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A faunistic survey on the genus *Chorebus* Haliday (Hymenoptera: Braconidae, Alysiinae, Dacnusini) in Eastern Iran

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ABSTRACT. The diagnosis and new contributions of the genus *Chorebus* Haliday, 1833 from Eastern Iranian provinces (North Khorasan, Khorasan-e Razavi, and Sistan-o Baluchestan) are provided. Samplings were carried out from 2009 to 2014. A total of 18 species are listed. *Chorebus* (*C.*) *ruficollis* (Stelfox, 1957) is recorded for the first time from Iran. An identification key is provided for *Chorebus* species occurring in the Eastern Iran.

Key words: Parasitic wasps, Braconidae, Alysiinae, Diptera, Eastern Iran, new records.

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Introduction

Chorebus Haliday, 1833 is the largest genus within Dacnusini tribe (Hymenoptera, Braconidae, Alysiinae) with approximately 220 Palaearctic species described (Docavo *et al*. 2006; Yu *et al*. 2012). This genus has a very important ecological role because of controling a wide variety of dipteran pest species such as Agromyzidae and Ephydridae (Pardo 2010).

This genus is well defined by the presence of the metapleuron with a rosette of setae around a central swelling or mandibles with four teeth; in most cases both characters appear together (Pardo 2010). The additional tooth is located between middle and lower tooth while in other Dacnusini genera the additional tooth is developed on the dorsal side of the elongate middle tooth (Pardo 2010). Gadallah *et al*. (2015) and Farahani *et al*. (2016) listed 110 Alysiinae species, of which 42 (39%) belonging to *Chorebus* genus. The early results of our study was presented in the 21th Iranian Plant Protection Congress (Yari *et al*. 2014), and cited later by Gadallah *et al*. (2015).

In the present paper the diagnosis and new records of *Chorebus* species from Eastern Iran are presented. The identification key for eighteen recorded species is also provided.

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Material and methods

Sampling was performed during 2009–2014 in Eastern provinces including North Khorasan, Khorasan-e Razavi, Sistan-o Baluchestan provinces. Specimens were mainly collected by sweeping net from various habitats in natural ecosystems as well as on field crops. Specimens were identified using reliable taxonomic resources including Griffiths (1964; 1967a,b,c; 1968a,b) and Tobias keys (1986). Terminology of the morphological features followed van Achterberg (1993). Nomenclature and distribution of species follows Yu *et al*. (2012). The material was imaged using Digital Microscope Keyence® VHX-2000 and BMZ-04-DZ™ digital imaging system (BehinPajouhesh Co., Iran), then sorted using Adobe Photoshop®. Specimens collected are deposited in the collection of the Department of Plant Protection at University of Zabol (Zabol, Iran; DPPZ) and Naturhistorisches Museum Wien (Vienna, Austria; NHMW).

Results

Eighteen *Chorebus* species are determined from the eastern provinces of Iran. Among them *Chorebus* (*C.*) *ruficollis* (Stelfox, 1957) is recorded for the first time for Iran. The diagnosis of the 18 *Chorebus* species recorded from this area are given below.

Subfamily Alysiinae Leach, 1815
Tribe Dacnusini Foerster, 1863
Genus *Chorebus* Haliday, 1833

1. *Chorebus* (*Chorebus*) *affinis* (Nees, 1812)

Diagnosis: Eyes slightly convergent. Antennae 20–26-segmented. Flagellar segments not thickened. Mesonotum slightly pubescent. Propodeum lacking tubercles. Radial vein rather uniformly curved. Hind coxae with distinct tuft of hairs. Second metasomal tergite rugose. Ovipositor valves shorter than first segment of hind tarsus.

Distribution in Iran: Fars, Khorasan-e Razavi, Mazandaran and Semnan (Farahani *et al*. 2016).

General distribution: Palaearctic.

2. *Chorebus* (*Chorebus*) *nigriscaposus* (Nixon, 1949)

Material examined: 1♀ (NHMW), Sistan-o Baluchestan, Hamoon (30°56′11″N, 61°18′43″E, 478m), 24.iv.2010, Swept on *Medicago sativa* L., leg.: N. Khajeh.

Diagnosis: Eyes slightly converging. Antennae 23-segmented. Flagellar segments not thickened. Mesonotum slightly pubescent. Propodeum with distinct tubercles and densely dark brown pubescence. Radial vein rather uniformly curved. Hind coxae with distinct tuft of hairs. Ovipositor valves not longer than first segment of hind tarsus.

Distribution in Iran: Sistan-o Baluchestan (Farahani *et al*. 2016).

General distribution: Palaearctic.

3. *Chorebus* (*Chorebus*) *ruficollis* (Stelfox, 1957) (Figs. 1, 2)

Material examined: 1♀ (NHMW), North Khorasan, Ashkhaneh (37°34′00″N, 56°53′45″ E, 739 m), 16-viii-2013, swept on *Mentha pulegium* L., leg.: Z. Rahmani.

