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Contribution to the knowledge of Alysiinae (Hymenoptera: Braconidae) of Kerman province, with three new records for Iran

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ABSTRACT. The present paper provides information about the Alysiinae (Hymenoptera: Braconidae) species captured in Kerman province (Iran). A total of 14 species belonging to eight genera were collected and identified, of which three species are reported for the first time from Iran: *Dinotrema (Prosapha) speculum* (Haliday, 1838), *Idiasta (Idiasta) dichrocera* Konigsmann, 1960 and *Protodacnus atristis* (Nees, 1834). Diagnostic characters of the newly recorded species is presented.

Key words: Braconidae, Alysiinae, parasitoids, Iran, new records

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Introduction

Alysiinae is a large subfamily of koinobiont endoparasitoid of Cyclorhapha-Diptera (Wharton, 1997, 2002) and has an enormous agricultural, ecological and economical interest because of their role in controlling phytophagous species, having direct effects on the size of host populations and indirect effects on the diversity and survival of the host plants (LaSalle & Gauld, 1993; González & Ruíz 2000; Peris-Felipo et al., 2014). A total of 104 genera and 2400 species are described worldwide within this subfamily (Yu et al., 2012). Despite the large number of studies carried out in order to increase knowledge about the diversity and ecological

information of braconids from Iran (Safahani et al., 2016; Cortés et al., 2016; Iranmanesh et al., 2017; Ghotbi Ravandi et al., 2017), its biological and taxonomical knowledge is still largely unknown (Lashkari-Bod et al., 2010, 2011; Fischer et al., 2011; Sedighi et al., 2014; Peris-Felipo et al., 2016a, b, c). In order to collect all the data Cortés et al. (2016) published a checklist with the 108 Alysiinae species known for Iran however only ten of them inhabit in Kerman province (South-Eastern Iran). The present work provides additional information to increase the knowledge of this large group of parasitoid wasps in Kerman province.

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Material and methods

Samples were carried out in six localities located in Kerman province (Kuhpayeh, Sirch, Bardsir, Kuhbanan, Negar, Qaleh Askar) (Fig. 1). These localities belong to areas have semi-dried condition, from temperate to cool climatic area. Specimens were collected during 2014–2015 by sweep net and Malaise traps and they were preserved directly in ethyl alcohol (75%). Later, specimens were softened in the laboratory using the AXA method (van

Achterberg, 2009), mounted on triangular point cards and examined by Nikon SMZ800 stereomicroscope. For the identification of Alysiinae, the criteria indicated by van Achterberg (1993), Tobias et al. (1986), and Wharton et al. (1997) were followed. The specimens are deposited in the Insect Collection of the Zoological Museum of Shahid Bahonar University of Kerman, Kerman, Iran (ZMSBUK).

