

Tychiini and Mecinini (Coleoptera: Curculionidae, Curculioninae) of Iran: eleven species recorded for the first time, with new data on host plants and distribution of several species

R. Gholami Ghavam Abad^{1&*}, S. E. Sadeghi¹, H. Ghajarieh², H. Nasserzadeh³, H. Yarmand¹, V. R. Moniri¹, M. Nikdel⁴, A. R. Haghshenas⁵, Z. Hashemi Khabir⁶, A. Salahi Ardekani⁷, A. Mohammadpour⁸ and R. Caldara⁹

1. Research Institute of Forests and Rangelands of Iran, Agricultural Research, Education and Extension Organization (AREEO), Tehran, P. O. Box 13185-116, Iran, 2. Tehran University, Aburayhan Faculty, Department of Plant Protection, Tehran, Iran, 3. Department of Insect Taxonomy, Iranian Research Institute of Plant Protection Research, Tehran, P. O. Box 1454 Iran, 4. Agricultural and Natural Resources Research Center of East Azarbaijan, Tabriz, Iran, 5. Agricultural and Natural Resources Research Center of Isfahan, Isfahan, Iran, 6. Agricultural and Natural Resources Research Center of West Azarbaijan, Urumiyeh, Iran, 7. Agricultural and Natural Resources Research Center of Kohkiluyeh and Boyer Ahmad, Yasuj, Iran, 8. Agricultural and Natural Resources Research Center of Qom, Iran, 9. Center of Alpine Entomology, University of Milan, Italy.

*Corresponding author, E-mail: r.gholami@alumni.ut.ac.ir

Abstract

A faunistic study on the tribes Tychiini and Mecinini (Curculionidae, Curculioninae) was carried out during the years 2010-2013 in different ecological regions of Iran. Twenty nine species belonging to the genera *Mecinus* Germar, 1821, *Gymnetron* Schoenherr, 1825, *Rhinusa* Stephens, 1829, *Cleopomiarus* Pierce, 1919, *Tychius* Germar, 1817 and *Sibinia* Germar, 1817 were collected. Localities and ecological notes on each species are provided. Among these, The following 11 species are new to the Iranian fauna: *Mecinus crassifemur* (Arzanov, 1991), *Mecinus simus* (Mulsant & Rey, 1859), *Gymnetron linkei* Reitter, 1907, *Rhinusa antirrhini* (Paykull, 1800), *Rhinusa brondelii* (H. Brisout de Barneville, 1862), *Rhinusa florum* (Rübsaamen, 1895), *Tychius reitteri* Faust, 1889, *Tychius tridentinus* Penecke, 1922, *Sibinia aureofulva* (Desbrochers des Loges, 1875), *Sibinia pellucens* (Scopoli, 1772), *Sibinia unicolor* Fähræus, 1843, whereas all other 18 species are new for one or more provinces. Host plants of several species reported for the first time and commented as well.

Key words: Curculionidae, Mecinini, Tychiini, host plants, new records, Iran

چکیده

شناسایی فون سوسک‌های قبیله‌های Mecinini و Tychiini و تعیین دامنه میزبانی و پراکنش آن‌ها در مراتع ایران ریحانه غلامی قوام‌آباد، سید ابراهیم صادقی، حمید قاجاریه، هیوا ناصرزاده، حمید یارمند، وحیدرضا منیری، مصطفی نیکدل، علیرضا حق‌شناس، زهرا هاشمی خیبر، عباس صلاحی اردکانی، علی محمدپور و روبرتو کلدارا در سال‌های ۱۳۹۲-۱۳۸۸ فون حشرات قبیله‌های Mecinini و Tychiini (Curculionidae, Curculioninae) در مناطق مختلف اکولوژیک ایران بررسی گردید. در این بررسی ۲۹ گونه متعلق به جنس‌های *Gymnetron* Schoenherr, *Mecinus* Germar, 1821, *Rhinusa* Stephens, 1829, *Cleopomiarus* Pierce, 1919, *Tychius* Germar, 1817 و *Sibinia* Germar, 1817 جمع‌آوری و شناسایی شد. مناطق پراکنش و میزبان‌های آن‌ها نیز ارائه شده است. یازده گونه *Mecinus crassifemur* (Arzanov, 1991), *Mecinus simus* (Mulsant & Rey, 1859), *Gymnetron linkei* Reitter, 1907, *Rhinusa antirrhini* (Paykull, 1800), *Rhinusa brondelii* (H. Brisout de Barneville, 1862), *Rhinusa florum* (Rübsaamen, 1895), *Tychius reitteri* Faust, 1889, *Tychius tridentinus* Penecke, 1922 و *Sibinia aureofulva* (Desbrochers des Loges, 1875), *Sibinia pellucens* (Scopoli, 1772), *Sibinia unicolor* Fähræus, 1843 برای اولین بار از ایران گزارش می‌شوند. ۱۸ گونه دیگر نیز برای اولین بار از یک یا چند استان کشور گزارش می‌شوند. همچنین چندین گونه گیاه میزبان جدید برای برخی از این حشرات گزارش می‌شود. واژگان کلیدی: Curculionidae, Mecinini, Tychiini, گیاهان میزبان, گزارش جدید, ایران