Diagnosis: Antennae 26–27-segmented. Flagellar segments not thickened. Mesonotum slightly pubescent. Pronotum dark brownish yellow. Propodeum somewhat densely pubescent, considerably concealing its sculpture. Radial vein rather uniformly curved. Hind coxae with distinct tuft of hairs. First metasomal tergite with very sparse hairs. Second metasomal tergite smooth. Ovipositor valves distinctly longer than hind basitarsus and exerted from metasomal apex.

Distribution in Iran: North Khorasan.

General distribution: Palaearctic. Iran (**new record**).

4. *Chorebus* (*Chorebus*) *stilifer* Griffiths, 1968

Material examined: 2♀ (1♀ in NHMW), Khorasan-e Razavi, Soltanabad (36°24′18″N, 58°02′04″E, 1207m), 22.ix.2013, swept on *Medicago sativa* L., leg.: N. Kazemirad.

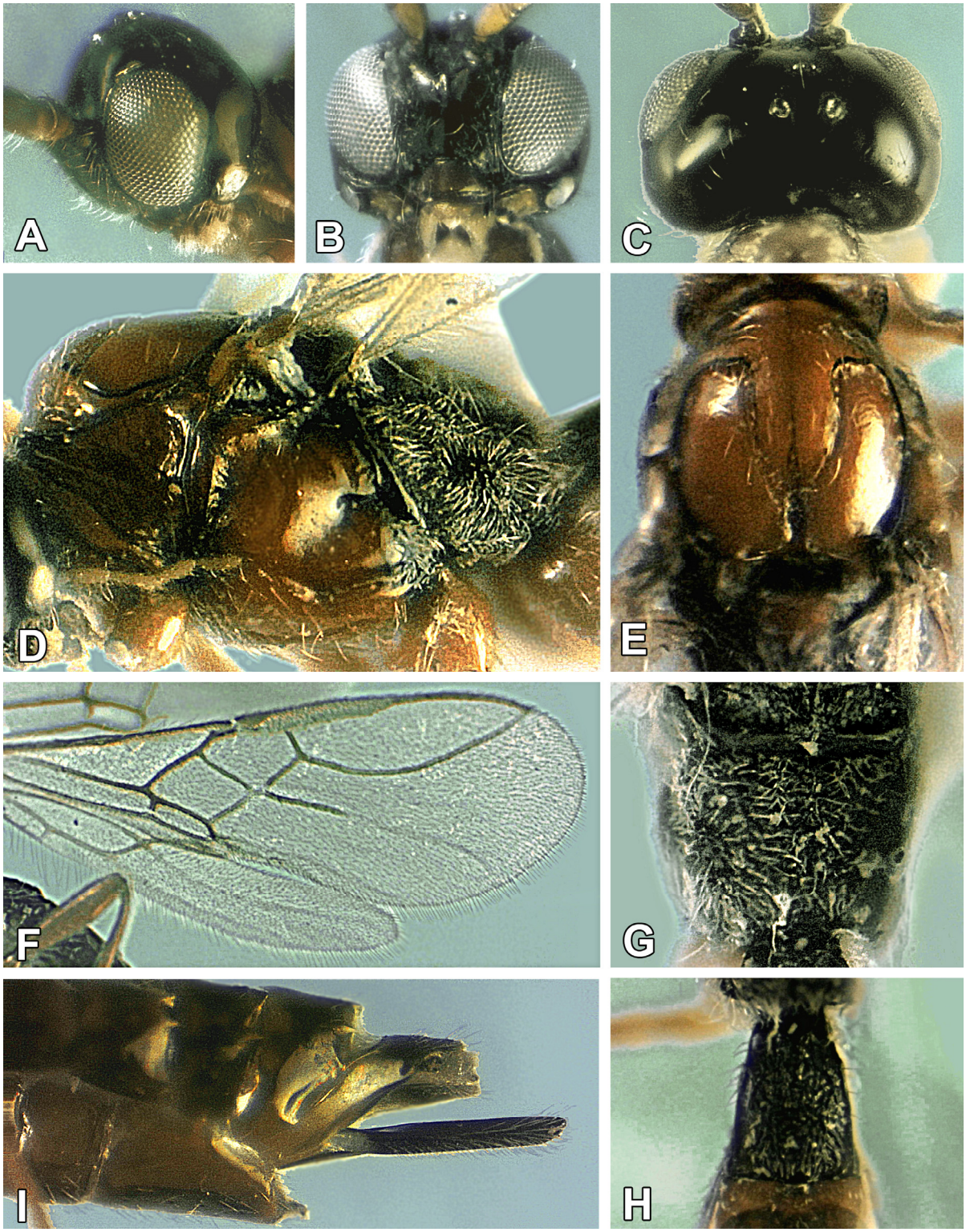

Figure 1. *Chorebus* (*Chorebus*) *ruficollis* (Stelfox, 1957): **A.** Head, lateral view. **B.** Head, frontal view. **C.** Head, dorsal view. **D.** Mesosoma, lateral view. **E.** Mesonotum, dorsal view. **F.** Fore and hind wings; **G.** Propodeum; **I.** Ovipositor sheath and tip of abdomen, lateral view. **H.** First metasomal tergite, dorsal view.