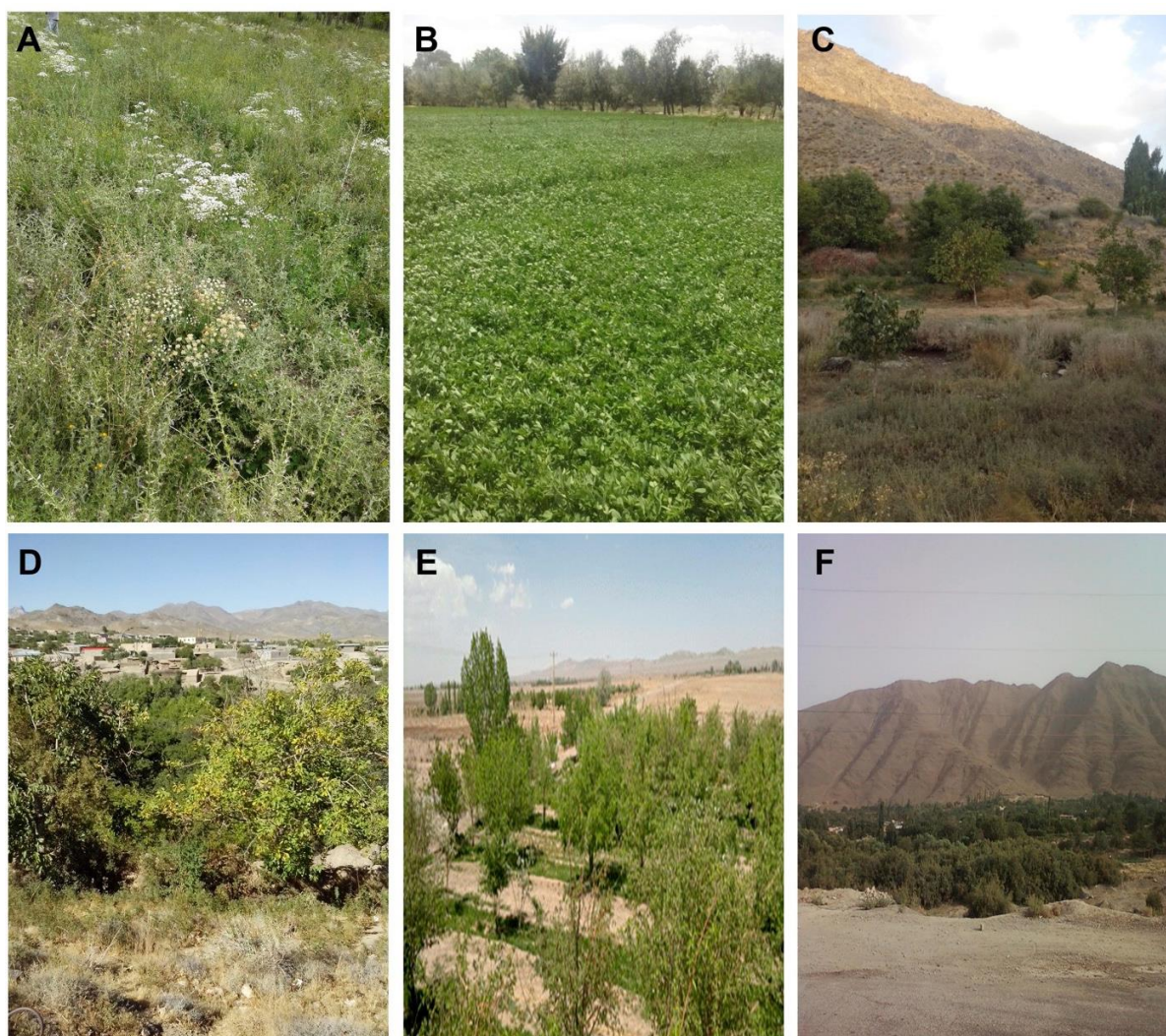


Figure 1. Habitats of Kerman province where the Alysiinae specimens were collected: **A.** Kuhbanan, **B.** Kuhpayeh, **C.** Bardsir, Qal-eh-Askar, **D.** Rabor, Siyahbenoieh, **E.** Negar, **F.** Sirch.

Results

A total of 14 species belonging to eight genera were captured. Six genera of Alysini (*Adeluroloa* Strand, 1928; *Aspilota* Foerster, 1863; *Dinotrema*, Forster 1863; *Idiasta* Foerster, 1863; *Orthostigma* Ratzeburg, 1844 and *Synaldis* Foerster, 1863) and two genera of Dacnusiini tribe (*Chorebus* Haliday, 1833 and *Protodacnusa* Griffiths, 1964) were identified. The identified material is given below and new records are marked with asterisk.

SUBFAMILY Alysiinae Leach, 1815

Tribe Alysini Leach, 1815

1. *Adeluroloa amplidens* (Fischer, 1966)

Material examined: Iran: 1♀, Kuhpayeh, Nehzat Abad, 30°25'N 57°18'E, 2045 m, 10.viii.2015, swept on *Anethum graveolens* L. (S. Safahani leg.).

2. *Aspilota alfalae* Fischer, Lashkari Bod, Rakhshani & Talebi, 2011

Material examined: 1♂, Kuhpayeh, Derakhtangan, 30°28'N 57°18'E, 1853 m, 21.viii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.).

3. *Aspilota isfahanensis* Peris-Felipo, 2016

Material examined: 1♂, Shahdad, Sirch, 30°12'35"N 57°33'90.6"E, 1720 m, 9.v.2014, swept on *Triticum aestivum* L. (M. Iranmanesh leg.).

