

First record of *Caradrina (Eremodrina) turcomana* Hacker, 2004 for Iran with a catalogue of the genus *Caradrina* Ochsenheimer, 1816 of Iran (Lepidoptera, Noctuidae)

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The genus *Caradrina* Ochsenheimer, 1816 is restricted to Holarctic and Ethiopian regions. Small inconspicuous appearance of its species is such that determination of the well over 150 species is one of the most difficult problems among all Noctuidae. According to light trap samplings which were made in different parts of Iran during 2010-2016, the present paper offers new data on the distribution of *Caradrina* species in Iran and reports *Caradrina turcomana* Hacker, 2004, as a new record for the Iranian fauna. Furthermore, we provide a catalogue of the genus *Caradrina* of Iran including 56 species and 11 subspecies together with available information on the type locality, synonyms, distribution and bionomics for all of the recorded species as well as discussion on the recent relevant publications.

Key words: *Caradrina*, checklist, Iran, new record, *Caradrina turcomana*.

INTRODUCTION

The genus *Caradrina* Ochsenheimer, 1816 with 156 described species is the most species-rich genus of the tribe Caradrinini Boisduval, 1840 in the subfamily Xyleninae and restricted to Holarctic and Ethiopian regions (Hacker 2004; Hacker & Legrain 2006). Even though their typical Noctuide-marking like the crosslines of the forewing and reniform and orbicular stigmata are reasonably well defined in most of the species, their small inconspicuous appearance is such that determination of the well over 150 species is one of the most difficult problems among all noctuids (Hacker, 2004).

Traditionally the *Caradrina* genus-complex has been placed systematically in the subfamily Amphipyriinae. Hacker (2004) in his fundamental revision suggested some autoapomorphic characters for defining the *Caradrina* genus-group in the tribe Caradrinini. Then, he included those species have the following character states in the genus *Caradrina*: heavily sclerotized throughout ostium-plate in the ventral side of the antrum in the female genitalia; and typical arrangement of 1-2 spine-fields and up to 4 diverticula in the vesica of the male genitalia. Hacker (2004) classified the genus into eight subgenera: *Caradrina*, *Platyperigea* Smith, 1894, *Boursinidrina* Hacker, 2004, *Kalchbergiana* Hacker, 2004, *Eremodrina* Boursin 1937, *Levantrina* Hacker, 2004, *Weigertrina* Hacker, 2004 and *Paradrina* Boursin, 1937.

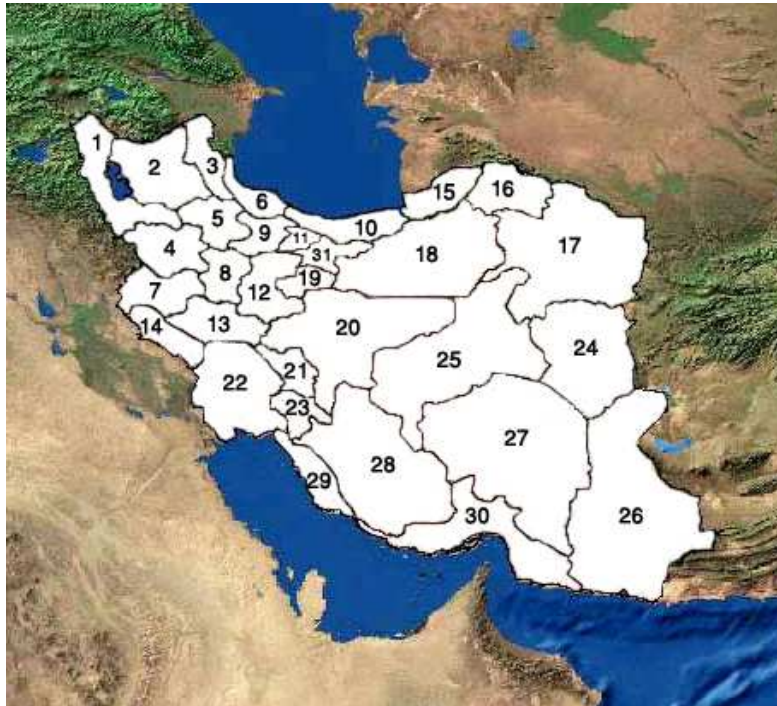


FIGURE 1. Provinces of Iran: 1. Azarbaijan-e-Gharbi, 2. Azarbaijan-e-Sharghi, 3. Ardabil, 4. Kordestan, 5. Zanzan, 6. Guilan, 7. Kermanshah, 8. Hamedan, 9. Qazvin, 10. Mazandaran, 11. Alborz, 12. Markazi, 13. Lorestan, 14. Ilam, 15. Golestan, 16. Khorasan-e-Shomali, 17. Khorasan-e-Razavi, 18. Semnan, 19. Qom, 20. Esfahan, 21. Chahar Mahal-va-Bakhtiari, 22. Khuzestan, 23. Kohgiluyeh-va-Boyerahmad, 24. Khorasan-e-Jonubi, 25. Yazd, 26. Sistan-va-Baluchestan, 27. Kerman, 28. Fars, 29. Bushehr, 30. Hormozgan, 31. Tehran.

The larvae of this genus are up to 3.0 cm, grayish-brown or muddy yellow, with yellowish dots and dark-colored striae. Head dark with special white pattern or dark without pattern. Spinneret 3.0 to 5.0 times longer than first segment of labial palp. Second seta of each palp 1.5 times longer than first seta, or setae equal. Small dark-colored spot present between setae II-IX on thoracic shield. No inner tooth on mandibles. Setae set on pinacula. Hooks of abdominal legs uniordinal or indistinctly biordinal. Stigmata dark-colored. Skin finely grained (Merzheevskaya, 1988).

Most of *Caradrines* are univoltine; some especially in the subgenus *Paradrina*, are bi- or multivoltine. In drier regions the flying season is mostly in late summer or autumn, in more humid regions in summer. The larvae are polyphagous on low plants, seemingly not so specific in choosing foodplant. This habitat might be advantageous in competition with other species and together with their well adaptation to dusty and inconspicuous subterranean environment and seems to be also a reason why they might survive more perfectly and develop a plenty of specific and individual forms (Hacker 2004; Fibiger & Hacker 2007).

Since Christoph (1876) reported *Caradrina vicina* Staudinger, 1870 from the North of Iran, many expeditions have been made in Iran resulted in finding many *Caradrina* species from different parts such as Binaloud, Alborz and Zagros Mountains including new taxa for the genus (e.g. Brandt, 1941; Ebert & Hacker, 2002). Expeditions of members of the State Museum of Natural

History of Karlsruhe resulted in recording 47 species and subspecies of *Caradrina* from various localities in Iran during 1969-75 (Ebert & Hacker, 2002).

The present paper offers new data on the distribution of some *Caradrina* species in Iran and reports *Caradrina turcomana* Hacker, 2004, as a new record for the Iranian fauna. Furthermore, we provide a catalogue of the genus *Caradrina* of Iran with information on the type locality, synonyms, distribution and bionomics for all of the recorded species.

MATERIAL AND METHODS

Samplings were carried out by using light traps powered by 12 volt batteries and 8 watt Black light UVB tubes. Extensive samplings were made in parts of Khuzestan and Kerman provinces and extra samplings were made also in Fars and Khorasan-e-Razavi during 2010-2016. Few specimens were examined at the State Museum of Natural History of Karlsruhe (Germany) in September 2015. Genitalia of the specimens were prepared using modern dissection standards for preparation of male and female genitalia of Lepidoptera. 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, Ahvaz, Iran. Distribution of the species was set according to the current provincial differentiations of Iran (Fig. 1). Identifications were made according to Hacker (2004). Final confirmation was done by noctuid specialists Dr. Laszlo Ronkay and Dr. Peter Gyulai. Systematics and nomenclature are according to Hacker (2004).

RESULTS

Altogether, 56 species and 11 subspecies of *Caradrina* were listed from Iran based on our samplings and literature review. Among them, 15 taxa were new provincial records (Seven for Kerman, five for Khuzestan, two for Fars and one for Khorasan-e-Razavi) and *Caradrina turcomana* was new to the fauna of Iran. According to our material and also the literature review, we present a catalogue of the genus *Caradrina* of Iran including 67 species and subspecies with summarising available information on the type locality, synonyms, distribution and bionomics for all of the recorded species. We cited Iranian provinces in the section "distribution in Iran" (cities and regions in parenthesis).

Genus *Caradrina* OCHSENHEIMER, 1816

Caradrina Ochsenheimer, 1816, Die Schmetterlinge von Europe 4: 80.

Type species. *Phalaena morpheus* Hufnagel, 1766, Berlinisches Mag. 3(3): 302-vicinity of Berlin.

Synonym. *Charadrina* Agassiz, 1847; *Amphidrina* Staudinger, 1892; *Pseudophyllophila* Berio, 1977.