Figure 2. Habitus of *Chorebus* (*Chorebus*) *ruficollis* (Stelfox, 1957) (female).

Diagnosis: Eyes greatly converging below. Genae in lateral view slightly projecting angularly. Mandibles not broadened. Antennae 31–32-segmented. Flagellar segments twice as long as its maximum width. Sides of pronotum entirely sculptured and covered by hairs. Precoxal suture smooth almost straight. Radial vein not uniformly arcuate but in apical half with S-shaped bend or straightened. Legs yellow. Hind coxae with distinct tuft of hair above. First metasomal tergite with hardly pubescent hairs.

Distribution in Iran: Fars and Khorasan-e Razavi (Farahani *et al*. 2016).

General distribution: Palaearctic.

5. *Chorebus* (*Phaenolexis*) *ares* (Nixon, 1944)

Material examined: 2♀, 1♂ (1♀, 1♂ in NHMW), Sistan-o Baluchestan province, Hirmand (30°07′37″N, 61°49′25″E, 483m), 04.ii.2011, swept on *Medicago sativa* L., leg. N. Khajeh.

Diagnosis: Eyes not converging below. Occiput with numerous sparse hairs. Mandible broadened toward apex. Antennae 29–36-segmented. Radial vein not uniformly arcuate but in apical half with S-shaped bend or straightened. Legs dark. Hind coxae with distinct tuft of hair above. Ovipositor slightly exerted from metasomal apex.

Distribution in Iran: Sistan-o Baluchestan (Farahani *et al*. 2016).

General distribution: Palaearctic.

6. *Chorebus* (*Phaenolexis*) *bathyzonus* (Marshall, 1895) (Fig. 3A)

Material examined: 2♀ (1♀ in NHMW), Sistan-o Baluchestan, Zabol (31°2′34″N, 61°33′26″E, 483m), 21.vi.2013, swept on *Medicago sativa* L., leg.: Z. Rahmani; 1♀, Zahedan (29°31′1″N, 60°53′43″E, 1360m), 06.xi.2011, swept on *Medicago sativa* L., leg.: S. Sedighi.

Diagnosis: Eyes not converging below. Occiput with numerous hairs. Genae in lateral view angularly projecting. Upper

tooth slightly developed. Antennae 26–27-segmented, not longer than body. Sternauli smooth. Radial vein not uniformly arcuate but in apical half with S-shaped bend or straightened. Hind coxae with distinct tuft of hair above. First metasomal tergite 3.0–4.0 times as long as its apical width and hardy pubescent.

Distribution in Iran: Kerman and Sistan-o Baluchestan (Farahani *et al*. 2016).

General distribution: Palaearctic.

7. *Chorebus* (*Phaenolexis*) *caesariatus* Griffiths, 1967

Material examined: 1♀, 2♂ (1♂ in NHMW), North Khorasan, Ashkhaneh (37°34′00″N, 56°53′45″E, 739 m), 28.ix.2013, swept on *Mentha pulegium* L., leg.: Z. Rahmani; 2♀, 2♂, 12-ix-2013, swept on Weeds, leg.: Z. Rahmani.

Diagnosis: Eyes not converging below. Occiput with numerous hairs. Genae not projecting angularly. Mandibles not broadened. Upper tooth slightly developed. Antennae 23–24-segmented. Mesonotum with dense whitish hairs. Precoxal suture smooth. Radial vein not uniformly arcuate but in apical half with S-shaped bend or straightened. Hind coxae with distinct tuft of hairs. First metasomal tergite twice as long as its apical width.

Distribution in Iran: North Khorasan (Gadallah *et al.* 2015).

General distribution: Palaearctic.

8. *Chorebus* (*Phaenolexis*) *gedanensis* (Ratzeburg, 1852)

Diagnosis: Eyes not converging below. Occiput densely pubescent. Genae above base of mandibles broadened and noticeably projecting. Upper tooth slightly developed. Antennae 30–33-segmented. Mesonotum pubescent its greater part with sparse hairs. Sternauli distinctly rugose. Radial vein not uniformly arcuate but in apical half with S-shaped bend or straightened. Stigma and radial cell longer. Hind coxae with distinct tuft of hair above. First metasomal tergite 3.0–4.0 times as long as its apical width and hardy pubescent.

Distribution in Iran: Khorasan Razavi and Qazvin (Farahani *et al*. 2016).

General distribution: Palaearctic.

9. *Chorebus* (*Phaenolexis*) *leptogaster* (Haliday, 1839)

Material examined: 1♀ (1♀ NHMW), North Khorasan, Bojnurd (37°27′54″N, 57°18′04″E, 1030 m), 14.ix.2013, swept on *Medicago sativa* L., leg.: Z. Rahmani; 1♀, Maneh va samalgan (37°36′21″N, 56°45′25″, 1028 m), 28.ix.2013, swept on *Mentha pulegium* L., leg.: Z. Rahmani; 1♀, 01.vii.2013, leg.: Z. Rahmani.