Introduction

As reported by the Department of Environment (DoE, 2010), of the total land area of Iran, about 86 million hectares (52.4%) are rangelands; 14.2 million hectares (8.6%) are forests and 32 million hectares (19.5%) are deserts including bare salty lands. Curculionidae, which represent one of the largest families of insects with 51,000 known species, lives in all of these habitats (Oberprieler, 2014). Rangelands in Iran are found on mountains, hillsides and flat plains covered by native vegetation they provide food for

animals at least on one grazing season (DoE, 2010) and constitutes the richest habitat for biodiversity. Immature and adult of many species of Curculionidae feed on different parts of their host plants, including roots, trunks, stems, leaves, flowers, fruits and seeds. Because of their strict association with particular genera and species of plants, some species of weevils are regarded as major or minor pests of agriculture and cause heavy economic losses. However, there are other species, which were successfully employed as biological control agents (Oberprieler, 2014).

Curculioninae is one of the largest subfamilies of Curculionidae including approximately 350 genera and 4,500 species. In this subfamily, Tychiini and Mecinini are among the largest tribes being represented by 600 and 260 valid species, respectively. Distribution of both tribes primarily includes the whole Palaearctic and Afrotropical regions, whereas Tychiini is widely distributed also in America (Caldara *et al.*, 2014).

Concerning Palaearctic Tychiini, all members of *Tychius* Germar, 1817 live on the worldwide distributed family Fabaceae (Hoffmann, 1954; Caldara, 1990). The majority of species of *Tychius* are seed predators, but a few form galls on leaves, flowers or pods (Clark & Burke, 1977). The Palaearctic species of *Sibinia* Germar, 1817 mainly feed on seeds of Caryophyllaceae, Plumbaginaceae, Statioideae, Paronychiaceae and Thymeleaceae (Hoffmann, 1954; Caldara, 1985).

Concerning the Palaearctic species of Mecinini, all species of *Gymnetron* Schoenherr, 1825 feed on different species of *Veronica* (Plantaginaceae) as the host plants (Caldara, 2008). Also all *Mecinus* Germar, 1821 species with known biology live on the genera *Plantago* and *Linaria*, belonging to family Plantaginaceae (Caldara & Fogato, 2013) and all species of *Rhinusa* Stephens, 1829 live on representatives of the plant families Scrophulariaceae and Plantaginaceae (Caldara, 2001, 2014). Finally *Miarus* Schoenherr, 1826 and *Cleopomiarus* Pierce, 1919 feed on Campanulaceae (Hoffmann, 1958; Caldara, 2001). Larvae of Mecinini develop in roots, shoots, leaves and flowers which may cause swelling or develop into galls on their hosts. Moreover, some species of *Rhinusa* are inquilines in galls produced by other species of the same genus (Toševski *et al.*, 2015).

The knowledge on the weevil fauna of Iran is still poor. Broumand (1998) listed 287 species of superfamily Curculionoidea, among which eight species of Tychiini and seven species of Mecinini were reported. A list of 189 weevil species consisting agricultural pests and their natural enemies in Iran was published by Modarres Awal (1997) (four species of Mecinini and eight species of Tychiini were quoted). Ghahari *et al.* (2009) collected 29 curculionid species in the Arasbaran Biosphere Reserve

and vicinity, north-western Iran, including five species of *Tychius*. In a comprehensive list based on literature, Legalov *et al.* (2010) reported seven species of *Sibinia*, 40 species of *Tychius*, two species of *Gymnetron*, four species of *Mecinus* and five species of *Rhinusa*. Subsequently Caldara (2010) described *Tychius zagrosianus* from the Zagros Mountain, whereas Ghahari & Legalov (2011), quoted ten species of Tychiini from Kurdistan province (five new for Iran). Finally Ghahari & Arzanov (2012) reported 56 species of Curculionidae, among which 13 species belonged to Tychiini (two of them quoted from Iran for the first time).

