli not as elongated as above.....	<i>vicina</i>
9- Cuculli on both sides bird-head-shaped, saccular process strong and distally hooked.....	<i>inumbrata</i>
9'- Cuculli less bird-head-shaped, but rounded, saccular process broad but very short.....	<i>adriennea</i>
10- Appendages of valva, especially clasper and ampulla, strongly developed, ampulla usually on strong base (<i>roxana</i> species group).....	<i>fergana</i>
10'- Appendages of valva (especially ampulla) do not strongly developed, proximal part of valve to the clasper not as broad as in <i>fergana</i> (<i>drauti</i> species group).....	<i>zernyi</i>

Among the collected materials, 13 species and subspecies were collected for the first time from Khorasan-Razavi province. We do expect to have a longer list for the species list of these subfamilies through future studies. Autumnal and especially winter samplings are recommended in most parts of the sampling localities especially along the Binaloud Mountains. Furthermore, we did not use any bait traps in our sampling programs. So, we suggest using of bait traps in different seasons and localities in the Khorasan-e-Razavi province in the future studies, as some of noctuid species do not attract by the light traps.

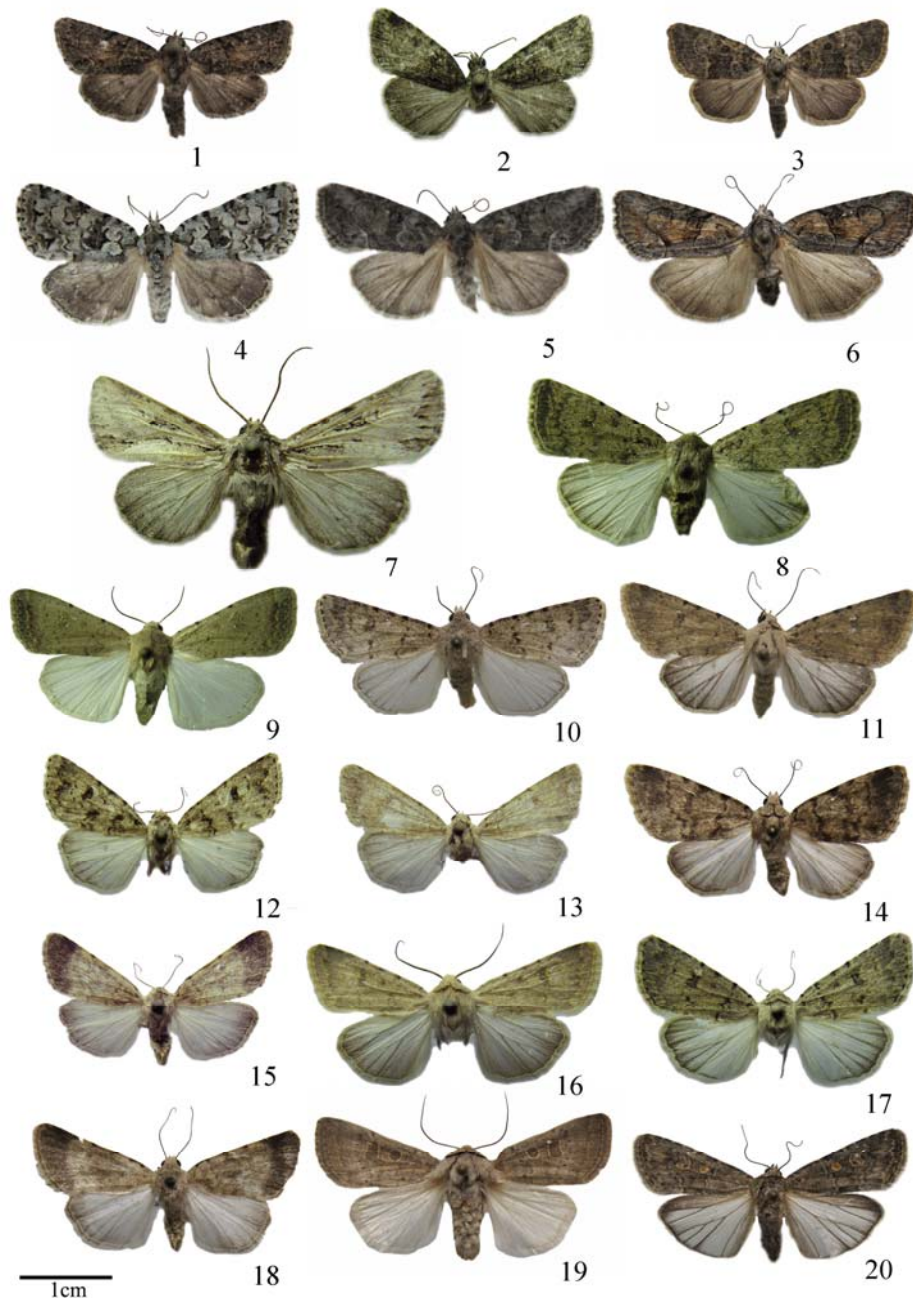


FIGURE 4. Wing patterns of collected species. 1. *Cryphia receptricula*, male (Binaloud: site1); 2. *C. algae*, male (Akhlamad); 3. *Bryophila maeonis*, female (Binaloud: site1); 4. *Nyctobrya amasina*, male (Binaloud: site1); 5. *B. ?felina*, female (Binaloud: site1); 6. *B. raptricula*, female (Quchan mountains); 7. *Cloantha hyperici*, male (Binaloud: site1); 8. *Caradrian clavipalpis*, female (Binaloud: site1); 9. *C. albina*, male (Shirahmad, South Sabzevar.); 10. *C. belucha*, female (Quchan mountains); 11. *C. inumbrata*, male (Quchan mountains); 12. *C. fergana*, female (Akhlamad); 13. *C. inopinata*, male (Akhlamad); 14. *C. zernyi*, female (Binaloud: site2); 15. *C. adriennea*, male (Akhlamad); 16. *C. bodenheimeri*, male (Shirahmad); 17. *C. vicina*, male (Akhlamad); 18. *C. asymmetrica*, male (Binaloud: site2); 19. *Hoplodrina ambigua*, male (Toos area); 20. *Spodoptera exigua*, male (Toos area).