Diagnosis: Eyes not converging below. Genae not projecting. Occiput hardly pubescent. Upper tooth slightly developed. Antennae 25–30-segmented. Precoxal suture distinctly rugose. Stigma very short and wide. Radial cell relatively short. Radial vein not uniformly arcuate but in apical half with S-shaped bend or straightened. Hind coxae with distinct tuft of hair above and black. Hind femur not thickened.

Distribution in Iran: Golestan and North Khorasan (Farahani *et al*. 2016).

General distribution: Palaearctic.

10. *Chorebus* (*Stiphrocera*) *aphantus* (Marshall, 1896) (Fig. 3B)

Material examined: 2♀ (1♀ in NHMW), Khorasan-e Razavi, Soltanabad (36°24′18″N, 58°02′04″E, 1207m), 22.ix.2013, swept on *Medicago sativa* L., leg.: N. Kazemirad.

Diagnosis: Head in dorsal view wider than longer. Maxillary palps long. Antennae 23–29-segmented. Propodeum with relatively dense hairs. Hind coxae above lacking tuft of hairs. Hind tarsi distinctly shorter than

hind tibiae. First metasomal tergite twice as long as its apical width; lacking tufts of hairs in postero-lateral angles. Ovipositor considerably shorter than hind tibiae.

Distribution in Iran: Kermanshah (Farahani *et al*. 2016), and Khorasan-e Razavi.

General distribution: Oriental and Palaearctic.

11. *Chorebus* (*Stiphrocera*) *cubocephalus* (Telenga, 1935)

Material examined: 2♀, 4♂ (1♂ in NHMW), North Khorasan, Maneh va samalgan (37°36′21″N, 56°45′25″, 1028 m), 23.vi.2013, swept on *Medicago sativa* L., leg.: Z. Rahmani; 2♀, 2♂, Sistan-o Baluchestan, Zabol (31°02′34″N, 61°31′34″E, 482m), 28.ix.2013, swept on *Medicago sativa* L., leg.: Z. Rahmani.

Diagnosis: Head 1.3 times as wide as long. Mandibles narrow. Antennae 22–30-segmented. Propodeum with relatively dense hairs. Legs dark colored. Hind coxae lacking tuft of hairs and smooth. First metasomal tergite twice as long as its apical width, with sparse hairs and lacking tufts of hairs in postero-lateral angles. Ovipositor slightly exerted from 6th tergite.

Distribution in Iran: Sistan-o Baluchestan (Farahani *et al*. 2016) and North Khorasan.

General distribution: Palaearctic.

12. *Chorebus* (*Stiphrocera*) *lar* (Morley, 1924) (Fig. 3C)

Material examined: 3♀, 5♂ (1♀ 1♂ in NHMW), Sistan-o Baluchestan, Zabol (31°02′34″N, 61°31′34″E, 482m), 01.v.2013, swept on *Medicago sativa* L. and *Triticum aestivum* L.; 1♂ (NHMW), North Khorasan, Maneh va samalgan (37°36′21″N, 56°45′25″, 1028 m), 28.ix.2013, swept on *Mentha pulegium* L., leg.: Z. Rahmani.

Diagnosis: Head behind eyes not broadened. Antennae 21–23-segmented. Basal flagellar segments dark. Hairs on mesonotum sparse. Propodeum densely pubescent. Radial cell very short. Hind legs dark. Hind coxae above lacking tuft of hairs, and smooth. First metasomal tergite almost without hairs. Second and third metasomal tergites reddish or dark brownish.

Distribution in Iran: Isfahan, Sistan-o Baluchestan and North Khorasan (Farahani *et al*. 2016).

General distribution: Palaearctic.

13. *Chorebus* (*Stiphrocera*) *merellus* (Nixon, 1937)

Material examined: 4♀, 1♂ (2♀ in NHMW), North Khorasan, Maneh va samalgan (37°36′21″N, 56°45′25″, 1028 m), 01.vii.2013, swept on *Mentha pulegium* L., leg.: Z. Rahmani.

Diagnosis: Head wider than long. Upper tooth not broadened. Antennae 33–37-segmented. Basal flagellar segments dark. Middle part of mesonotum entirely pubescent. Notaulices as distinct furrows reaching middle of mesonotum. Precoxal suture rugose. Propodeum with relatively dense hairs. Legs light colored. Hind coxae above lacking tuft of hairs, and smooth. Metasoma only anteriorly with light colored pattern. First metasomal tergite twice as long as its apical width. Ovipositor considerably shorter than hind tibiae.

Distribution in Iran: North Khorasan (Farahani *et al*. 2016).

General distribution: Palaearctic.

14. *Chorebus* (*Stiphrocera*) *mucronatus* (Telenga, 1935)

Material examined: 2♀, 4♂, Sistan-o Baluchestan, Zabol, (31°02′34″N, 61°31′34″E, 482m), 21.vi.2013, swept on *Triticum aestivum* L., leg.: Z. Rahmani (DPPZ; 1♀ in NHMW); 1♀, swept on *Medicago sativa* L., 14.ix.2013, leg.: Z. Rahmani (NHMW).