Subgenus *Platyperigea* Smith, 1894

Caradrina (Platyperigea) terrea matron Ronkay & Varga, 1985

Type. *Caradrina terrea matron* Ronkay & Varga, 1985, Zeitschrift der Arbeitsgemeinschaft österreichischer Entomologen 36: 91 – L. t.: Geghard (Armenia).

General Distribution. This subspecies is widespread and common in forest steppes of Anatolia, Transcaucasus and North Iran. The nominate subspecies occurs in southern and southeastern parts of Central Europe (Fibiger & Hacker, 2007).

Distribution in Iran. Apart from North of Iran (Fibiger & Hacker, 2007), this species distributes in southern Iranian territory according to our record and is new to Kerman.

Bionomics. This univoltine xerothermophilic steppe species avoids the Mediterranean evergreen sclerophyllous forests. The larva was described and figured by Beck (2000) and is probably polyphagous on plenty of low plants (Fibiger & Hacker, 2007).

Material examined. 1 ♂, Kerman (Sangdan, 29° 06' 06" N 57° 33' 12" E), 15.4.2015.

***Caradrina (Platyperigea) terrea froitzheimi* Boursin, 1957**

Type. *Caradrina froitzheimi* Boursin, 1957, Bulletin de la Société Linnéenne de Lyon 26: 158 – L. t.: Ejan (Afghanistan).

Synonym. *froitzheimi* Boursin, 1957.

General Distribution. This subspecies is widespread from Northeast Iran to the western Himalayan region including Pakistan (Fibiger & Hacker, 2007).

Distribution in Iran. Khorasan (Binaloud) (Hacker 2004).

Bionomics. The early stages and bionomics of this species are unknown in Iran and elsewhere.

***Caradrina (Platyperigea) warneckeii* (Boursin, 1936)**

Type. *Athetis warneckeii* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 91 – L. t.: Ala-tau (Kyrgyzstan).

General Distribution. Turkestanian: from Iran and Turkmenistan to China.

Distribution in Iran. Tehran (Alborz Mts.) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. The early stages and foodplants of this species are unknown.

***Caradrina (Platyperigea) kadenii* Freyer, 1836**

Type. *Caradrina kadenii* Freyer, 1836, Neuere Beitrage zur Schmetterlingskunde mit Abbildungen nach der Natur 2: 147 – L. t.: South Russia, without detail.

General Distribution. Ponto-Mediterranean: from southern Europe to Levante, Iran and Turkmenistan (Hacker, 2001, 2004).

Distribution in Iran. Mazandaran (Razan) (Hacker, 2004; Fibiger & Hacker, 2007).

Bionomics. This bivoltine species flies in spring and late summer to early autumn in Europe (Hacker, 2001). The larva feeds on low herbs and figured by Beck (2000). It inhabits xerotherm and rocky places in southern Europe; and xerotherm sandy or rocky regions in central Europe (Kravchenko *et al.*, 2007).

***Caradrina (Platyperigea) aspersa* Rambur, 1834**

Type. *Caradrina aspersa* Rambur, 1834, Annales de la Societe Entomologique de France 3: 385 – L. t.: Marseille (France).

Synonym. *anceps* Herrich-Schäffer, [1849]; *aspersa* ab. *alfacaria* Ribbe, 1912; *culoti* Turati, 1913; *predotae* Schawera, 1931; *alfacaria* Draudt, 1934; var. *pyjoli* Agenjo, 1954; *buddenbrocki* Gross, 1956; *proverai* Berio, 1977.

General Distribution. Ponto-Mediterranean: it is widespread in the southern half of the Europe, North Africa and Near and Middle East (Fibiger & Hacker, 2007).

Distribution in Iran. Golestan and Khorasan (Hacker, 2004).

Bionomics. Bivoltine, Flying in spring and late summer to autumn. The larva feeds on low herbaceous plants and was described by Beck (2000).

***Caradrina (Platyperigea) montana montana* Bremer, 1861**

Type. *Caradrina montana* Bremer, 1861, Bulletin de l'Académie Impériale des Sciences de Saint-Petersbourg 3: 485 – L. t.: Apfelgebirge (Russia).

Synonym. *grisea* var. *apatetica* Püngeler, 1914; *fuscicornis sachalinensis* Matsumura, 1925; *melancholica* Draudt, 1934; *grisea kaolina* Bryk, 1949.

Taxonomic note. Hacker (2004) treated Iranian population as *Caradrina montana rougemonti* Spuler, 1908. However, *rougemonti* occurs in Alps and the nominotypical subspecies exists in Iran (Laszlo Ronkay pers. comm.).

General Distribution. Holarctic: nominate subspecies distributed from Ural Mountains to China and Mongolia (Fibiger & Hacker, 2007).

Distribution in Iran. Kordestan (Divandarre, Bijar), Zanjan, Tehran (Damavand), Alborz (Kandovan), Mazandaran (Lar dam) and Khorasan (Kopet-Dagh) (Hacker, 2004). It is new for Kerman.

Bionomics. Different low plants such as Alfalfa, *Verbascum thapsus*, *Rumex*, *Plantago* and *Hieracium* reported as food plants (Fibiger & Hacker, 2007). Larva was described by Beck (2000).

Material examined. 1 ♀, Kerman (Sangdan, 29° 06' 06" N 57° 33' 12" E), 1.2.2015; 5 ♂, Kerman (Omrudoieh, 29° 05' 55" N 57° 33' 13" E), 8,30.7.2015; 1 ♀, Kerman (Babgorgy, 29° 05' 17" N 57° 33' 33" E), 10.8.2015; 2 ♂, 1 ♀, Kerman (Dochar, 29° 04' 40" N 57° 37' 01" E), 10.9.2015; 4 ♂, 2 ♀, Kerman (Sangdan, 29° 06' 06" N 57° 33' 12" E), 3,29,30.9.2015, 1 ♂, 2 ♀, Kerman (Sangdan, 29° 06' 06" N 57° 33' 12" E), 1.10.2015.

Caradrina (Platyperigea) albina Eversmann, 1848

Type. *Caradrina albina* Eversmann, 1848, Bulletin de la Societe Imperiale des Naturalistes de Moscou 21: 215 – L. t.: Kasan (South Russia).

Synonym. *congesta* Lederer, 1853; *albina tenera* A. Bang-Haas, 1912.

General Distribution. Ponto-Turkestanian: from Eastern Europe through all the Near and Middle East (Fibiger & Hacker, 2007).

Distribution in Iran. Kermanshah, Alborz (Karaj), Mazandaran (Bandar-e-Anzali and Polur), Gilan (Tonekabon), Khorasan (Binaloud), Fars (Shahriari) (Ebert & Hacker, 2002; Hacker, 2004), Hamadan (Hacker & Meineke, 2001), Khorasan-e-Shomali (Dasht) (Wieser & Stangelmaier, 2005) Azarbaijan-e-Shahrghi (Modarres Awal, 2002) and Khorasan-e-Razavi (Rabieh *et.al.* 2013).

Bionomics. This species probably feeds on various low plants like other congeners (Fibiger & Hacker, 2007). The larva was described and figured by Beck (2000).

Subgenus *Boursinidrina* Hacker, 2004

Caradrina (Boursinidrina) rjabovi (Boursin, 1936)

Type. *Athetis rjabovi* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 91 – L. t.: Armenia, Araxe, near Migry, Njuvady (Armenia).

Synonym. *rjabovi pseudovicina* Boursin, 1939

General Distribution. Iran: from Alborz and Zaghzro Mts. to Turkey and Armenia (Hacker, 2004).

Distribution in Iran. Azarbayjan-e-Sharghi (Moghan), Tehran, Alborz, Mazandaran, Kordestan (Divandarre), Lorestan (Dorud), Fars (Sepidan), Kerman (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. The bionomics and early stages of this species are unknown in Iran and elsewhere as well as food plants. However, according to recorded materials could be summer-autumn species.

Material examined. 1 ♂, Fars (Kamfiruz, 30° 20' 28" N 52° 13' 13" E), 25.8.2011.

Caradrina (Boursinidrina) panurgia (Boursin, 1939)

Type. *Elaphria panurgia* Boursin, 1939, Entomologische Rundschau 56: 292 – L. t.: Fars: Shiraz-Kazerun road (Iran).

General Distribution. Iran: also from Turkey and Palestine (Hacker, 2001, 2004).

Distribution in Iran. Hamadan (Razan), Kermanshah (Qasr-e-Shirin, Kohgiluyeh-va-Boyerahmad (Yasuj, Sisakht), Fars (Shiraz-Kazerun road, Sivand) and Esfahan (Khansar) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. Bivoltine. The early stages and host plants are unknown until now. This species inhabits rocky steppe zones (Hacker, 2001).