The aim of this study was to collect species of Tychiini and Mecinini in the rangelands of different Iranian provinces, to identify them and their host plants as well as analyzing their distribution.

Material and methods

This study was carried out during 2010-2013 in rangelands of all the four ecozones of Iran (DoE, 2010). During spring and summer, periodical samplings were done every 7-15 days. Adult weevils were collected from the following 12 provinces: West Azarbaijan, East Azarbaijan, Ardabil, Lorestan, Hamadan, Qom, Ghazvin, Isfahan, Fars, Razavi Khorasan, Kohgiluyeh and Boyer Ahmad and Bushehr (Fig. 1).

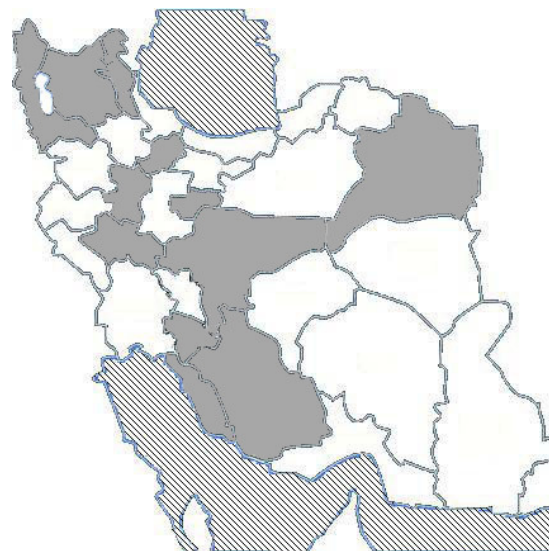


Fig. 1. Map of Iran with the investigated provinces in grey.

The specimens-which are now deposited in the Curculionid's collection of Arthropod's Museum of Research Institute of Forests and Rangelands of Iran - were obtained by netting or collecting herbaceous plants into plastic bags and then examined in laboratory. Weevils were initially identified on the basis of recent revisions (Caldara, 1985, 1986, 1990, 2008, 2014; Hernández-Vera *et al.*, 2010, Caldara & Fogato, 2013; Toševski *et al.*, 2015) and then confirmed by R. Caldara. Plants were identified by the help of expert botanists.

Result

The following 29 species belonging to *Mecinus*, *Gymnetron*, *Rhinusa* and *Cleopomiarus* (Meciniini), and *Tychius* and *Sibinia* (Tychiini) were collected. For each genus, they are listed in alphabetical order. Asterisk indicates the species recorded in Iran for the first time:

1- Tribe Meciniini

**Mecinus crassifemur* (Arzanov, 1991)

Material examined-Iran: East Azarbaijan, Tikmeh Dash, 21.ix.2010, on *Astracantha microcephala* (Willd.) Podlech (Fabaceae), leg. M. Nikdel, 1 ♂.

Distribution-Bosnia and Herzegovina, southern Russia, Georgia, Armenia, Azarbaijan, Turkey (Caldara & Fogato, 2013).

Biological notes- This species was collected on *Plantago saxatilis* M. (Caldara & Fogato, 2013), its probable host plant. We simply consider the presence of this species on Fabaceae occasional.

Mecinus ictericus (Gyllenhal, 1838)

Material examined-Iran: Ardabil, Goyche, 4.vi.2010, on *Plantago afra* L. (Plantaginaceae), leg. D. Aligolizadeh, 5 ♂♂ and 9 ♀♀.

Distribution-Central and southern Europe, Caucasian States, Turkey, Iran (Caldara & Fogato, 2013).

Biological notes-It is well known that this species lives on *Plantago indica* L. (= *P. arenaria* W. & K.), and *P. sempervirens* Crantz (= *P. cynops* L.) (Caldara &

Fogato, 2013). It is therefore highly probable that also *Plantago afra* (= *P. psyllium* L.) is another host plants.