4. **Dinotrema (Prosapha) speculum* (Haliday, 1838) (Fig. 2A)

Material examined: 1♂, Shahdad, Sirch, 30°11' N 57°34' E, 1654 m, 16.vii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♂, Shahdad, Sirch, 30°11'N 57°33'E, 1689 m, 1.ix.2014, swept on *Rubus* sp. (M. Iranmanesh leg.).

Diagnosis: Mandibles small, simple, tridentate. Paraclypeal fovea short, not nearly reaching ventral edge of eyes. Precoxal sulcus present. Propodeum with different with longitudinal or transverse

carinae. Pterostigma of forewing broad. Fore wing radial (marginal) cell long. vein cu₁ (2-SR) present and distinctly sclerotized. Veins recurrent (m-cu) and nervulus (cu-a) postfurcal. brachial (first subdiscal) cell closed postero-apically by brachial (CU1a) vein. Metasoma distinctly compressed laterally. Ovipositor sheaths usually shorter than metasoma.

5. **Idiasta (Idiasta) dichrocera* Konigsmann, 1960 (Fig. 2B)

Material examined: 1♀, Bardsir, Negar, 29°53'N 56°46'E, 2095 m, 22.iv.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♀, Kuhpayeh, Nehzat Abad, 30°25'N 57°18'E, 2045 m, 10.viii.2014, swept on *Anethum graveolens* L. (S. Safahani leg.); 1♀, Bardsir, Bidkhan, 29°34'N 56°30'E, 2943 m, 14.vii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.).

Diagnosis: Mandible with three teeth; its ventral and diagonal ridges well developed. First flagellar segment of antenna shorter than second segment. Metanotum with high subpointed median tooth. Pterostigma of forewing broad, discrete, wedge-shaped. Vein 2-SR longer than vein 3-SR. Hind wing with vein m-cu well developed. Vein M+CU usually equal to or longer than vein 1M.

6. *Synaldis distracta* (Nees, 1834)

Material examined: 1♂, Shahdad, Sirch, 30°12'N, 57°33'E, 1720 m, 9.v.2014, swept on *Triticum aestivum* L. (M. Iranmanesh leg.); 1♀, Kuhpayeh, Nehzat Abad, 30°25'N, 57°18'E, 2045 m, 10.viii.2015, swept on *Anethum graveolens* L. (S. Safahani leg.).

Tribe Dacnusiini Foerster, 1863

7. *Chorebus (Phaenolexis) bathyzonus* (Marshall, 1895)

Material examined: 1♂, Shahdad, Sirch, 30°11' N 57°33'E, 1702 m, 2.viii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.);

2♀, Shahdad, Sirch, 30°11'N 57°33'E, 1722 m, 28.vi.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 2♀, 1♂, Kuhpayeh, Nehzat Abad, 30°25'N 57°18'E, 2045 m, 10-17.viii.2015, Malaise trap (S. Safahani leg.); 1♀, 1♂, Kuhbanan, Fidkuiyeh, 31°27'N 56°11'E, 2114 m, 21.viii.2015, swept on *Medicago sativa* L. (S. Safahani leg.); 1♀, 1♂, Bardsir, Bidkhan, 29°34'N 56°30'E, 2943 m, 14.vii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♀, Bardsir, Bidkhan, 29°42'N 56°33'E, 2853 m, 25.ix.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♀, Bardsir, Bidkhan, 29°35'N 56°30'E, 2861 m, 2.vii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♀, Bardsir, Bidkhan, 29°35'N 56°30'E, 2861 m, 2-10.vii.2014, Malaise trap (M. Iranmanesh leg.).

8. *Chorebus (Stiphrocera) lar* (Morley, 1924)

Material examined: 2♀, Bardsir, Bidkhan, 29°35'N 56°30'E, 2861 m, 2-9.vii.2014, Malaise trap and swept on *Medicago sativa* L. (M. Iranmanesh leg.).