***Caradrina (Boursinidrina) pseudadelpha* (Boursin, 1939)**

Type. *Elaphria pseudadelpha* Boursin, 1939, Entomologische Rundschau 56: 321– L. t.: Sepidan: Komehr (Iran).

General Distribution. Iran: also known from Turkey (Hacker, 2004).

Distribution in Iran. Kermanshah (Qasr-e-Shirin), Kordestan (Divandarreh), Tehran (Damavand), Alborz (Kandovan), Fars (Shiraz-Kazeroun road, Sepidan), Esfahan (Khansar) and Kohgiluyeh-va-Boyerahmad (Sisakht) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. It is unknown until now.

Material examined. 1 ♂, Fars (Neyriz, 29° 13' 22" N 54° 26' 17" E), 27.8.2011.

***Caradrina (Boursinidrina) brandti* (Boursin, 1939)**

Type. *Elaphria brandti* Boursin, 1939, Entomologische Rundschau 56: 321 – L. t.: Shiraz-Kazerun road (Iran).

General Distribution. Iran: Turkmenian Kopet Dagh (Hacker, 2004).

Distribution in Iran. Khorasan (Binaloud and Kopet-Dagh), Mazandaran, Azarbayejan -e-Sharghi (Miyaneh), Esfahan (Gohrud and Khansar), Fars (Hacker, 2004) and Kerman (Jiroft and Sirjan) (Bidar, 2010).

Bionomics. The bionomics and early stages are unknown.

Material examined. 2 ♂, Kerman (Sangdan, 29° 06' 06" N 57° 33' 12" E), 3, 4.9.2015.

***Caradrina (Boursinidrina) hemipentha* (Boursin, 1939)**

Type. *Elaphria hemipentha* Boursin, 1939, Entomologische Rundschau 56: 322 – L. t.: Sepidan: Komehr (Iran).

General Distribution. Iran.

Distribution in Iran. Lorestan (Doroud), Tehran, Fars (Sepidan, Shiraz-Kazerun) and Kohgiluyeh-va-Boyerahmad (Sisakht) (Hacker, 2004).

Bionomics. The early stages and host plants are unknown until now.

***Caradrina (Boursinidrina) wiltshirei* (Boursin, 1936)**

Type. *Athetis wiltshirei* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 92 – L. t.: Rowanduz (Iraq).

General Distribution. Iran: Also known from Iraq and Turkey (Hacker, 2004).

Distribution in Iran. Lorestan (Dorud), Mazandaran (Damavand), Fars (Sepidan, Kazerun) and Esfahan (Khansar) (Ebert & Hacker, 2002; Hacker, 2004). It is new for Kerman and Khuzestan.

Bionomics. The bionomics and early stages of this species are unknown.

Material examined. 1 ♂, 2 ♀, Kerman (Khabr National Park, 28° 39' 19" N 56° 26' 46" E), 14.9.2015; 4 ♂, 2 ♀, Khuzestan (Malaqa, 31° 35' 57" N 50° 00' 50" E), 16.5.2011, 2.6.2011; 1 ♀, Fars (Tang-e-bolhayat, 29° 44' 02" N 51° 46' 58" E), 29.4.2011; 1 ♀, Fars (Farashband road, 28° 54' 12" N 52° 17' 31" E), 13.5.2011; 1 ♀, Fars (Kamfiruz, 30° 20' 28" N 52° 13' 13" E), 25.8.2011.

***Caradrina (Boursinidrina) parvaspersa* (Boursin, 1936)**

Type. *Athetis parvaspersa* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 92 – L. t.: Rayat (Iraq).

General Distribution. Iran: Iraq and Turkey as well.

Distribution in Iran. Fars (Sepidan and Shiraz-Kazerun road) and Kohgiluyeh-va-Boyerahmad (Sisakht) (Hacker, 2004).

Bionomics. Early stages and food plants are unknown in Iran and elsewhere.

***Caradrina (Boursinidrina) pulvis* (Boursin, 1939)**

Type. *Elaphria pulvis* Boursin, 1939, Entomologische Rundschau 56: 291 – L. t.: Sepidan: Komehr (Iran).

General Distribution. Iran.

Distribution in Iran. Fars (Shiraz-Kazerun road) (Hacker, 2004) and Lorestan (Dorud).

Bionomics. It is unknown until now.

Material examined. 1 ♂, 1 ♀, Lorestan (14 km E Dorud), 6.8.1975, leg. Ebert & Falkner (coll. SMNK, Germany).

***Caradrina (Boursinidrina) surchica* (Boursin, 1937)**

Type. *Elaphria surchica* Boursin, 1937, Entomologische Rundschau 54: 13 – L. t.: Rowanduz (Iraq).

General Distribution. Iran: Iraq and Turkey (Hacker, 2004).

Distribution in Iran. Kermanshah (Qasr-e-Shirin), Lorestan (Dorud), Kohgiluyeh-va-Boyerahmad (Sisakht, Yasuj), Fars (Kazerun, Sivand) and Esfahan (Hacker, 2004). It is new for Khuzestan.

Bionomics. The early stages or host plants are unknown.

Material examined. 1 ♂, 1 ♀, Fars (Neyriz, Layraz, 29° 13' 22" N 54° 26' 17" E), 27.8.2011; 1 ♀, Fars (Qirokarzin, 28° 14' 12" N 52° 43' 07" E), 22.4.2011; 1 ♂, Khuzestan (Malaqa, 31° 35' 57" N 50° 00' 50" E), 3.6.2015.

***Caradrina (Boursinidrina) stenoptera* (Boursin, 1939)**

Type. *Elaphria stenoptera* Boursin, 1939, Entomologische Rundschau 56: 291 – L. t.: Fars: Mian Kotal (Iran).

Synonym. *agrapha* Boursin, 1939.

General Distribution. Iran.

Distribution in Iran. Fars (Sepidan, Suriyan and Miyan Kotal) and Lorestan (Dorud) (Hacker, 2004). It is new for Khuzestan.

Bionomics. Flying in June and August, early stages are unknown.

Material examined. 2 ♂, 2 ♀, Khuzestan (Malaqa, 31° 35' 57" N 50° 00' 50" E), 7.6.2011; 2 ♀, Fars (Sepidan, Bereshne village, 30° 21' 22" N 52° 53' 36" E), 21.7.2011.

***Caradrina (Boursinidrina) oberthuri persica* (Boursin, 1942)**

Type. *Elaphria oberthurid persica* Boursin, 1942, Zeitschrift der Wiener Entomologischen Gesellschaft 27: 92 – L. t.: Hormozgan: Said Abad (Iran).

General Distribution. Iran: Arabian Peninsula and Levante.

Distribution in Iran. Lorestan, Fars (Lar), Kohgiluyeh-va-Boyerahmad (Yasuj, Sisakht), Hormozgan (Bandar-e-Abbas) and Sistan-va-Baluchestan (Chabahar) (Hacker, 2004).

Bionomics. Bivoltine in spring and autumn. The larva was described and figured by Beck (2000). This specie is a winter flier and inhabits desert and semidesert areas (Hacker, 2001, 2004).

***Caradrina (Boursinidrina) soudanensis* (Hampson, 1918)**

Type. *Athetis soudanensis* Hampson, 1918, Novitates Zoologicae 25: 145 – L. t.: Kut Sudan (Sudan).

General Distribution. Saharo-Sindian: from north of the Sahara to Arabian Desert (Hacker, 2001).

Distribution in Iran. Sistan-va-Baluchestan (Chabahar) and Hormozgan (Bandar-e-Abbas) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. Bivoltine, in March to April and October to December. The early stages are unknown. It is a true desert species (Hacker, 2001).

Subgenus *Eremodrina* Boursin, 1937***Caradrina (Eremodrina) vicina* Staudinger, 1870**

Type. *Caradrina vicina* Staudinger, 1870, Berliner Entomologische Zeitschrift 14: 118 – L. t.: Sarepta (South Russia).

Synonym. *perspicua* Warren, 1911.

General Distribution. Ponto-Mediterranean-Turkestanian. This species is widespread in east Europe and Near and Middle East (Hacker, 2001).

Distribution in Iran. Tehran (Polur and Qolhak), Khorasan (Binaloud and Kopet-Dagh) and Fars (Sepidan) (Ebert & Hacker, 2002; Hacker, 2004; Rabieh *et al.*, 2013).

Bionomics. Univoltine, during summer and autumn. The larvae feed on low plants. The species inhabits the steppe (Fibiger & Hacker, 2007).

***Caradrina (Eremodrina) asymmetrica* (Boursin, 1936)**

Type. *Athetis asymmetrica* Boursin, 1936, Bulletin de la Societe Entomologique de France 41: 88 – L. t.: Ashgabat (Turkmenistan).

Synonym. *perspicua* Filipjev, 1928.

General Distribution. It ranges from North Iran to Turkmenistan, Uzbekistan, Tadjikestan, Kazakhstan and Afghanistan (Hacker, 2004).