Remarks- This species was previously known from another northern province of Iran, Gilan (Caldara & Fogato, 2013), which is close to Ardabil province.

Mecinus labilis (Herbst, 1795)

Material examined- Iran: West Azarbaijan, Ghasemloo, 9.viii.2011, on *Plantago major* L. (Plantaginaceae), leg. Z. Hashemi, 1 ♂. East Azarbaijan, Tikmeh Dash, 18.vii.2011, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. A. Dordaei, 1 ♂ and 8 ♀♀. Lorestan, Daretakht, N 33° 18' 24" E 49° 25' 53", 20.vii.2011, on *Plantago lanceolata* L. (Plantaginaceae), leg. F. Piruzi, 1 ♀ and 7 ♂♂. Hamadan, Simin, N 34° 39' 28" E 48° 32' 35", 24.vii.2012, on *Plantago lagopus* L. (Plantaginaceae), leg. N. A. Rajabi Mazhar, 1 ♂. Qom, Ghahan, N 34° 40' 50.2" E 50° 11' 29.7", 22.vii.2012, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. Mohammadpour, 1 ♀.

Distribution- Europe, Caucasian States and Turkey (Caldara & Fogato, 2013).

Biological notes- This species is known to feed on *Plantago lanceolata* (Hoffmann, 1958), on which most of our specimens were collected. It may live on the closely related *Plantago lagopus* too.

Remarks-Previously cited in Iran only from Tehran province (Broumand, 1998). Our data confirm the presence of this species in north-western Iran and also in several other provinces.

Mecinus pascuorum (Gyllenhal, 1813)

Material examined-Iran: West Azarbaijan, Qarabag, N 42° 10' 32" E 50° 41', 9.viii.2011, on *Plantago major* L. (Plantaginaceae), leg. Z. Hashemi, 5 ♀♀ and 14 ♂♂. West Azarbaijan, Takab, N 40° 30' 51" E 68° 60' 25", 6.viii.2009, on *Plantago lanceolata* L. (Plantaginaceae), leg. Z. Hashemi, 3 ♀♀ and 2 ♂♂. West Azarbaijan, Piranshahr, 8.viii.2012, on *Astragalus* sp. (Fabaceae), leg. E. Alizadeh, 4 ♂♂. East Azarbaijan, Tikmeh dash, 21.ix.2010, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. A. Dordaei, 8 ♀♀ and 9 ♂♂. East Azarbaijan, Jalfa marand, 1.vi.2010, on *Plantago lanceolata* L.

(Plantaginaceae), leg. A. A. Dordaei, 1 ♂. East Azarbaijan, Hurand, 22.vi.2010, on *Trifolium arvense* L. (Fabaceae), leg. A. A. Dordaei, 1 ♂. Ardabil, Heiran, 5.viii.2010, unknown host, leg. D. Aligolizadeh, 4 ♂♂ and 4 ♀♀. Hamadan, Hamadan, 15.ix.2010, on *Malva neglecta* Wallr. (Malvaceae), leg. N. A. Rajabi Mazhar, 1 ♂. Hamadan, Vafr-e jin, N 35° 48' 7" E 48° 23' 31", 15.viii.2011, on *Plantago lagopus* L. (Plantaginaceae), leg. N. A. Rajabi Mazhar, 1 ♂ and 8 ♀♀. Qom, Karamjegan, N 34° 15' 14.9" E 50° 50' 41.8", 27.viii.2011, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. Mohammadpour, 1 ♂. Qom, Tinooj, N 34° 34' 20.1" E 50.6° 50' 5", 9.viii.2012, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. Mohammadpour, 1 ♀ and 5 ♂♂. Qom, Dolatabad, N 34° 41' 9.1" E 50° 25' 19.4", 20.vi.2012, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. Mohammadpour, 4 ♂♂ and 1 ♀. Qom, Vasaf, N 34° 11' 15.2" E 50° 56' 2.7", 16.vii.2012, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. Mohammadpour, 7 ♂♂. Qom, Vasaf, N 34° 11' 15.2" E 50° 56' 2.7", 16.vii.2012, on *Sanguisorba minor* Scop. (Rosaceae), leg. A. Mohammadpour, 1 ♀. Qom, Ghahan, N 34° 40' 50.2" E 50° 11' 29.7", 22.vii.2012, on *Plantago lanceolata* L. (Plantaginaceae), leg. A. Mohammadpour, 1 ♀.