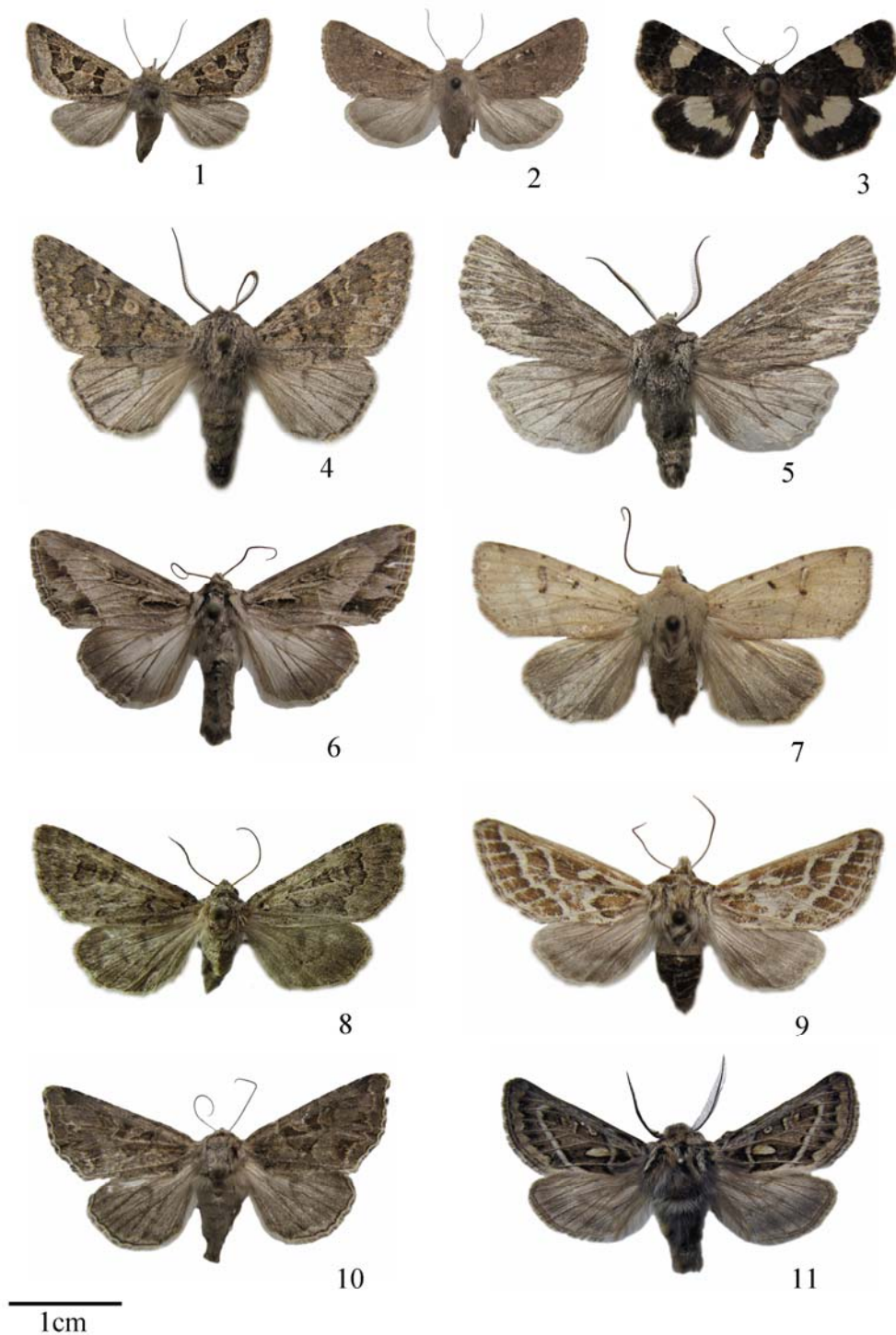


FIGURE 5. Wing patterns of collected species. 1. *Episema glaucina*, female (Fariman city); 2. *E. lederi*, female (Toos area); 3. *Tya luctuosa*, male (Toos area); 4. *Polymixis paradisiacal*, male (Binaloud: site2); 5. *P. atossa*, male (Binaloud: site2); 6. *Auchmis peterseni*, male (Kalat-e-Nader city); 7. *Agrochola hychnidis*, female (Toos area); 8. *Brandtaxia discalis*, female (Shirahmad, South Sabzevar,); 9. *Margelana versicolor*, female (Quchan mountains); 10. *Phoebophylus veternosus*, female (Quchan mountains); 11. *Ulochlaena hirta*, male (Binaloud: site2).