Distribution in Iran. Tehran, Alborz, Khorasan-e-Shomali (Kopet Dagh) Khorasan-e-Razavi (Binaloud) (Ebert & Hacker, 2002; Rabieh *et al.*, 2013).

Bionomics. The early stages of this species and its food plants are unknown.

***Caradrina (Eremodrina) inopinata* Hacker, 2004**

Type. *Caradrina inopinata* Hacker, 2004, Esperiana 10: 156 – L.t.: Khorasan: Kopet-Dagh (Iran).

General Distribution. It is known only from Iranian part of Kopet-Dagh Mountains.

Distribution in Iran. Rabieh *et al.* (2013) collected this species from different parts of Khorasan-e-Razav.

Bionomics. It is on the wing from spring to autumn. Early stages are unknown.

***Caradrina (Eremodrina) belucha* Swinhoe, 1885**

Type. *Caradrina belucha* Swinhoe, 1885, Transaction of the Royal Entomological Society of London 1885: 348 – L. t.: Quetta (Pakistan).

Synonym. *conditorana* Pinker, 1980.

General Distribution. Irano-Eremic: Syria, Iraq, Turkey, Pakistan, Iran and Turkmenistan to China (Hacker, 2004).

Distribution in Iran. Fars (Shiraz), Kermanshah (Qasr-e-Shirin), Azarbayejan-e-Gharbi (Ebert & Hacker, 2002; Hacker, 2004) and Khorasan-e-Razavi (Rabieh *et al.*, 2013)

Bionomics. Univoltine, autumnal. The early stages and bionomics are unknown. The species inhabits semideserts and deserts (Hacker, 2001).

***Caradrina (Eremodrina) melanura* Alphéraky, 1897**

Type. *Caradrina vicina* var. *melanura* Alphéraky, 1897, in: Romanoff, Mémoires sur les Lépidoptères 9: 33 – L. t.: Eldar, Ordubad (Armenia).

Synonym. *melanura samurana* Boursin, 1939; *melanura samurana* Boursin, 1940.

General Distribution. Iran: Transcaucasus, Turkmenistan, northeastern Turkey (Hacker, 2004).

Distribution in Iran. Golestan (Shahkuh), Tehran (Damavand) and Khorasan (Binaloud and Kopet-Dagh) (Ebert & Hacker, 2002).

Bionomics. It inhabits lower and moderate altitudes. Early stages and food plants of this species are unknown.

***Caradrina (Eremodrina) khorassana* (Boursin, 1942)**

Type. *Elaphria khorassana* Boursin, 1942, Zeitschrift der Wiener Entomologischen Gesellschaft 27: 97 – L. t.: Binaloud (Iran).

General Distribution. Iran and Afghanistan (Hacker, 2004).

Distribution in Iran. Khorasan-e-Razavi (Binaloud) (Hacker, 2004).

Bionomics. The bionomics and early stages of this species are unknown.

***Caradrina (Eremodrina) armeniaca* (Boursin, 1936)**

Type. *Athetis clara armeniaca* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 94 – L. t.: Negram, pres Nakhitschevan, sur l'Araxe (Armenia).

Synonym. *clara armeniaca* Boursin, 1936.

General Distribution. It ranges from eastern Turkey and Transcaucasus through the western Asian mountain chains (Fibiger & Hacker, 2007).

Distribution in Iran. Gilan (Talesh), Tehran (Kamard, Rudehen, Evin), Alborz (Karaj), Lorestan (Dorud), Fars (Sepidan, Sivand), Esfahan (Semrom, Natanz), Sistan-va-Baluchestan (Khash), Kohgiluyeh va Boyerahmad (Sisakht), Azarbaijan-e-Gharbi (Mianeh) (Ebert & Hacker, 2002; Hacker, 2004), Khorasan-e-Shomali (Dasht, Almeh and Mirza Baylu), Golestan (Tang-e-Gol) (Wieser & Stangelmaier, 2005) and Kerman (Baft) (Bidar, 2010).

Bionomics. This species usually occurs on lowlands (Fibiger & Hacker, 2007). The larva was figured and described by Beck (2000).

***Caradrina (Eremodrina) inumbrata obfuscata* Hacker, 2004**

Type. *Caradrina inumbrata obfuscata* Hacker, 2004, Esperiana 10: 192 – L. t.: Kars (Turkey).

General Distribution. Widespread in Northeastern Turkey to west of Iran.

Distribution in Iran. Azarbaijan-e-Gharbi (Chaypareh) (Hacker, 2004).

Bionomics. The bionomics and early stages as well as food plants are unknown.

***Caradrina (Eremodrina) inumbrata exterioris* Hacker, 2004**

Type. *Caradrina inumbrata exterioris* Hacker, 2004, Esperiana 10: 193 – L. t.: Binaloud (Iran).

Taxonomic note. The nominotypical *inumbrata* occurs in Turkey and records of this subspecies from Iran should be deleted (e.g. Ebert & Hacker, 2002; Rabieh *et al.*, 2013).

General Distribution. This subspecies occurs in Iran, Turkmenian part of Kopet-Dagh and North Afghanistan (Hacker, 2004).

Distribution in Iran. Khorasan-e-Razavi (Binaloud), Khorasan-e-Shomali (Jozak, Shirvan), Gilan (Astara), Tehran, Lorestan (Dorud), Fars (Sepidan), Azarbaijan-e-Sharghi (Bostanabad, Miyane), Mazandaran (different parts of Alborz Mts.), Zanjan (Tarom), Kohgiluyeh-va-Boyerahmad (Dena), Esfahan (Golestan), Hamadan (Razan) (Hacker, 2004) and Kerman (Baft) (Bidar, 2010).

Bionomics. The early stages and food plants are unknown yet.

Material examined. 1 ♂, Kerman (Dochar, 29° 04' 40" N 57° 37' 01" E), 10.9.2015.

***Caradrina (Eremodrina) isfahana* Hacker, 2004**

Type. *Caradrina isfahana* Hacker, 2004, Esperiana 10: 196 – L. t.: Khansar (Iran).

General Distribution. It is only known from type locality.

Distribution in Iran. Esfahan (Khansar) (Hacker, 2004)

Bionomics. No bionomic data obtained on this species yet.

***Caradrina (Eremodrina) didyma* (Boursin, 1939)**

Type. *Elaphria didyma* Boursin, 1939, Entomologische Rundschau 56: 322 – L. t.: Sepidan: Komehr (Iran).

Synonym. *didyma hemipenthoides* Boursin, 1942.

Taxonomic note. We collected few specimens close to *didyma* in Kerman province, but their genitalia differ slightly from *didyma*. Precise identification of these specimens needs further study.

General Distributidon. It has only reported from Iran.

Distribution in Iran. Kermanshah (Qasr-e-Shirin), Fars (Shiraz-Kazeroun road), Kohgiluyeh-va-Boyerahmad (Sisakht), Esfahan (Natanz, Kuhe Karkas), Khorasan (Binaloud), Tehran (Darband), Alborz (Karaj) (Hacker, 2004) and Kerman (Shirvani, 2012).

Bionomics. The bionomics and early stages of this species are unknown.

***Caradrina (Eremodrina) adriennea* Hacker and Gyulai, 2004**

Type. *Caradrina adriennea* Hacker and Gyulai, 2004, Esperiana 10: 198 – L. t.: Esfahan: Qohrud Mountain ranges (Iran).

General Distribution. It has only collected from Iran.

Distribution in Iran. Esfahan (Qohrud) (Hacker, 2004) and Khorasan-e-Razavi (Rabieh *et al.*, 2013). It is new for Fars (Neyriz).

Bionomics. The bionomics of this species is unknown in Iran and elsewhere.

Material examined. 1 ♂, Fars (Neyriz, 29° 13' 22" N 54° 26' 17" E), 27.8.2011.

***Caradrina (Eremodrina) eucrinospila* (Boursin, 1936)**

Type. *Athetis eucrinospila* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 88 – L. t.: Ashgabat (Turkmenistan).

Synonym. *prospera* Kuznetsov, 1958.

General Distribution. Caspian element: Turkmenistan and northeastern Iran (Hacker, 2004).

Distribution in Iran. Khorasan-e-Razavi (Binaloud) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. This is a desert and semidesert species (Hacker, 2004). The early stages of this species and its food plants are unknown.

***Caradrina (Eremodrina) altissima* Hacker, 2004**

Type. *Caradrina altissima* Hacker, 2004, Esperiana 10: 204 – L. t.: Esfahan: Fereidun Shahr (Iran).

General Distribution. This species is probably an endemic of the highest parts of the central Zagros mountain chain near Esfahan (Hacker, 2004).

Distribution in Iran. Esfahan (Fereidun Shahr) (Hacker, 2004).

Bionomics. No data is available until now.