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

Material examined: 1♂, Shahdad, Sirch, 30°11'N 57°34'E, 1683 m, 10.viii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♀, Shahdad, Sirch, 30°11'N 57°33'E, 1722 m, 28.vi.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♂, Shahdad, Sirch, 30°11'N 57°32'E, 1719 m, 11.xi.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♀, Shahdad, Sirch, 30°12'N 57°32'E, 1760 m, 1.xii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.).

10. *Chorebus (Chorebus) mucronatus* (Telenga, 1935)

Material examined: 1♂, 2♀, Shahdad, Sirch, 30°11'N 57°33'E, 1702 m, 10.viii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♀, Shahdad, Sirch, 30°11'N 57°34'E, 1683 m, 10.viii.2014, swept on herbaceous plants (M.

Iranmanesh leg.); 1♀, Bardsir, Bidkhan, 29°35'N 56°30'E, 2751 m, 22.vii.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.); 1♂, Bardsir, Bidkhan, 29°42'N 56°33'E, 2853 m, 25.ix.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.).

11. *Chorebus (Chorebus) ruficollis* (Stelfox, 1957)

Material examined: 1♀, Bardsir, Negar, 29°53'N 56°46'E, 2095 m, 22.iv.2014, swept on *Medicago sativa* L. (M. Iranmanesh leg.).

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

Material examined: 1♂, Ghanat sir, 29°44'N 56°45'E, 2121 m, 14.v.2015, swept on *Medicago sativa* L. (S. Safahani leg.).

13. **Protodacnusa atristis* (Nees, 1834) (Fig. 2C)

Material examined: 1♀, Bardsir, Lalehzar, 29°29'N 56°49'E, 2969 m, 1.ix.2015, swept on *Medicago sativa* L. (S. Safahani leg.).

Diagnosis: Head massive with broad temples. Mandibles with three teeth; large and with upper tooth widely deflected sideward. Sides of metathorax and propodeum slightly pubescent. Pterostigma linear. Ovipositor concealed.

Discussion

The present study was performed as part of our on-going research on the braconid fauna of Iran in order to increase the knowledge on Alysiinae fauna. Ghotbi-Ravandi et al. (2015) reported 11 Alysiinae species from different parts of Kerman province, of which four species were new records for Iran. Recently, Cortés et al. (2016) reported ten Alysiinae species from this region that all were new records for Iran. In the present study 14 species belonging to eight genera were identified. Of them three species: *Dinotrema (Prosapha) speculum* (Haliday, 1838), *Idiasta (Idiasta) dichrocera* Konigsmann, 1960 and *Protodacnusa tristis* (Nees, 1834) were recorded for the first time for Iran and seven species were new for Kerman province.