Diagnosis: Head broadened behind eyes. Antennae 17–21-segmented. Basal flagellar segments dark. Precoxal suture present and

crenulated. Hind coxae above lacking tuft of hairs and smooth. Hind tarsi distinctly shorter than hind tibia. Second metasomal tergite with only 2 or 3 hairs on sides.

Distribution in Iran: Ilam, Golestan and Mazandaran (Farahani *et al*. 2016), and Sistan-o Baluchestan.

General distribution: Palaearctic.

15. *Chorebus* (*Stiphrocera*) *parvungula* (Thomson, 1985) (Fig. 3D)

Material examined: 1♂, North Khorasan, Ashkhaneh (37°34′00″N, 56°53′45″E, 739 m), 16.viii.2013, swept on *Mentha pulegium* L., leg.: Z. Rahmani (NHMW); 9♀ (1♀ in NHMW), Maneh va samalgan (37°36′21″N, 56°45′25″, 1028 m), 17.vi.2013 and 05.x.2013, swept on *Medicago sativa* L., leg.: Z. Rahmani.

Diagnosis: Head in dorsal view 1.6 times as long as its median length. Antennae 20–29-segmented. Middle part of mesonotum entirely pubescent. Propodeum with relatively dense hairs. Legs dark colored. Hind coxae above lacking tuft of hairs and smooth. First metasomal tergite 1.3–1.6 times as long as its apical width; lacking tufts of hairs in postero-lateral angles. Ovipositor considerably shorter than hind tibiae and slightly exerted from metasomal apex.

Distribution in Iran: Kerman (Farahani *et al*. 2016) and North Khorasan.

General distribution: Palaearctic.

16. *Chorebus* (*Stiphrocera*) *scabiosae* Griffiths, 1967

Material examined: 5♀, 3♂ (1♀ in NHMW); North Khorasan, Ashkhaneh (37°34′00″N, 56°53′45″E, 739 m), 16.viii.2013, swept on *Medicago sativa* L. leg.: Z. Rahmani; 3♀, North Khorasan, Maneh va samalgan (37°36′21″N, 56°45′25″, 1028 m), 28.ix.2013, swept on *Mentha pulegium* L., leg.: Z. Rahmani; 1♀, Khorasan-e Razavi, Soltanabad (36°24′18″N, 58°02′04″E, 1207m), 04.x.2013, swept on *Medicago sativa* L., leg.: N. Kazemirad.

Diagnosis: Head not broadened behind eyes. Upper tooth not deflected. Antennae 21–23-segmented. Basal flagellar segments dark. Side parts of mesonotum without hairs. Propodeum densely pubescent. Hind coxae above lacking tuft of hairs and smooth. Hind tarsi as long as hind tibia. First metasomal tergite in basal half with dense hairs, in apical half hardly pubescent; lacking tufts of hairs in postero-lateral angles. Second metasomal tergite with only 2 or 3 hairs on sides. Ovipositor considerably shorter than hind tibia.

Distribution in Iran: Khorasan-e Razavi (Gadallah *et al*. 2015), and North Khorasan.

General distribution: Palaearctic.

17. *Chorebus* (*Stiphrocera*) *solstitialis* (Stelfox, 1951)

Material examined: 2♀ (1♀ in NHMW), Sistan-o Baluchestan, Zahak (30°54′07″N, 61°40′24″E, 491 m), 16.xii.2009, swept on *Medicago sativa* L., leg.: N. Khajeh.

Diagnosis: Mandibles large, with distinctly developed, sideward deflected upper tooth. Antennae 26–29-segmented. Flagellar segments longer than wide. Hairs on mesonotum sparse, only along the line of notaulices. Legs darkened. Hind coxae lacking tuft of hairs and smooth. First metasomal tergite twice as long as its apical width, and lacking tufts of hairs in postero-lateral angles. Ovipositor considerably shorter than hind tibia.

Distribution in Iran: Sistan-o Baluchestan (Gadallah *et al*. 2015).

General distribution: Palaearctic.

18. *Chorebus* (*Stiphrocera*) *spenceri* Griffiths, 1964

Material examined: 3♀ (1♀ in NHMW), North Khorasan, Maneh va samalgan (37°36′21″N, 56°45′25″, 1028 m), 26.vi.2013, swept on *Medicago sativa* L., leg.: Z. Rahmani.