Distribution- Europe, Caucasian States, Middle East, Central Asia, Algeria. Northern America, Australia and New Zealand, South Africa (Caldara & Fogato, 2013).

Biological notes- It is known that the larvae of this species feed on fruits of *Plantago lanceolata* (Caldara & Fogato, 2013). However, according to our above reported data, species of *Plantago*, such as *P. major* and *P. lagopus* might be the host plants.

Remarks- Previously reported in Iran only from the provinces of Fars and Tehran (Legalov *et al.*, 2010). As shown by our data, this species has a wide distribution in Palaearctic and it is very common in Iran.

***Mecinus simus (Mulsant & Rey, 1859)**

Material examined-Iran: Kohgiluyeh and Boyer Ahmad, Narak, 7.vii.2013, unknown plant, leg. A. Salah, 1 ♂.

Distribution-Central and Southern Spain, Southern France, Central and Southern Italy and Sicily, Greece, Malta, Cyprus, Northern Africa, Middle East (Caldara & Fogato, 2013).

Biological notes- This species lives on several species of *Plantago*: *P. afra* L. (= *P. psyllium* L.), *P. indica* (= *P. arenaria* W. & K.), and *P. sempervirens* Crantz (= *P. cynops* L.) (Caldara & Fogato, 2013). Biological data are lacking on this species in Iran

***Gymnetron linkei Reitter, 1907**

Material examined-Iran: East Azarbaijan, Hashtrud, 2.vii.2012, on *Veronica orientalis* Miller (Plantaginaceae), leg. A. A. Dordaei, 8 ♀♀ and 7 ♂♂. East Azarbaijan, Samiran, 22.vi.2010, on *Veronica orientalis* Miller (Plantaginaceae), leg. A. A. Dordaei, 2 ♀♀ and 2 ♂♂.

Distribution- Russia, Armenia, Azarbaijan, Turkey (Caldara, 2008).

Biological notes- No biological data were reported previously. The repeated collection of this species on *Veronica orientalis* suggests that this might be the host plant of *G. linkei*. As already mentioned, all Palaearctic species of *Gymnetron* with known biology live on *Veronica* (Caldara, 2008).

Remarks-This species is reported for the first time from Iran.

Gymnetron niloticum Kirsch, 1881

Material examined- Iran: Lorestan, Kushki, N 34° 2' 10" E 48° 48' 51", 14.vi.2011, on *Medicago sativa* L. (Fabaceae), leg. M. Tavakoli, 4 ♀♀ and 3 ♂♂. Lorestan, Kushki, N 34° 2' 10" E 48° 48' 51", 17.vi.2011, on *Glycyrrhiza glabra* (L.) (Fabaceae), leg. M. Tavakoli, 6 ♀♀ and 5 ♂♂. Lorestan, Sheikh miri, N 33° 54' 33" E 48° 41' 1", 17.vi.2011, on *Veronica orientalis* Miller (Plantaginaceae), leg. M. Tavakoli, 74 ♀♀ and 66 ♂♂.

Distribution-Western Palaearctic and central Asia (Caldara, 2008).

Biological notes- No biological data were previously reported. However, as mentioned above, all the

Palearctic species of *Gymnetron* live on *Veronica* (Caldara, 2008). It is probable that the host plant of this species is *Veronica orientalis*, We consider *Medicago* and *Glycyrrhiza* as the refuge plants.

Remarks-This species already reported from three other north-western Iranian provinces: Kermanshah province, Kohgiluyeh and Boyer Ahmad province, Kurdistan province (Caldara, 2008).

****Rhinusa antirrhini* (Paykull, 1800)**

Material examined- Iran: East Azarbaijan, Hashtrud, 2.vii.2012, on *Linaria kurdica* Boiss. et Hohen. (Plantaginaceae), leg. A. A. Dordaei, 1 ♂. Qom, Veshnaveh, N 34° 17' 22" E 50° 58' 41.3", 15.vi.2011, on *Trigonella monantha* C. Meyer (Fabaceae), leg. A. Mohammadpour, 4 ♂♂ and 10 ♀♀. Isfahan, Fereydu shahr, N 33° 55' E 51° 50', 12.vii.2010, on *Silene* sp. (Caryophyllaceae), leg. A. R. Haghshenas, 1 ♂.

Distribution- Central and South Central Europe, the Mediterranean region and the Caucasus, North Africa (Hernández-Vera *et al.*, 2010).