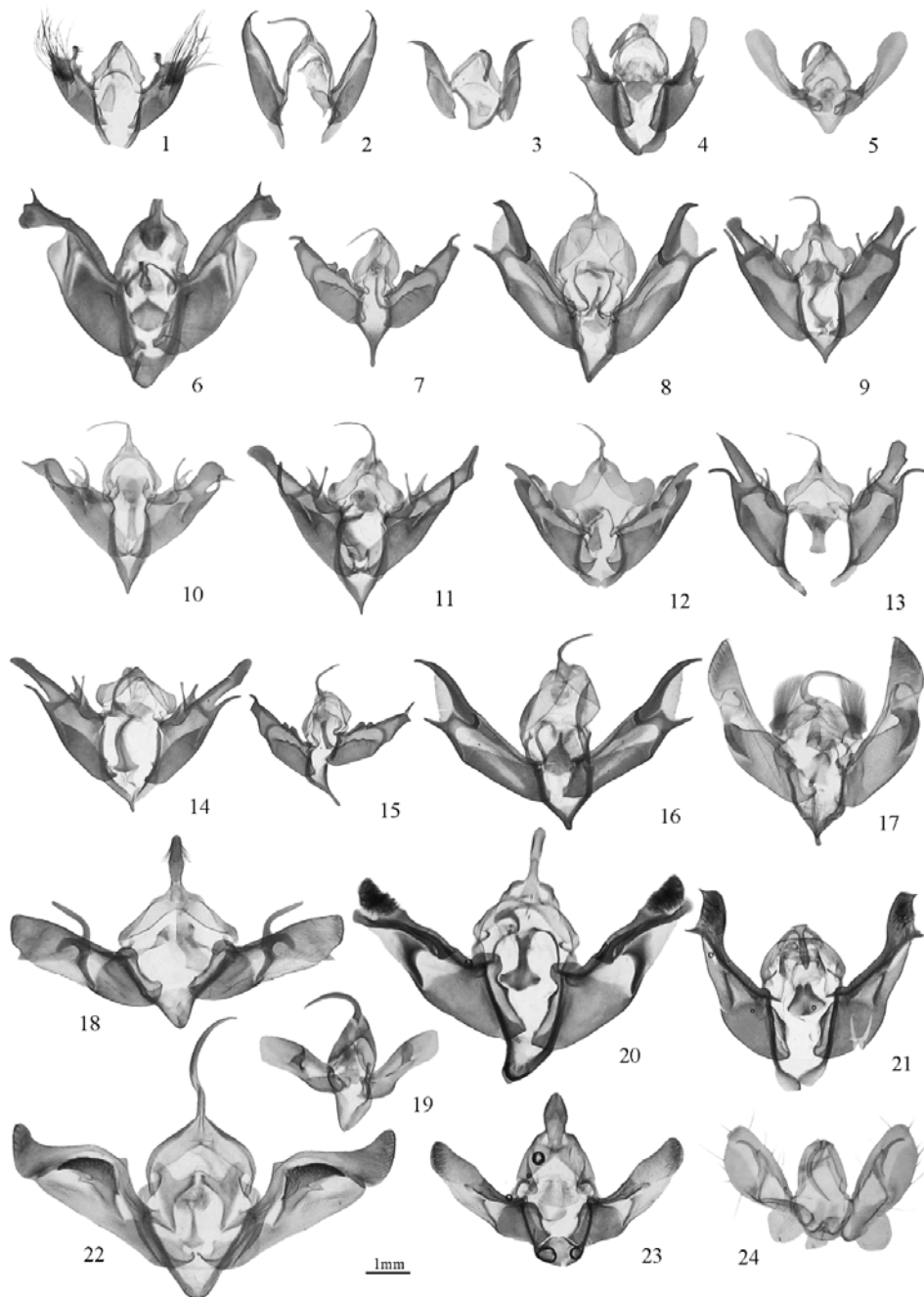


FIGURE 6. Male genital armature of collected species. 1. *Cryphia receptricula* (Binaloud: site1); 2. *C. algae* (Akhlamad); 3. *Bryophila maeonis* (Binaloud: site1); 4. *Nyctobrya amasina* (Binaloud: site1); 5. *B. raptricula* (Quchan mountains). 6. *Cloantha hyperici* (Binaloud: site1); 7. *Caradrian clavipalpis* (Binaloud: site1); 8. *C. albina* (Shirahmad, South Sabzevar); 9. *C. asymmetrica* (Binaloud: site2); 10. *C. inumbrata* (Quchan mountains); 11. *C. inopinata* (Akhlamad); 12. *C. adriennea* (Akhlamad); 13. *C. bodenheimeri* (Shirahmad, South Sabzevar); 14. *C. vicina* (Akhlamad); 15. *C. zernyi* (Binaloud: site2); 16. *C. belucha* (Quchan mountains); 17. *Hoplodrina ambigua* (Toos area); 18. *Phoebophylus veterosus* (Quchan mountains); 19. *Tyta luctuosa* (Toos area); 20. *Polymixis paradisiacal* (Binaloud: site2); 21. *P. atossa* (Binaloud: site2); 22. *Auchmis peterseni* (Kalat-e-Nader city); 23. *Ulochlaena hirta* (Binaloud: site2); 24. *Spodoptera exigua* (Toos area).