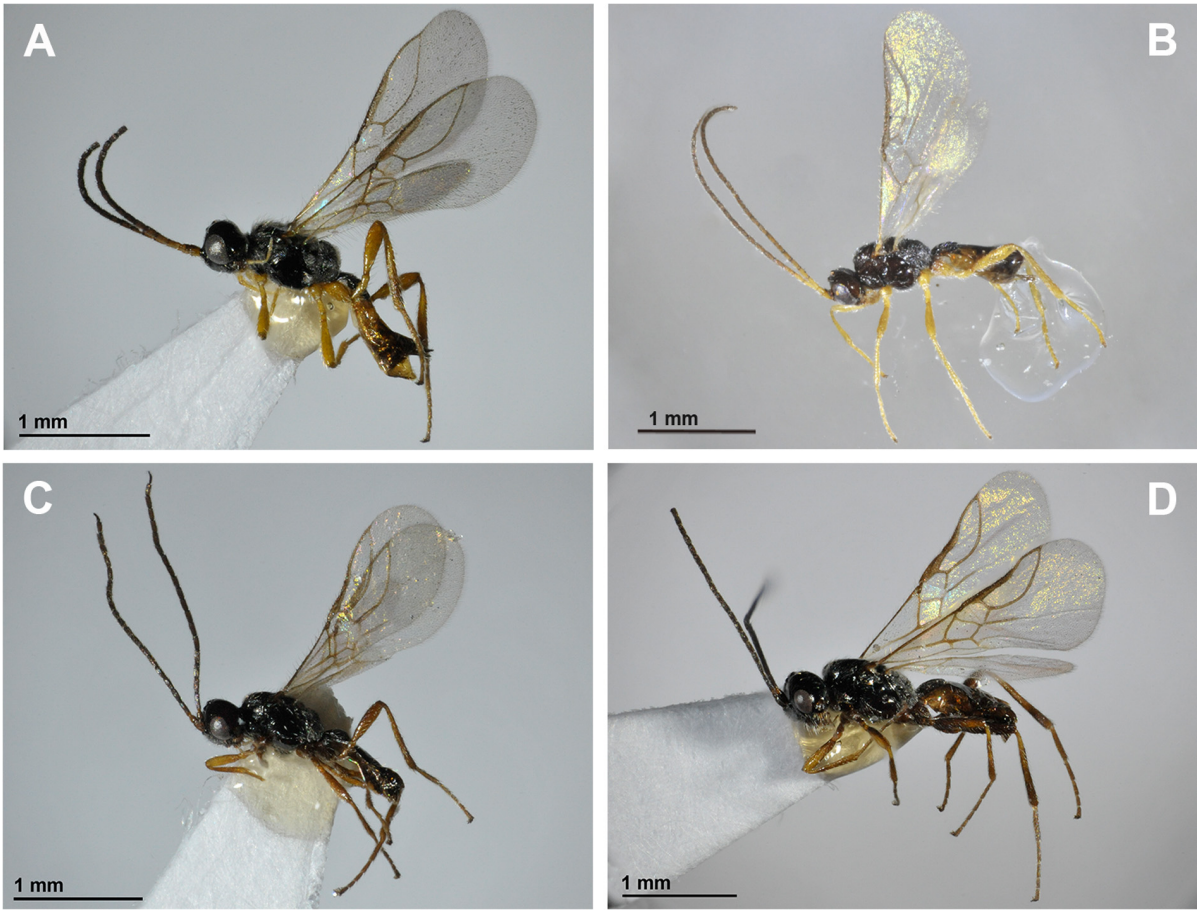

Figure 3. Habitus of *Chorebus* species, lateral view. **A.** *Chorebus* (*Phaenolexis*) *bathyzonus* (Marshall, 1895) (female). **B.** *Chorebus* (*Stiphrocera*) *aphantus* (Marshall, 1896) (female). **C.** *Chorebus* (*Stiphrocera*) *lar* (Morley, 1924) (male). **D.** *Chorebus* (*Stiphrocera*) *parvungula* (Thomson, 1985) (male).

Diagnosis: Head much wider than long. Mandibles not broadened toward apex. Upper tooth not deflected. Antennae 32–34-segmented. Precoxal suture very rugose. Propodeum with sparse hairs. Legs yellow. Hind coxae above lacking tuft of hairs, and smooth and yellow.

Distribution in Iran: North Khorasan (Farahani *et al*. 2016).

General distribution: Palaearctic.

Key for the eastern Iranian species of *Chorebus* (keys based on females and males)

1. Hind coxae above without tuft of hairs [Subgenus *Stiphrocera*]…….…… **2**

- Hind coxae above with tuft of hairs……**10**

2(1). Head 1.3 times as wide as long. – Antennae 22–30-segmented. Body length 1.6–2.2 mm…… ……..... ***C.* (*S.*) *cubocephalus*** (Telenga)

- Head 1.7–2.0 times as wide as long……..**3**

3(2). First metasomal tergite 2.6 times as long as its apical width. – Antennae 33–37-segmented. Body length 1.8–2.8 mm. …….. ***C.* (*S.*) *merellus*** (Nixon)

- First metasomal tergite 1.2–1.7 times as long as its apical width …….... **4**

4(3). Hind leg yellow…….…….. **5**

- Hind leg dark brown …….. **8**

5(4). First flagellar segment 3.0 times as long as it maximum width; second segment

2.2 times and middle segments 2.0 times as long as their maximum width. – Antennae 17–21-segmented. Body length 1.7 mm. ……. ***C.*** **(*S.*)** ***mucronatus*** (Telenga)

- First flagellar segment 1.2–1.5 times as long as it maximum width; second segment 1.1 times and middle segments 1.0–1.1 times as long as their maximum width …….. **6**

6(5). Metapleural pubescence not forming a distinct rosette. First metasomal tergite 1.2–1.4 times as long as its apical width. First flagellar segment 1.5 times as long as its maximum width. – Antennae 32–34-segmented. Body length 2.5–2.7 mm. ……... **(*S.*)** ***spenceri*** Griffiths