Biological notes- It was established that *Linaria vulgaris* Mill. was the host plant of this species (Hernández-Vera *et al.*, 2010). Probably different cryptic taxa which live on other species of *Linaria*, such as *L. genistaefolia* (Fracenfeld), *L. tournefortii* Poir., *L. minor* Desf., *L. repens* (L.) Mill. have not yet been described, where *R. antirrhini* was previously quoted, as suggested by the preliminary molecular data (Hernández-Vera *et al.*, 2010). Therefore, some or all the collected specimens, especially those collected on *L. kurdica*, might belong to another species different from *R. antirrhini*.

***Rhinusa asellus* (Gravenhorst, 1807)**

Material examined- Iran: Kohgiluyeh and Boyer Ahmad, Kooch gol, 6.vi.2012, on *Verbascum* sp. (Scrophulariaceae), leg. A. Salahi, 1 ♂ and 1 ♀.

Distribution- Central and Southern Europe, Caucasus, Turkey, Iran (Caldara, 2014).

Biological notes- This species lives on *Verbascum* spp.: *V. nigrum* L., *V. phlomoides* L., *V. pulverulentum* Vill.,

V. sinuatum L., *V. thapsoides* Schw., *V. thapsus* L., *V. virgatum* With. (Caldara, 2014)

Remarks-It was already reported from various Iranian provinces: East Azarbaijan, Fars, Sistan Baluchestan and Tehran (Broumand, 1998), although the specimens in the South might belong to the closely related taxon *R. tenuirostris* (Stierlin, 1888) (Caldara, 2014).

***Rhinusa bipustulata* (Rossi, 1792)**

Material examined- Iran: East Azarbaijan, Ahar, 21.vii.2009, on *Scrophularia variegata* (Scrophulariaceae), leg. A. A. Dordaei, 3 ♂♂ and 4 ♀♀. East Azarbaijan, Sarab, 3.vii.2012, on *Scrophularia nervosa* Benth. (Scrophulariaceae), leg. A. A. Dordaei, 1 ♂. Lorestan, Daretakht, N 33° 18' 24" E 49° 25' 53", 20.vii.2011, on *Scrophularia striata* Boiss. (Scrophulariaceae), leg. F. Piruzi, 6 ♂♂ and 5 ♀♀. Razavi Khorasan, Torogh, 25.vi.2012, on *Althaea officinalis* L. (Malvaceae), leg. M. Afruzian, 6 ♂♂ and 10 ♀♀.

Distribution- Europe, Middle East, Central Asia (Caldara, 2014).

Biological notes-This species feeds on seeds of various species of *Scrophularia*: *S. nodosa* L., *S. aquatica* L., *S. canina* L., *S. olympica* Boiss. It is probable that *S. variegata* is also another host plant.

Remarks-This species was never quoted for Iran. However two taxa, *R. brevipile* (Desbrochers des Loges, 1893) and *R. germari* Faust, 1889 which both previously considered synonyms of *R. bipustulata* (Caldara, 2014), were quoted for this country (Modarres Awal, 1997; Legalov *et al.*, 2010).

****Rhinusa brondelii* (H. Brisout de Barneville, 1862)**

Material examined- Iran: Qom, Varzaneh, 9.v.2010, on *Linaria michauxii* Chav. (Plantaginaceae), leg. A. Mohammadpour, 7 ♂♂ and 8 ♀♀.

Distribution- Southern Italy, Sicily, North Africa, Middle East (Toševski *et al.*, 2015).

Biological notes- This gall-inducing species lives on *Linaria purpurea* (L.) P. Mill. in Southern Italy and Sicily and probably on *L. reflexa* (L.) Chaz. in North

Africa (Toševski *et al.*, 2015). It is probable that its host plant in Iran and Middle East is *L. michauxii* Chav.

****Rhinusa florum* (Rübsaamen, 1895)**

Material examined- Iran: West Azarbaijan, Orumieh, 15.viii.2012, on unknown plant, leg. Z. Hashemi, 1 ♂. East Azarbaijan, Bostanabad, 15.vi. 2011, on *Linaria* sp. (Plantaginaceae), leg. A. A. Dordaei, 1 ♂ and 1 ♀. Qom, Bagh-e yek, N 34° 31' 2.3" E 50° 23' 50", 15.vi.2011, on *Linaria kurdica* Boiss. et Hohen. (Plantaginaceae), leg. A. Mohammadpour, 9 ♂♂ and 6 ♀♀. Isfahan, Fereydun shahr, N 33° 55' E 51° 50', 12.vii.2010, on *Linaria* sp. (Plantaginaceae), leg. A. R. Haghshenas, 1 ♂.