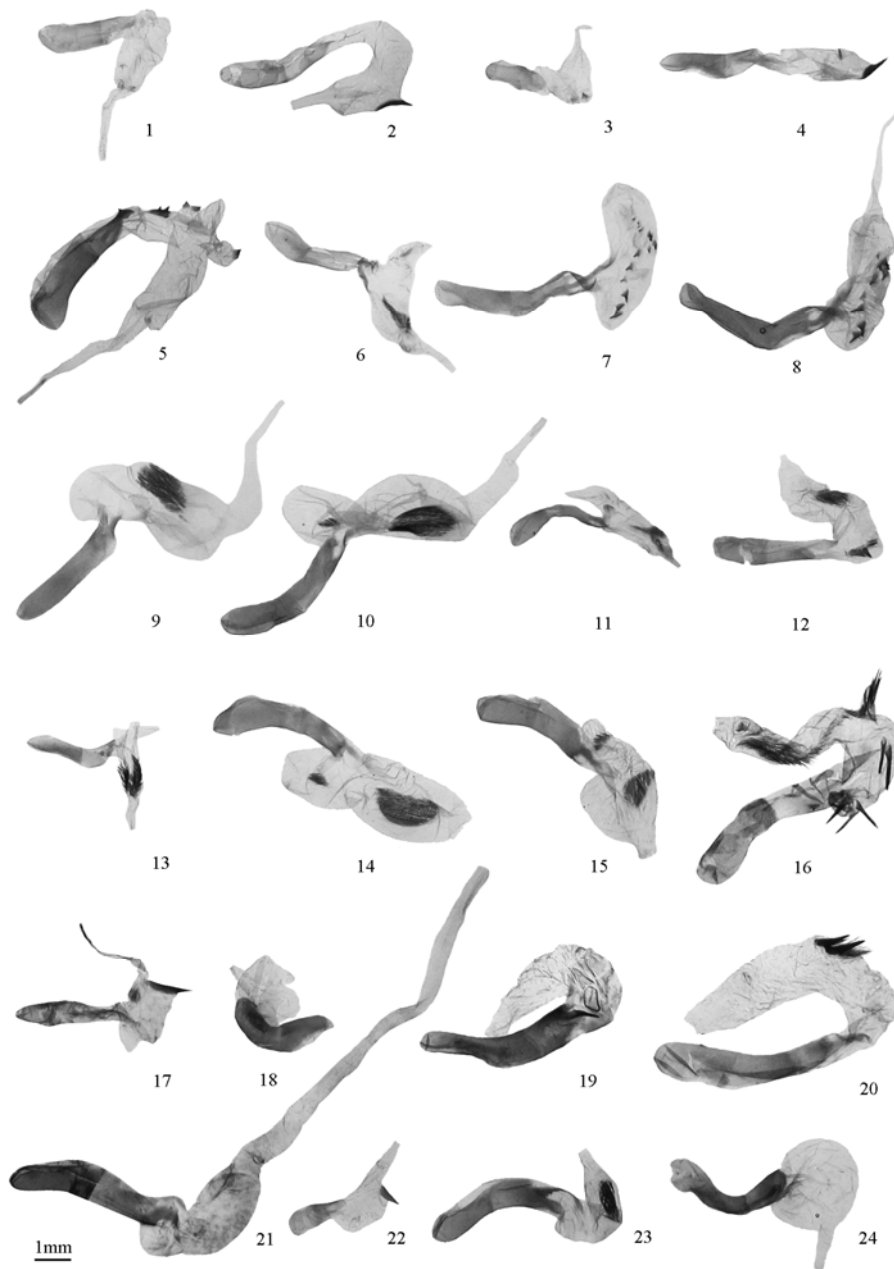


FIGURE 7. Male genital aedeagus of collected species. 1. *Cryphia receptricula* (Binaloud: site1); 2. *C. algae* (Akhlamad); 3. *Bryophila maeonis* (Binaloud: site1); 4. *Nyctobrya amasina* (Binaloud: site1); 5. *Cloantha hyperici* (Binaloud: site1); 6. *Caradrian clavipalpis* (Binaloud: site1); 7. *C. albina* (Shirahmad, South Sabzevar.); 8. *C. belucha* (Quchan mountains); 9. *C. inumbrata* (Quchan mountains); 10. *C. inopinata* (Akhlamad); 11. *C. zernyi* (Binaloud: site2); 12. *C. adriennea* (Akhlamad); 13. *C. bodenheimeri* (Shirahmad, South Sabzevar.); 14. *C. vicina* (Akhlamad); 15. *C. asymmetrica* (Binaloud: site2); 16. *Hoplodrina ambigua* (Toos area); 17. *Spodoptera exigua* (Toos area); 18. *Tyta luctuosa* (Toos area); 19. *Polymixis paradisiacal* (Binaloud: site2); 20. *P. atossa* (Binaloud: site2); 21. *Auchmis peterseni* (Kalat-e-Nader city); 22. *B. raptricula* (Quchan mountains); 23. *Phoebophylus veterosus* (Quchan mountains); 24. *Ulochlaena hirta* (Binaloud: site2).