***Caradrina (Eremodrina) filipjevi* (Boursin, 1936)**

Type. *Athetis filipjevi* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 89 – L. t.: Samarkand, Kara-Tioubé (Usbekistan).

General Distribution. Turkestanian element: widespread in Pamir and Hindukush mountain chains (Hacker, 2004).

Distribution in Iran. Fars (Sepidan: Komehr, Barm-e-Firuz) (Ebert and Hacker, 2002; Hacker, 2004) and Khorasan (Kopet-Dagh) (Hacker, 2004).

Bionomics. The early stages of this species and the food plants are unknown.

***Caradrina (Eremodrina) parthica* Hacker, 2004**

Type. *Caradrina parthica* Hacker, 2004, Esperiana 10: 209 – L. t.: Khorasan: Quchan (Iran).

General Distribution. This species has only recorded from kopet-Dagh Mountains of Iran and Turkmenistan (Hacker, 2004).

Distribution in Iran. Khorasan (Quchan: Kopet-Dagh).

Bionomics. The bionomics of this species is unknown until now.

***Caradrina (Eremodrina) phanosciera* (Boursin, 1939)**

Type. *Elaphria phanosciera* Boursin, 1939, Entomologische Rundschau 56: 323 – L. t.: Sepidan: Komehr (Iran).

General Distribution. This species was only recorded from Iran.

Distribution in Iran. Kohgiluyeh-va-Boyerahmad (Sisakht) Esfahan (Khansar) and Fars (Sepidan: Komehr, Barm-e-Firuz) (Hacker, 2004).

Bionomics. It is restricted to mountain ranges of Zaghros, Alborz and Khorasan. No further data is available yet.

***Caradrina (Eremodrina) salzi* (Boursin, 1936)**

Type. *Athetis salzi* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 90 – L. t.: Diarbakir, Malatia Tecde (Turkey).

General Distribution. Iran: from eastern Turkey and Iran (Hacker, 2004).

Distribution in Iran. Tehran (Rudehen), Alborz (Karaj), Fars (Sepidan: Komehr, Sivand, Shiraz-Kazeroun road) (Ebert & Hacker, 2002; Hacker, 2004), Azarbayijan-e-Sharghi (Mianeh), Azarbayijan-e-Gharbi (Chaypareh), Kohgiluyeh-va-Boyerahmad (Sisakht) and Esfahan (Qohrud) (Hacker, 2004).

Bionomics. The early stages and bionomics of this species are unknown.

Material examined. 1 ♀, Fars (Sivand, 30° 05' 17" N 52° 54' 58" E), 18.5.2011.

***Caradrina (Eremodrina) xanthorhoda* (Boursin, 1937)**

Type. *Elaphria xanthorhoda* Boursin, 1937, Entomologische Rundschau 54: 437 – L. t.: Tehran: Rudehen, Damavend (Iran).

Synonym. *xanthorhoda tenebrosa* Boursin, 1942.

General Distribution. Iran.

Distribution in Iran. Mazandaran (Minac), Khorasan (Binaloud), Kohgiluyeh-va-Boyerahmad (Sisakht), Chahar Mahal-va-Bakhtiari (Zard Kuh, Haft Cheshmeh), Tehran and Alborz (different mountain ranges) (Hacker, 2004).

Bionomics. The early stages and bionomics of this species are unknown.

***Caradrina (Eremodrina) draudti* (Boursin, 1936)**

Type. *Athetis draudti* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 89 – L. t.: Vansee (Turkey).

Synonym. *pseudopertinax* Boursin, 1939, 1940.

General Distribution. Ponto-Mediterranean: Turkey, Transcaucasus, Iran (Fibiger & Hacker 2007).

Distribution in Iran. Mazandaran (Niknamdeh), Golestan, Khorasan-e-Shomali (Golestan National Park) (Hacker, 2004) and Zanjan (Hacker & Meineke, 2001).

Bionomics. It is on the wing in summer and autumn. The early stages were described by Reisser (1958). The spread trees of *Abies*, *Juniperus*, *Quercus*, bushes, grasses and herbaceous plants mentioned as habitat of the species (Fibiger & Hacker, 2007).

***Caradrina (Eremodrina) zagrobia* Hacker, 2004**

Type. *Caradrina zagrobia* Hacker, 2004, Esperiana 10: 228 – L. t.: Qasr-e-Shirin (Iran).

General Distribution. Iran.

Distribution in Iran. Kermanshah (Qasr-e-Shirin), Yazd (Taft: Deh Bala) and Fars (Tangebolhayat) (Hacker, 2004).

Bionomics. The bionomics and early stages of this species are unknown.

***Caradrina (Eremodrina) zernyi debilis* (Boursin, 1936)**

Type. *Athetis zernyi debilis* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 88 – L. t.: Rowanduz (Iraq).

Taxonomic note. According to revision of Hacker (2004) The population from southeast Turkey southeastwards belong to the subspecies *C. zernyi debilis* and records of nominate subspecies from Iran should be *zernyi debilis* (e.g. Ebert & Hacker, 2002; Rabieh *et al.*, 2013).

General Distribution. Iran, Iraq and southeast Turkey.

Distribution in Iran. Azarbayjan-e-Gharbi (Mianeh, Chaypareh), Kermanshah (Qasr-e-Shirin), Fars (Sivand, Tangebolhayat) and Esfahan (Natanz) (Hacker, 2004). It is new for Khuzestan and Kerman.

Bionomics. It is univoltine and autumn species in the Levante (Kravchenko *et al.*, 2007); but in Iran (Khuzestan) flying from May to October. Early stages and host plants are unknown until now.

Material examined. 5 ♂, 4 ♀, Khuzestan (Malaqa, Baghmalek, 31° 35' 57" N 50° 00' 50" E), 16.5.2011, 2.6.2011; 2 ♂, 2 ♀, Kerman (Khabr National Park, 28° 39' 19" N 56° 26' 46" E), 20.8.2015, 14.9.2015.

***Caradrina (Eremodrina) eremocosma* (Boursin, 1937)**

Type. *Elaphria eremocosma* Boursin, 1937, Entomologische Rundschau 54: 438 – L. t.: Kala-Zendj (Iran), it should be Tale Zang village in North Khuzestan province.

General Distribution. Irano-eremic: endemic to Iran but might also occur in Arabian Peninsula.

Distribution in Iran. Khuzestan, Kermanshah (Qasr-e-Shirin), Fars (Shiraz, Sivand), Hormozgan and Lorestan (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. The early stages and bionomics of this species are unknown.

Material examined. 2 ♂, 1 ♀, Khuzestan (Malaqa, 31° 35' 57" N 50° 00' 50" E), 16.5.2011, 2.6.2011.

***Caradrina (Eremodrina) melanurina* (Staudinger, 1901)**

Type. *Agrotis melanura* var. *melanurina* Staudinger, 1901, Catalog der Lepidopteren des palaearctischen Faunengebietes 1:146– L. t.: South Palestine.

General Distribution. Syro-eremic: Levante, Arabian Peninsula and Iran (Hacker, 2001).

Distribution in Iran. Unidentified location in southern Iran cited as “Mesh-Tosongh” in Ebert & Hacker (2002).

Bionomics. The early stages were described by Wiltshire (1948). Univoltine and autumnal species, the larvae feed on low plants (e.g. various *Anabasis* species). The species inhabits stony semidesert and desert (Hacker, 2001; Kravchenko *et al.*, 2007).

***Caradrina (Eremodrina) alfierii* (Boursin, 1937)**

Type. *Elaphria alfierii* Boursin, 1937, Entomologische Rundschau 54: 439 – L. t.: Sinai, Arab-Gebiet (Egypt).

General Distribution. Syro-eremic: Levante, Arabian Peninsula and Iran (Hacker, 2004).

Distribution in Iran. Kavir-e-Namak, Esfahan (Natanz) (Hacker, 2004).

Bionomics. Univoltine and autumnal species. The species inhabits the stony semidesert and desert. The early stages and bionomics are unknown (Hacker, 2001).

***Caradrina (Eremodrina) hypocnephas* Boursin, [1968]**

Type. *Caradrina hypocnephas* Boursin, 1967, Entomops, Nice 2(11): 105 – L. t.: Sarobi-e-Kabul (Afghanistan).

General Distribution. This species is only known from Afghanistan and Iran (Hacker, 2004).

Distribution in Iran. Esfahan (Natanz) (Ebert & Hacker, 2002).

Bionomics. The early stages of this species and the food plants are unknown.

***Caradrina (Eremodrina) turcomana* Hacker, 2004**

Type. *Caradrina turcomana* Hacker, 2004, Esperiana 10: 241 – L. t.: Ashgabat (Turkmenistan).