- Metapleural pubescence forming a distinct rosette. First metasomal tergite 1.7–2.0 times as long as its apical width. First flagellar segment 1.2–1.3 times as long as its maximum width. ……..**7**

7(6). Hind tarsi as long as hind tibia. First metasomal tergite rather densely pubescent near base, not contrasting with propodeum pubescence. – Antennae 21–23-segmented. Body length 1.4–1.6 mm. …… ……***C.*** **(*S.*)** ***scabiosae*** Griffiths

- Hind tarsi clearly shorter than hind tibia. First metasomal tergite almost without hairs, contrasting with propodeum pubescence. – Antennae 23–29-segmented. Body length 1.6–2.1 mm. …… ……***C.*** **(*S.*)** ***aphantus*** (Marshall)

8(4). First metasomal tergite 1.7 times as long as its apical width. Mesosoma in lateral view 1.1 times as long as high. – Antennae 21–23-segmented. Body length 1.3–1.6 mm. ……***C.*** **(*S.*)** ***lar*** (Morley)

- First metasomal tergite 1.4 times as long as its apical width. Mesosoma in lateral view 1.4–1.6 times as long as high **9**

9(8). Third tooth relatively small. First flagellar segment 1.3 times as long as its maximum width; second 1.1 times as long as its maximum width. – Antennae 26–29-segmented. Body length 2.5 mm. ……... …..……***C.*** **(*S.*)** ***solstitialis*** (Stelfox)

- Third tooth large. First flagellar segment 1.5 times as long as its maximum width; second 1.3 times as long as its maximum width. – Antennae 20–29-segmented. Body length 1.9–2.6 mm. …… ……***C.*** **(*S.*)** ***parvungula*** (Thomson)

10(1). Radial vein not uniformly curved, with S-shape in apical half [Subgenus *Phaenolexis*]. ……..... **11**

- Radial vein uniformly curved [Subgenus *Chorebus* s.s.]. ……... **15**

11(10). First metasomal tergite with dense pubescence covering its surface. Antennae 29–36-segmented. Body length 3.0 mm. ……..... ***C.*** **(*P.*)** ***ares*** (Nixon)

- First metasomal tergite largely bare, with pubescence only near its base ……... **12**

12(11). First metasomal tergite 2.2–2.5 times as long as its apical width ……. **13**

- First metasomal tergite 3.0–3.2 times as long as its apical width …….. **14**

13(12). Head 1.6–1.7 times as wide as long. Hind legs dark brown. Mesoscutum with dense pubescence in its base. – Antennae 23–24-segmented. Body length 1.7–2.0 mm. ……... ***C.*** **(*P.*)** ***caesariatus*** Griffiths

- Head 2.1 times as wide as long. Hind legs yellow or yellow brown. Mesoscutum with fine pubescence in its base. – Antennae 30–33-segmented. Body length 2.7–3.0 mm. ……..…… ***C.*** **(*P.*)** ***gedanensis*** (Ratzeburg)

14(12). Head 1.5 times as wide as long. Hind legs yellow. – Antennae 26–27-segmented. Body length 2.0–2.5 mm. …… ***C.*** **(*P.*)** ***bathyzonus*** (Marshall)

- Head 1.8–1.9 times as wide as long. Hind legs dark brown. – Antennae 25–30-segmented. Body length 2.0–2.5 mm. ……..…… ***C.*** **(*P.*)** ***leptogaster*** (Haliday)

15(10). Ovipositor valves distinctly longer than first segment of hind tarsus and exserted on dorsal view from metasomal apex more than the length of second

segment of hind tarsus. – Antennae 26–27-segmented. Body length 2.0 mm. …… …… ***C.* (*C.*) *ruficollis*** (Stelfox)

- Ovipositor valves shorter than first segment of hind tarsus and not exserted on dorsal view from metasomal apex more than the length of second segment of hind tarsus. …..…… **16**

16(15). Mesoscutum in dorsal view completely bare except few hairs along notauli course. – Antennae 20–26-segmented. Body length 1.8–2.0 mm. …… …..……. ***C.* (*C.*) *affinis*** (Nees)

- Mesoscutum in dorsal view with extensive pubescence, reaching at least the anterior part. ..…… **17**

17(16). First metasomal tergite 1.2–1.4 times as long as its apical width. First flagellar segment 1.2–1.5 times as long as its maximum width. – Antennae 23-segmented. Body length 2.4 mm. ……. …… ***C.* (*C.*) *nigriscaposus*** (Nixon)

- First metasomal tergite 3.1 – 3.7 times as long as its apical width. First flagellar segment 1.8–1.9 times as long as its maximum width. – Antennae 31–32-segmented. Body length 2.3–2.4 mm. …….. …… ***C.* (*C.*) *stilifer*** Griffiths

Discussion

In the present study, *Chorebus* (*C.*) *ruficollis* is recorded for the first time from Iran (North Khorasan province). The provincial distribution of the 16 species is also recorded for the first time, while it was generally documented by Yari *et al*. (2014) in the Eastern part of Iran. The occurrence of only 18 *Chorebus* species in the large territory, including three provinces in Eastern part of Iran, indicates the disrupted ecosystems. Few specimens collected only sporadically from the common field crops and nearby areas represent the major part of *Chorebus* species. Despite the low number of species from Eastern area a total of 42 species are recorded from the whole country (Gadallah *et al*. 2015). However, it is still far from the 220 known Palaearctic species (Docavo *et al*. 2006; Yu *et al*. 2012).