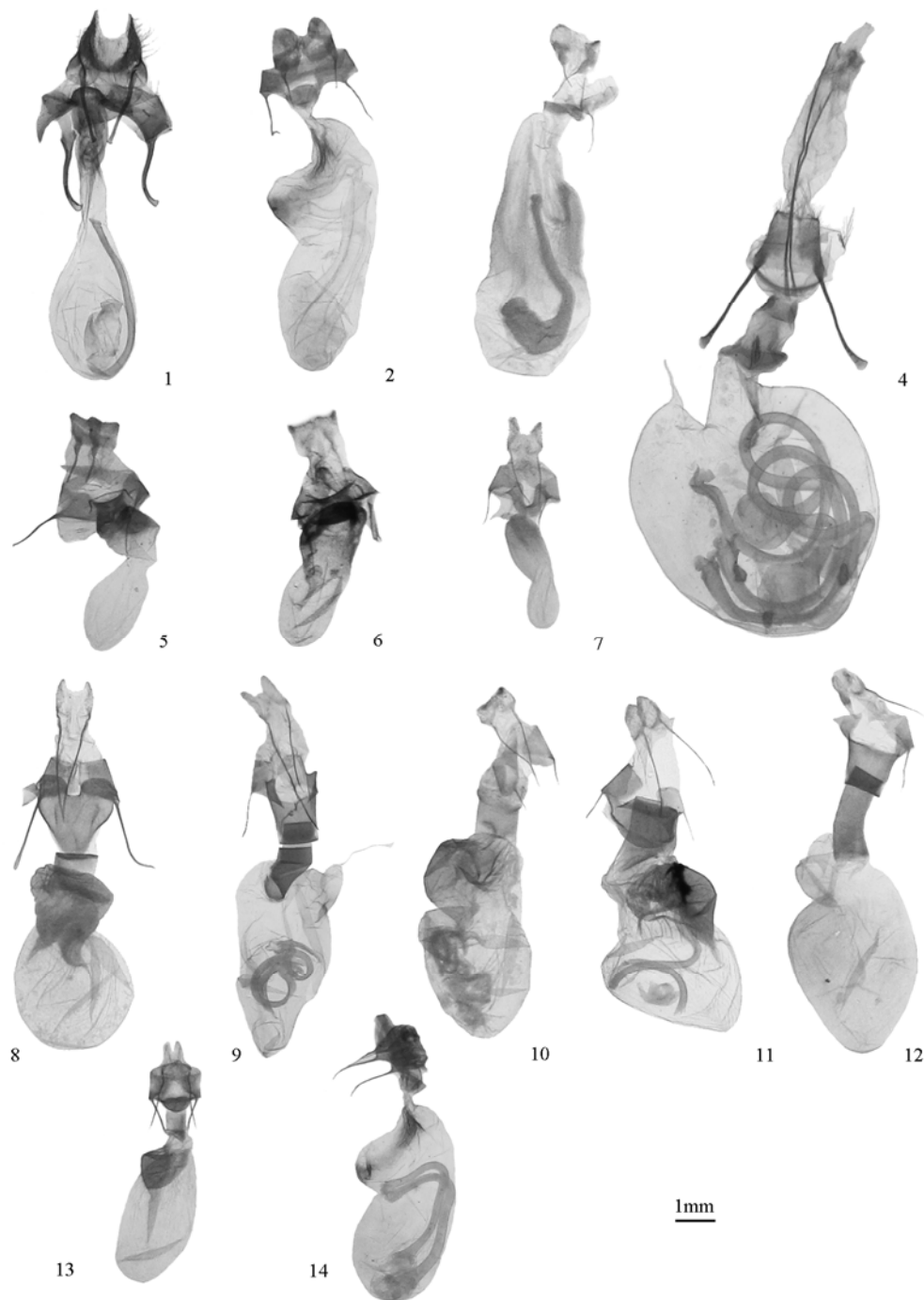


FIGURE 8. Female genitalia of collected species. 1. *Margelana versicolor* (Quchan mountains); 2. *Bryophila raptricula* (Quchan mountains); 3. *Brandtaxia discalis* (Shirahmad, South Sabzevar.); 4. *Agrochola lychnidis* (Toos area); 5. *Episema glaucina* (Fariman city); 6. *E. lederi* (Toos area); 7. *Caradrina bodenheimeri* (Shirahmad, South Sabzevar.); 8. *C. albina* (Shirahmad, South Sabzevar.); 9. *C. fergana* (Akhlamad); 10. *C. inumbrata* (Quchan mountains); 11. *C. vicina* (Akhlamad); 12. *C. zernyi* (Binaloud: site2); 13. *Caradrina clavipalpis* (Binaloud: site1); 14. *B. ?felina* (Binaloud: site1).

ACKNOWLEDGMENTS

The authors extend their sincere thanks to Dr. Peter Gyulai, Miskolc, Hungary for confirmation of the species identification as well as Mr. Alireza Rabieh for his kind helps in sampling excursions. We also thank Mr. Shamabadi and other authorities from Environment Protection Organization of Sabzevar, Mashhad and Dargaz for their kindly helps and supports. This study was financially supported by Shahid Chamran University of Ahvaz.

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