Identification. This species is a sister species of *C. furcivalva* (Hacker, 1992) and *C. hypocnephas* which both occurs in east Afghanistan (Fig. 2). Male antennae very slightly ciliate, and in female filiform. Wingspan 23-28 mm, forewings, narrow with angled apex, pale grey ground color with brown tone, reniform and orbicular stigmata poorly defined, dark brown-grey well-defined submarginal shading, rarely interrupted by the paler subterminal fascica, three dark costal spots present but reduced. Hindwings much paler, terminal shade darker in both sexes. Underside of the wings shiny uniform pale grey, subterminal shading present on both forewings and hindwings. Distal third of the valve longer and basally broader, slightly curved at posterior with very small spine-like process on costal end. Vesica bent laterally with large spine field of long spiculi. In the female genitalia, gonapophyses short; ostium plate large, cup-like; ductus bursae moderately long and broad; elongated and anteriorly narrowed corpus bursae, appendix bursae large but not clearly separated.

This species is one of the smallest in *Eremodrina*. It can not be mistaken with other species of Kopet-Dagh Mts. due to its small size, angled wing apex and uniform and dark colour and markings. It resembles more to *hypocnephas* but can be separated by the narrower forewing and darker ground colour. *C. furcivalva* is larger with paler ground colour.

General Distribution. Turkmenistan, Iran (Hacker, 2004).

Distribution in Iran. This is a new record for the Iranian fauna from Kerman and Khorasan-e-Razavi (Binaloud Mountains).

Bionomics. It inhabits low and middle altitudes of eremic areas (Figure 3). The bionomics of this species is unknown.

Material examined. 2 ♀, Kerman (Khabr National Park, Sohan Darreh, 28° 39' 43" N 56° 26' 50" E, 1920m.), 14.9.2015, slide no. 815 & 789; 1 ♀, Khorasan-e-Razavi, Binaloud Mountains (Akhlamad, 36° 35' 52" N 58° 55' 07" E, 1550m.), 1.9.2011, slide no. 305.

***Caradrina (Eremodrina) nadir* Boursin, 1957**

Type. *Caradrina nadir* Boursin, 1957, Bulletin de la Société Linnéenne de Lyon 26: 160 – L. t.: Paghman (Afghanistan).

General Distribution. Turkestanian: from NW Pakistan to Tajikistan.

Distribution in Iran. Zanzan (Kuh-e-Sendan) (Ebert & Hacker, 2002).

Bionomics. The early stages and bionomics of this species are unknown in Iran and elsewhere.

***Caradrina (Eremodrina) fergana* Staudinger, 1892**

Type. *Caradrina vicina* var. *fergana* Staudinger, 1892, Deutsche Entomologische Zeitschrift Iris 4: 295 – L. t.: Margelan (Uzbekistan).

Synonym. *vicina* var. *fergana* Staudinger, 1892.

General Distribution. Turkestanian: from south Russia to India.

Distribution in Iran. Khorasan-e-Razavi (Binaloud), Khorasan-e-Shomali (Jozak) and Mazandaran (Hacker, 2004; Rabieh *et al.*, 2013).

Bionomics. The early stages of this species and its food plants are unknown.



FIGURE 2. Adult wing pattern (left) and female genitalia (right) of *Caradrina turcomana*, new record for Iran.

***Caradrina (Eremodrina) sarhadica* (Boursin, 1942)**

Type. *Elaphria sarhadica* Boursin, 1942, Zeitschrift der Wiener Entomologischen Gesellschaft 27: 96 – L. t.: Kuh-e-Taftan (Iran).

General Distribution. Iran.

Distribution in Iran. Sistan-va-Baluchestan (Kuh-e-Taftan) (Hacker, 2004).

Bionomics. The early stages and bionomics of this species are unknown.

***Caradrina (Eremodrina) pertinax* (Staudinger, 1879)**

Type. *Caradrina pertinax* Staudinger, 1879, Horae Societatis Entomologicae Rossicae 14: 387 – L. t.: Amasia, Kerasdere (Turkey).

Synonym. *pertinax argentea* Caradja, 1930.

General Distribution. Iran: widespread and common in Near East and parts of Middle East (Hacker, 2004).

Distribution in Iran. Tehran (Darband, Rudehen, Damavand), Khorasan (Binaloud), Mazandaran (Sari: Baladeh, Minac, Razan), Chahar Mahal-va-Bakhtiari (Naghan), Kordestan (Baneh), Lorestan (Dorud), Zanjan (Kuh-e-Sendan), Yazd (Shir Kuh) and Fars (Shiraz, Sepidan: Komehr, Abadeh, Miyan-Kotal, Eghlid: Kuh-e-Bell) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. No data is available on the early stages and bionomics of this species.

***Caradrina (Eremodrina) ammoxantha* (Boursin, 1957)**

Type. *ammoxantha* Boursin, 1957, Bulletin de la Société Linnéenne de Lyon 26: 161 – L. t.: Badakhshan, Senna (Afghanistan).

Taxonomic note. Because no male has yet been found among Iranian specimens, occurrence of this species in Iran is not fully confirmed (Hacker, 2004).

General Distribution. Turkestanian.

Distribution in Iran. Fars (Abadeh, Miyan-Kotal) Kordestan (Baneh, Marivan) and Lorestan (Dorud) (Ebert & Hacker, 2002).

Bionomics. The early stages and bionomics of this species are unknown.

***Caradrina (Eremodrina) gilva orientalis* (Boursin, 1936)**

Type. *Athetis gilva orientalis* Boursin, 1936, Bulletin de la Societe Entomologique de France 1936: 93 – L. t.: Ak-Chehir (Turkey).

General Distribution. This subspecies has only recorded from Iran and Turkey (Hacker, 2004).

Distribution in Iran. Tehran (Darband) (Hacker, 2004).



FIGURE 3. Habitat of *Caradrina turcomana* in the Akhلامad area in Binaloud Mountain ranges of Northeast Iran (left) and Khahr National Park in Kerman province, South Iran (right).

Bionomics. This xeromontane species inhabits mostly the higher mountains where there is sparse vegetation in rocky places. The larva which was described by Beck (2000) feeds on various low plants (Fibiger & Hacker, 2007).

***Caradrina (Eremodrina) flava* Oberthür, 1876**

Type. *Caradrina flava* Oberthür, 1876, Etudes d'Entomologie 1: 45 – L. t.: Tlemcen, Collo (Algeria).

Synonym. *approximans* Rothschild, 1914.

General Distribution. Saharo-Sindian: from Mauretania to Iran (Hacker, 2004).

Distribution in Iran. Sistan-va-Baluchestan (Chabahar) and Hormozgan (Kuh-e-Genou) (Ebert & Hacker, 2002; Hacker, 2004). It is new for Kerman.

Bionomics. Bivoltine, vernal and autumnal. The early stages were described and figured by Beck (2000). The host plants are still unknown. This is a semidesert and desert species (Fibiger & Hacker, 2007).

Material examined. 1 ♀, Kerman (Omrudoieh, 29° 05' 55" N 57° 33' 13" E), 24.4.2015; 2 ♂, 4 ♀, Kerman (Hishin, 28° 38' 23" N 57° 56' 43" E), 5.2.2016.

***Caradrina (Eremodrina) pseudalbina* (Boursin, 1942)**

Type. *Elaphria pseudalbina* Boursin, 1942, Zeitschrift der Wiener Entomologischen Gesellschaft 27: 93 – L. t.: Chabahar: Takht-e-Malek (Iran).

General Distribution. Irano-eremic: Pakistan and Afghanistan as well.

Distribution in Iran. Sistan-va-Baluchestan (Chabahar) (Hacker, 2004). It is new for Khorasan-e-Razavi.

Bionomics. The early stages and bionomics of this species are unknown.

Material examined. 1 ♀, Khorasan-e-Razavi (Binaloud, 36° 28' 56" N 59° 46' 17" E), 10.9.2012.

Subgenus *Levantrina* Hacker, 2004

***Caradrina (Levantrina) bodenheimeri* (Draudt, 1934)**

Type. *Athetis bodenheimeri* Draudt, 1934, in Seitz, Die Palaearkt. Eulenart. Nachtf. Suppl. 176 – L. t.: Palestine.

Synonym. *bodenheimeri* Amsel, 1935; *bodenheimeri chlorotica* Boursin, 1936; *bodenheimeri plesiarchia* Boursin, 1937.

General Distribution. Irano-Eremic: This is the most frequent species in the Levante and other parts of the Near and Middle East (Hacker, 2001).

Distribution in Iran. Tehran (Evin, Kamard, Damavand, Qolhak), Alborz (Karaj), Fars (Jahrom, Marvdasht, Dasht-e-Arjan, Abadeh, Meymand, Sivand, Neyriz, Mian Kotal), Kohgiluyeh-va-Boyerahmad (Yasuj, Sisakht), Bushehr (Dalaki, Minab), Hormozgan (Bandar-Abbas, Genou), Kordestan, Zanjan (Tarom), Esfahan (Kashan), Kermanshah (Qasr-e-Shirin), Khuzestan (Shush) (Ebert & Hacker, 2002; Hacker, 2004), and Golestan (Jahan Nama, Ziarat), Khorasan-e-Shomali (Almeh, Sulgerd, Mirza Boyloo and Dasht) (Wieser and Stangelmaier, 2005), Kerman (Shirvani, 2012), Khorasan-e-Razavi (Shirahmad) (Rabieh *et al.*, 2013).