Distribution- East Central and Southern Europe, Middle East (Caldara, 2013).

Biological notes-The host plant of this species is *Linaria genistifolia* (L.) Miller (Hernández-Vera *et al.*, 2010). It is very probable that also *Linaria kurdica* is its another host plant.

***Rhinusa neta* (Germar, 1821)**

Material examined- Iran: West Azarbaijan, Orumieh, 15.viii.2012, on unknown plant, leg. Z. Hashemi, 8 ♂♂ and 9 ♀♀. Lorestan, Sarvand, 8.x.2009, on *Verbascum* sp. (Scrophulariaceae), leg. F. Piruzi, 5 ♂♂ and 4 ♀♀. Qom, Varzaneh, N 34° 32' 44.3" E 50° 19' 16.2", on *Linaria michauxii* Chav. (Plantaginaceae), leg. A. Mohammadpour, 42 ♂♂ and 30 ♀♀. Qom, Bagh-e yek, N 34° 31' 3.9" E 50° 23' 55.2", 3.vi.2011, on *Astragalus tribuloides* Delile (Fabaceae), leg. A. Mohammadpour, 1 ♂. Isfahan, Fereydun shahr, N 33° 55' E 51° 50', 12.vii.2011, on *Scrophularia* sp. (Scrophulariaceae), leg. A. R. Haghshenas, 1 ♂.

Distribution- Europe, Caucasus, Africa, Siberia, Central Asia (Caldara, 2013).

Biological notes-This species lives on various species of *Linaria*: *L. italica* Trev., *L. sparteae* Link et Hoffm., *L. spuria* Mill., *L. striata* D. C., *L. supina* Desf., *L. vulgaris* L. Therefore *L. michauxii* might be its another

host plant. It is also possible that it occasionally feeds on *Scrophularia* and *Verbascum*.

Remarks-Already quoted from Iran without more precise indications by Modarres Awal (1997), this species seems to be common in Northern Iran.

***Rhinusa tetra* (Fabricius, 1801)**

Material examined- Iran: East Azarbaijan, Bostanabad, 15.vi.2011, on *Silene spergulifolia* (Willd.) (Caryophyllaceae), leg. A. A. Dordaei, 1 ♂. Kohgiluyeh and Boyer Ahmad, Sang mang, N 30° 18' 41" E 51° 28' 37.8", 8.vi.2012, on *Verbascum* sp. (Scrophulariaceae), leg. A. Salahi, 1 ♂. Kohgiluyeh and Boyer Ahmad, Kooch Gol, N 30° 50' 9.9" E 51° 32' 19.7", 6.vi.2012, on *Verbascum* sp. (Scrophulariaceae), leg. A. Salahi, 23 ♂♂ and 12 ♀♀. Kohgiluyeh and Boyer Ahmad, Kooch Gol, N 30° 50' 9.9" E 51° 32' 19.7", 6.vi.2012, on *Phlomis* sp. (Labiatae), leg. A. Salahi, 1 ♂ and 4 ♀♀. Hamadan, Tuyserkan, N 34° 28' 48" E 48° 32' 56", on *Verbascum speciosum* Schrader (Scrophulariaceae), leg. N. A. Rajabi Mazhar, 1 ♂. Qom, Ghahan, N 34° 40' 50.2" E 50° 11' 29.7", 12.viii.2011, on *Haplophyllum perforatum* (M. Bieb.) (Rutaceae), leg. A. Mohammadpour, 1 ♂. Qom, Emamzadeh Esmail, N 34° 18' 29" E 50° 58' 2.1", 12.viii.2011, on *Verbascum speciosum* Schrader (Scrophulariaceae), leg. A. Mohammadpour, 1 ♂.

Distribution- Europe, Caucasus, SW Siberia, Central Asia, North Africa, Middle East, imported in north America (Caldara, 2014).