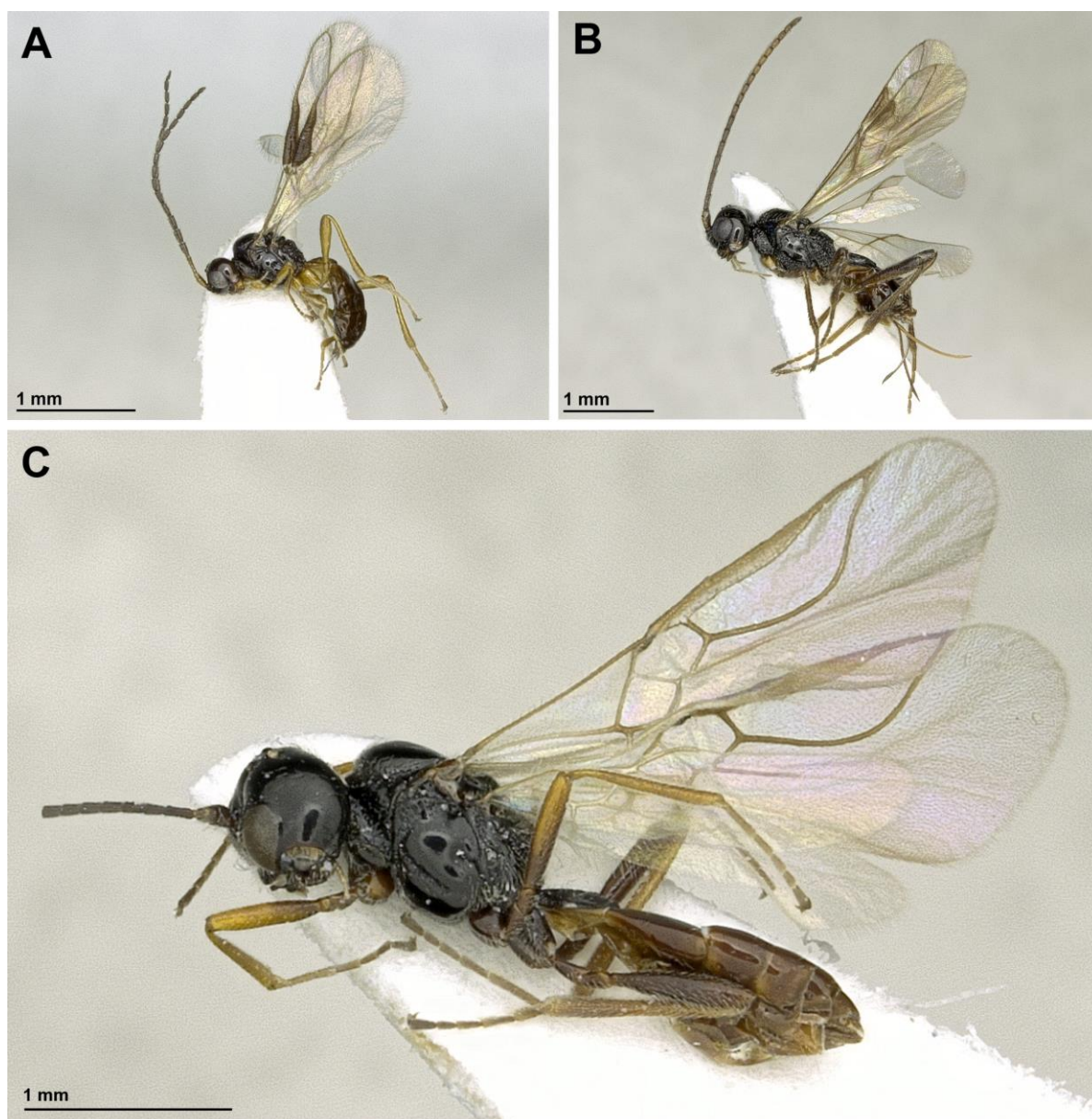


Figure 2. The newly recorded species, habitus, lateral view: **A.** *Dinotrema (Prosapha) speculum* (Haliday, 1838); **B.** *Idiasta (Idiasta) dichrocera* Konigsmann, 1960; **C.** *Protodacnusa tristis* (Nees, 1834).

The total number of Alysiinae species that are recorded from Kerman province including the present study reach to 31 increasing the total number of known Iranian Alysiinae to 111 species (Ghotbi-Ravandi et al., 2015; Cortés et al., 2016).

To conclude, the number of species from Kerman province is still low and further investigations especially on host association

data should be carried out in order to provide more information about this interesting faunistic group of parasitoid wasps.

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Conflict of Interests

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

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مطالعه زنبورهای زیر خانواده Alysinae (Hymenoptera: Braconidae) استان کرمان به همراه سه گزارش جدید

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چکیده: در مقاله حاضر اطلاعاتی در خصوص گونه‌های زیرخانواده Alysinae (Hymenoptera: Braconidae) که از استان کرمان جمع آوری شدند ارائه شده است. جمعاً ۱۴ گونه متعلق به هشت جنس جمع‌آوری و شناسایی شد. از بین گونه‌های جمع‌آوری شده سه گونه شامل *Dinotrema (Prosapha) speculum* (Haliday, 1838)، *Idiasta (Idiasta) dichrocer* Konigsmann, 1960 و *Protodacnus atristis* (Nees, 1834) برای اولین بار از ایران گزارش می‌شوند. خصوصیات افتراقی گونه‌هایی که به تازگی گزارش می‌شوند آورده شده است.

واژگان کلیدی: Alysinae, Braconidae, پارازیتوئیدها، ایران، گزارش‌های جدید