Bionomics. Bivoltine, the autumnal generations are significantly smaller and darker. The early stages were described by Wiltshire (1943). The larvae feed on low plants such as *Calendula* sp., *Echinops philistaeus* (Asteraceae). The is a steppe and semidesert species (Hacker, 2001).

Material examined. 1 ♂, Kerman (Omrudoieh, 29° 05' 55" N 57° 33' 13" E), 24.4.2015; 1 ♀, Kerman (Jiroft, 28° 39' 11" N 57° 45' 56" E), 9.5.2015; 2 ♀, Kerman (Dehsard, 28° 40' 39" N 56° 33' 02" E), 2.2.2016; 2 ♂, 1 ♀, Kerman (Hishin, 28° 38' 23" N 57° 56' 43" E), 5.2.2016; 1 ♀, Fars (Nur-Abad, 30° 11' 36" N 51° 31' 27" E), 15.4.2011; 3 ♂, Fars (Kotal Pirzan, 29° 36' 48" N 51° 56' 28" E), 13.4.2011; 2 ♀, Fars (Bolhayat & Kotal Pirzan, 29° 36' 48" N 51° 56' 28" E), 2,9.6.2011; 6 ♂, 3 ♀, Khuzestan (Malaqa, 31° 35' 57" N 50° 00' 50" E), 20.4.2015, 16.5.2011.

Subgenus *Weigertrina* Hacker, 2004

***Caradrina (Weigertrina) diabolica* (Boursin, 1942)**

Type. *Elaphria diabolica* Boursin, 1942, Zeitschrift der Wiener Entomologischen Gesellschaft 27: 95 – L. t.: Chahbahar: Takht-e-Malek (Iran).

General Distribution. Irano-eremic: Saudi Arabia and Iran.

Distribution in Iran. Baluchestan (Chahbahar: Takht-e-Malek) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. This is a winter species and only few specimens of this species have been collected so far. No data on the early stages and bionomics of this species are available.

Subgenus *Paradrina* Boursin, 1937

***Caradrina (Paradrina) selini forsteri* (Boursin, 1939)**

Type. *Elaphria forsteri* Boursin, 1939, Entomologische Rundschau 56: 324 – L. t.: Mazandaran: Kelardasht, Takht-e-Suleiman Massif (Iran).

General Distribution. Iranian element.

Distribution in Iran. Mazandaran (Gonbad-e-Qabus, Razan, Kelardasht), Tehran (Darband, Polur) and Hormozgan (Gohreh) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. A univoltine spring species; feeds on herbaceous plants such as *Rumex*, *Plantago*, *Taraxacum* (Hacker, 2004).

***Caradrina (Paradrina) abruzzensis rufirena* (Boursin, 1939)**

Type. *Elaphria rufirena* Boursin, 1939, Entomologische Rundschau 56: 324 – L. t.: Mazandaran: Kelardasht, Takht-e-Suleiman Massif (Iran).

Synonym. *rufirena* Boursin, 1940; *personata* Kuznetsov, 1958.

Taxonomic note. We collected a single male specimen from Kerman which is close to this subspecies but with slight differences in genitalia. Precise identification needs to collect more of this specimen.

General Distribution. Only Known from North Iran and Turkmenistan (Hacker, 2004).

Distribution in Iran. Tehran (Takht-e-Suleiman), Mazandaran (Kelardasht: Hasankif, Razan) and Khorasan (Binaloud: Zoshk) (Hacker, 2004).

Bionomics. In Europe, the habitat of nominate subspecies is open, warm rocky areas with typical Mediterranean dry flora. It is on the wing in spring and early summer. The early stages and host plants are unknown (Fibiger & Hacker, 2007).

***Caradrina (Paradrina) poecila* (Boursin, 1939)**

Type. *Elaphria poecila* Boursin, 1939, Entomologische Rundschau 56: 322 – L. t.: Sepidan: Komehr (Iran).

General Distribution. Iran.

Distribution in Iran. Fars (Sepidan: Komehr and Barm-e-Firuz, Dasht-e-Arjan), Lorestan (Dorud), Kohgiluyeh-va-Boyerahmad (Sisakht), Chahar Mahal-va-Bakhtiari (Zard Kuh, Haft Cheshmeh, Borujen: Dorahan) (Hacker & Kautt, 1999; Hacker, 2004).

Bionomics. The early stages and bionomics of this species are unknown.

***Caradrina (Paradrina) fulvafusca* Hacker, 2004**

Type. *Caradrina fulvafusca* Hacker, 2004, Esperiana 10: 355 – L. t.: Hakkari (Turkey).

General Distribution. Turkey, North of Iran and Russia.

Distribution in Iran. Zanjan (Hacker, 2004).

Bionomics. This univoltine species is on the wing from end of May to beginning of August. The early stages are undescribed.

***Caradrina (Paradrina) boursini* (F. Wagner, 1936)**

Type. *Athetis boursini* F. Wagner, 1936, Zeitschrift des Österr Entomologen Vereines 21: 74 – L. t.: Alborz province: Kandovan (Iran),

General Distribution. Iran, Turkey and Armenia (Hacker, 2004).

Distribution in Iran. Mazandaran (Damavand), Alborz (Kandovan) Mazandaran (Kelardasht: Takht-e-Suleiman, Hasankif), Zanjan and Azarbaijan-e-Sharghi (Sarkend-e-Dizaj) (Ebert & Hacker, 2002; Hacker, 2004).

Bionomics. The larva and its food plants are unknown.

Material examined. 2 ♂, 1 ♀, Alborz (Gachsar), 17.8.1972, leg. Ebert (coll. SMNK, Germany).

***Caradrina (Paradrina) flavirena* Guenée, 1852**

Type. *Caradrina flavirena* Guenée, 1852, in: Boisduval and Guenée, Histoire Naturelle des Insectes. Noctuelites 1: 250 – without data.

Synonym. *selini* var. *minor* Staudinger, 1897; *flavirena* ab. *subdita* Warren, 1911; *muricolor* Boursin, 1933; *flavirena subdita* Leraut, 1980.

Taxonomic note. Some specimens were collected by the second author from Khuzestan which has some similarity with this species but with clear differences. It could be a new species and will be treated later.

General Distribution. Mediterranean-Iranian: occurs in the whole Mediterranean basin, most of the Black sea basin and some of the adjacent countries of the Near and Middle East (Fibiger & Hacker, 2007).

Distribution in Iran. Kordestan (Sanandaj) (Hacker, 2004). It is new for Fars.

Bionomics. This is a bivoltine species, but in North Africa it may be multivoltine. The larva is figured and described by Beck (2000). Its host plants are unknown in Iran, but it is polyphagous on low herbs in Europe (Fibiger & Hacker, 2007).

Material examined. 2 ♂, 1 ♀, Fars (Shiraz, Qirokarzin road, 28° 41' 12" N 52° 43' 07" E), 22.4.2011.

***Caradrina (Paradrina) flavirena zobeidah* (Boursin, 1937)**

Type. *Elaphria zobeidah* Boursin, 1937, Entomologische Rundschau 54: 431 – L. t.: Baghdad (Iraq).

General Distribution. Atlantico-Mediterranean (Hacker, 2004).

Distribution in Iran. Alborz (Karaj) and Tehran (Darband) (Hacker, 2004).

Bionomics. The larvae are polyphagous on low herbs, favouring especially *Sonchus*. The early stages were described by Wiltshire (1957).

***Caradrina (Paradrina) zandi* Wiltshire, 1952**

Type. *Caradrina zandi* Wiltshire, 1952, Bulletin of the Society Foudad I Entomology 36: 198 – L. t.: Shiraz (Iran).

General Distribution. Syrian: Levante area.

Distribution in Iran. Fars (Shiraz) (Hacker, 2004). It is new for Kerman.

Bionomics. Univoltine in autumn. The early stages were described by Wiltshire (1952). The larvae were reared on *Taraxacum*, *Calendula* and other low plants (Hacker, 2001). *Atriplex halimus* and *A. leuoclada* (Chenopodiaceae) also were mentioned as food plants of the larvae (Kravchenko *et al.*, 2007).

Material examined. 1 ♂, 1 ♀, Kerman (Dehsard, 28° 40' 39" N 56° 33' 02" E), 29.10.2015.

***Caradrina (Paradrina) scotoptera fuscovaria* Hacker, 2004**

Type. *Caradrina scotoptera fuscovaria* Hacker, 2004, Esperiana, 10: 386 – L. t.: Bala-vi-Taq mountains near Qasr-e-Shirin (Iran).