To conclude, further studies are necessary to increase the knowledge on diversity of *Chorebus* and to provide the basis for biological control of the dipterous pests in agricultural and urban landscapes.

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References

Docavo-Alberti, I., Tormos-Ferrando, J. and Fischer, M. 2006. *Bracónidos de España (Hymenoptera, Braconidae)*. Síntesis general de la familia. Subfamilia Alysiinae. Patronato Valenciano de Zoología "Ignacio Docavo", Valencia, 367 pp.

Farahani, S., Talebi, A.A. and Rakhshani, E. 2016. Iranian Braconidae (Insecta: Hymenoptera: Ichneumonoidea): diversity, distribution and host association. *Journal of Insect Biodiversity and Systematics*, 2(1): 1–92.

Gadallah, N. S., Ghahari, H., Peris-Felipo, F. J., and Fischer, M. (2015). An annotated catalogue of the Iranian Alysiinae (Hymenoptera: Braconidae). *Zootaxa*, 3974(1): 1–28. DOI: http://dx.doi.org/10.11646/zootaxa.3974.1.1

Griffiths, G.C.D. 1964. The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera) I. General questions of taxonomy, biology and evolution. *Beitrage zur Entomologie*, 14(7–8): 823–914.

Griffiths, G.C.D. 1967a. The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera) II. The parasites of *Agromyza* Fallen. *Beitrage zur Entomologie*, 16(5–6) (1966): 551–605.

Griffiths, G.C.D. 1967b. The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera) III. The parasites of *Paraphytomyza*

Enderlein, *Phytagromyza* Hendel, and *Phytomyza* Fallen. *Beitrage zur Entomologie*, 16(7–8) (1966): 775–951.

Griffiths, G.C.D. 1967c. The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera) IV. The parasites of *Hexomyza* Enderlein, *Melanagromyza* Hendel, *Ophiomyia* Braschnikov and *Napomyza* Westwood. *Beitrage zur Entomologie*, 17(5–8): 653–696.

Griffiths, G.C.D. 1968a. The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera) V. The parasites of *Liriomyza* Mik and certain small genera of Phytomyzinae. *Beitrage zur Entomologie*, 18(1–2): 5–62.

Griffiths, G.C.D. 1968b. The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera) VI. The parasites of *Cerodontha* Rondani s.l. *Beitrage zur Entomologie*, 18(1–2): 63–152.

Pardo, X. 2010. Bracónidos exodontos de España (Hymenoptera, Braconidae, Alysiinae). Tesis Doctoral (PhD Thesis), Salamanca, 351 pp. http://gredos.usal.es/jspui/handle/10366/76503 [accessed 29 September 2016].

Tobias, V.I. 1986. Subfamily Alysiinae. pp: 156–386, In: Medvedev, G.S. (Ed.) *Keys to the Insects of the European Part of the USSR*, III. Part V. Leningrad, USSR: Nauka Publisher, (in Russian; English translation in 1995).

van Achterberg C. 1993. Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Verhandelingen* Leiden, 283: 1–189.

Yari, Z., Khajeh, N., Rahmani, Z., Rakhshani, E. and Peris-Felipo, F.J. 2014. A faunistic study on Alysiinae (Hym.: Braconidae) in Estern part of Iran. Proceedings of 21th Iranian Plant Protection Congress, 23–26 August 2014, Urmia University, Iran, p. 749.

Yu, D.S., Achterberg, C. van and Horstman, K. 2012. Taxapad 2012, Ichneumonoidea 2011. Database on flash-drive. Ottawa, Ontario, Canada.

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مطالعه فونستیک زنبورهای جنس *Chorebus* Haliday (Hymenoptera: Braconidae, Alysiinae, Dacnusini) در شرق ایران

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چکیده: ویژگی‌های افتراقی و نتایج مطالعات فونستیک جدید روی جنس *Chorebus* Haliday, 1833 در استان‌های شرقی ایران (شامل خراسان شمالی، خراسانی رضوی و سیستان و بلوچستان) در این مقاله ارایه شده است. نمونه‌برداری طی سال‌های ۱۳۸۹ تا ۱۳۹۳ انجام شد. به طور کلی ۱۸ گونه متعلق به جنس *Chorebus* فهرست شد. گونهٔ *Chorebus* (C.) *ruficollis* (Stelfox, 1957) برای اولین بار از ایران گزارش می‌شود. کلید شناسایی گونه‌های جنس *Chorebus* در شرق ایران نیز ارایه شده است.

واژگان کلیدی: زنبورهای پارازیتویید، براکونیده، آلیزینه، دوبالان، شرق ایران، گزارش جدید.