General Distribution. It is known from Iran and South Turkey (Hacker, 2004).

Distribution in Iran. Kermanshah (Qasr-e-Shirin), Kohgiluyeh-va-Boyerahmad (Yasuj, Sisakht), Fars (Sivand, Tangebolhayat) and Zanjan (Hacker, 2004).

Bionomics. In the Levante, the multivoltine nominate subspecies is restricted to wet and swampy locations with lush vegetation shadowed by trees and bushes; in the semi-arid and arid regions only in oases with springs or streamlets (Kravchenko *et al.*, 2007).

***Caradrina (Paradrina) atriluna* Guenée, 1852**

Type. *Caradrina atriluna* Guenée, 1852, in: Boisduval and Guenée, Histoire Naturelle des Insectes. Noctuelites 1: 252 – L. t.: Abyssinie (Ethiopia).

Synonym. *indicata* Walker, [1857]; *mediterraneae* Bethune-Baker, 1894; *distinct* Staudinger, 1898; *angularis* Turati, 1935.

General Distribution. Afro-Tropical: occurs in nearly all tropical and subtropical Africa, is widespread on the Arabian Peninsula and extends eastward to Iran and Pakistan (Hacker, 2001).

Distribution in Iran. Fars (Neyriz, Sivand, Tang-e-bolhayat), Sistan-va-Baluchestan (Khash), Hormozgan (Bandar-e-Abbas, Genou, Faryab) and Kerman (Anbar-Abad) (Ebert & Hacker, 2002; Hacker, 2004). It is new for Khuzestan.

Bionomics. This multivoltine widespread species flyies throughout the year, but its early stages and bionomics are unknown (Fibiger & Hacker, 2007). In the Levante, larvae were found on *Pistacia atlantica* trees (Anacardiaceae), as well as on *Prosopis farcta* (Mimosaceae) (Kravchenko *et al.*, 2007).

Material examined. 1 ♂, 1 ♀, Kerman (Jiroft, 28° 39' 11" N 57° 45' 56" E), 17, 24.4.2016; 1 ♀, Kerman (Khabr National Park, 28° 39' 19" N 56° 26' 46" E), 3.9.2015; 1 ♀, Khuzestan (Malaqa, 31° 35' 57" N 50° 00' 50" E), 4.5.2010.

***Caradrina (Paradrina) clavipalpis* (Scopoli, 1763)**

Type. *Phalaena clavipalpis* Scopoli, 1763, Entomologia Carniolica 213 – L. t.: Carniolia (Slovenia).

Synonym. *grisea* Hufnagel, 1766; *quadripunctata* Fabricius, 1775; *cubicularis* [Denis and Schiffermüller], 1775; *leucoptera* Thunberg, 1791; *pulverosa* Walker, [1857]; *avicula* Krulikowsky, 1909; *clavipalpis* f. *mauretanicus* Draudt, 1934.

General Distribution. Mediterranean. This species is one of the most widespread species of the genus *Caradrina*. The range covers nearly all Europe with the exception of the extreme north, North Africa, Near and Middle East. But the species doesn't occur in the Pacific Palaearctic regions (Hacker, 2001).

Distribution in Iran. Azarbaijan-e-Sharghi, Azarbaijan-e-Gharbi, Alborz, Tehran, Mazandaran, Golestan, Gilan, Khorasan-e-Shomali, Khorasan-e-Razavi, Kermanshah, Kordestan, Chahar Mahal-va-Bakhtiari, Kohgiluyeh-va-Boyerahmad, Fars, Hormozgan and Khuzestan (Hacker & Meineke, 2001; Ebert & Hacker, 2002; Hacker, 2004; Wieser & Stangelmaier, 2005; Esfandiari *et al.*, 2011; Rabieh *et al.*, 2013). It is new for Kerman.

Bionomics. This multivoltine species is on the wing throughout the year in subtropical regions. The larva was described and figured by Beck (2000). It is polyphagous on numerous herbaceous plants including *Stellaria*, *Taraxacum*, *Campanula*, *Plantago* and *Lamium* spp., sometimes damaging stacks of wheat, as well as other grains and peas. The species inhabits the steppe, not the semidesert and desert (Fibiger & Hacker, 2007; Kravchenko *et al.*, 2007).

Material examined. 1 ♀, Kerman (Lalehzar, 56° 37' 45" N 29° 42' 41" E), 3.9.2008; 2 ♂, Kerman (Omrudoieh, 29° 05' 55" N 57° 33' 13" E), 24.4.2015, 30.7.2015; 1 ♂, Kerman (Khabr National Park, 28° 39' 43" N 56° 26' 50" E), 27.5.2015; 1 ♂, 1 ♀, Kerman (Sangdan, 29° 06' 06" N 57° 33' 12" E), 29.4.2015, 13.8.2015; 1 ♀, Kerman (Jiroft, 28° 39' 11" N 57° 45' 56" E), 27.4.2016; 1 ♂, Kerman (Dochar, 29° 04' 40" N 57° 37' 01" E), 10.9.2015; 1 ♀, Kerman (Hishin, 28° 38' 23" N 57° 56' 43" E), 5.2.2016; 1 ♀, Khuzestan (Hamidieh, 31° 22' 43" N 48° 32' 11" E), 24.5.2011; 1 ♂, Khuzestan (Baghmalek, 31° 23' 03" N 50° 09' 13" E), 11.5.2012; 2 ♂, 1 ♀, Khuzestan (Malaqa, 31° 35' 57" N 50° 00' 50" E), 20.4.2012; 2 ♂, Khuzestan (Karun3, 31° 46' 54" N 50° 06' 13" E), 6.6.2012; 1 ♀, Fars (Shiraz, Farashband road, 28° 54' 12" N 52° 17' 31" E), 13.5.2011; 1 ♀, Fars (Sepidan, Bereshne village, 30° 21' 22" N 52° 03' 36" E), 21.7.2011.

DISCUSSION

Altogether, 56 species and 11 subspecies of the genus *Caradrina* have been recorded from Iran until now which are about half of the all described *Caradrina*. Among them, 13 taxa have only found in Iran and 26 taxa have Iranian type locality. It indicates that Iran is a species rich area regarding to *Caradrina*. Kazemi & Shirvani (2012) listed 53 species and 9 subspecies of *Caradrina* from Iran. However, we updated the list with several corrections and additions. As noted before, we also found some specimens which are suspected to be new caradrines. Hence, future faunistic works are still necessary in those areas which poorly investigated in the past. We do expect the list of the Iranian *Caradrina* could be expanded, both with which occur in the bordering countries to Iran as well as undescribed new species. For example, *Caradrina* species which occur in Turkmenistan may be found in the Iranian part of the Kopet-Dagh Mountains in the northeastern of the country.

Because Iranian material examined data in Hacker's revision obtained from old and diverse literature, scattered papers in different journals and periodicals, information of collected localities contains old, obscure and outdated locality names. For example, label data of Brandt's materials belong to near 80 years ago and sometimes they are misleading due to changing in the locality names. Therefore, we tried to extract and present them according to the current city names and provincial differentiation in Iran to make easy tracing collecting localities.

Although the heavily extended treatment of Hacker (2004) could serve as an aid to the determination of unidentified caradrines and most importantly could throw light on the generic, specific and subspecific subdivisions of the genus *Caradrina* (*s.l.*) according to autoapomorphic

characters; however, it seems that still there are taxonomic ambiguities within the group that needs more investigations, samplings from more localities, and using modern techniques such as molecular studies to be solved. For example, Volynkin et al. (2016) synonymized *Caradrina vargaei* Hacker, 2004 for *Caradrina gyulaii* Hacker, 2004 and suggested a Chinese subspecies for *C. gyulaii*. Because by studying material from various localities in Central Asia, they discovered a high variability in the male genitalia structure of the species complex, and there was not a single pair of male specimens with identical genitalia, including the type material of *C. vargaei*. Another example is our suggestion on the occurrence of the nominate subspecies of *C. montana* in Iran instead of *C. montana rougemonti* which mentioned by Hacker (2004), even though he confirmed that the subspecific arrangement of *C. montana* is controversial. Hacker (2004) also stated that for constructing the phylogeny of *Caradrina* “the results were scored and documented in matrices”; but he didn’t present more detail of such analysis (e.g. character matrix, tree, computer program). Moreover, distribution maps in Hacker (2004) are not based on the recorded localities, but seem to be an estimated approximate distribution.

It is suggested that more faunistic works in different localities (e.g. for species found only in small localities) can help for better understanding of identity, distribution and zoogeography of caradrines populations. On the other hand, there is little or no information about the bionomics, early stages and the food plants of many *Caradrina* species. It is suggested to pay attention to such aspects in the future research in Iran.

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