Biological notes- It was quoted on several species of *Verbascum*: *V. blattaria* L., *V. boerhavia* L., *V. creticum* (L.) Cav., *V. lychnitis* L., *V. nigrum* L., *V. phlomoides* L., *V. phoeniceum* L., *V. pulverulentum* Vill., *V. speciosum* Schrader, *V. thapsiforme* Schrader, *V. thapsus* L. Adults were collected also on *Scrophularia auriculata* L., *S. canina* L., and *S. laevigata* Vahl. It is introduced to North America where it was proposed as a potential candidate for the biological control of invasive common mullein, *V. thapsus* (Caldara, 2014).

Remarks-In Iran this species was previously known from the provinces of East Azarbaijan, Qazvin,

Khuzestan and Tehran (Broumand, 1998). It seems that this species is common all around Iran.

***Cleopomiarus distinctus* (Boheman, 1845)**

Material examined- Iran: East Azarbaijan, Vaighan, 23.viii.2009, on *Campanula rapunculoides* L. (Campanulaceae), leg. A. A. Dordaei, 1 ♂. Qom, Nevis, N 34° 44' 50" E 50° 11' 41.5", 4.viii.2011, on *Mindium laevigatum* Vevt. (Campanulaceae), leg. A. Mohammadpour, 7 ♂♂ and 6 ♀♀.

Distribution- Europe, Siberia to the Russian Far East, Middle East (Caldara, 2013).

Biological notes- This species lives on various species of *Campanula* (*C. glomerata* L., *C. incurva* Auch., *C. latifolia* L., *C. persicaefoliae* L., *C. rapunculus* L., *C. rhomboidalis* L., *C. thyrsoides* L., *C. trachelium* L.) in central Europe (Hoffmann 1958; Caldara pers. obs.), whereas nothing is known on its host plants in Turkey. *Campanula rapunculoides* and *Mindium laevigatum* might be its other two host plants.

Remarks- *Cleopomiarus distinctus* was previously known from Iran without more precise indication (Modarres Awal, 1997). The length of rostrum especially in the females of Anatolian population, seems to be very variable. It would be very interesting to perform a detailed molecular study on the populations of different host plants in order to understand whether this variability corresponds actually to different cryptic species as already discovered in *Rhinusa antirrhini* and *R. pilosa*.

2- Tribe Tychiini

***Tychiusargentatus* Chevrolat, 1859**

Material examined- Iran: East Azarbaijan, Abdorazagh, 22.vi.2010, on *Medicago rigidula* (L.) All. (Fabaceae), leg. M. Nikdel, 3 ♀♀.

Distribution- Circum-Mediterranean (Caldara, 1990).

Biological notes- It was quoted on several species of *Lotus* (*L. ornithopodioides* L., *L. edulis* L., *L. creticus* L. and *L. tenuis* Wald et Kit). We consider *Medicago rigidula* as a refuge plant for this insect.

Remarks- This species was previously quoted in Iran only from the Kurdistan (Ghahari & Legalov, 2011), North Western is correct Iran.

***Tychiusaureolus* Kiesenwetter, 1851**

Material examined- Iran: Qom, Mazraeh-gey, 27.vii.2011, on *Medicago sativa* L. (Fabaceae), leg. A. Mohammadpour, 2 ♀♀.

Distribution- Western and Central Palaearctic (Caldara, 2013).

Biological notes- It is well known that this species mainly parasitize Alfalfa, *Medicago sativa*, and the Blue Alfalfa, *M. falcata* L., (Clark & Burke, 1977; Caldara, 1990), although it is also reported on species of *Melilotus* (*M. alba* Lam., *M. elegans* Salzm.) and *Trifolium pratense* L. (Hoffmann, 1954).

Remarks- This species was already known from northern Iranian provinces: Tehran and Khorasan (Broumand, 1998), Kurdistan (Ghahari & Legalov, 2011), Isfahan and Chaharmahal and Bakhtiari (Ghahari *et al.*, 2010).

***Tychius breviusculus* Desbrochers des Loges, 1873**

Material examined- Iran: West Azarbaijan, Soluk, 3.viii.2011, on *Medicago sativa* L. (Fabaceae), leg. M. R. Zargaran, 8 ♀♀ and 6 ♂♂. West Azarbaijan, Oshnaviyeh, 20.ix.2011, on *Melilotus officinalis* (L.) Lam. (Fabaceae), leg. M. R. Zargaran, 2 ♀♀. Fars, Sepidan, 29.v.2011, on *Vicia sativa* L. (Fabaceae), leg. S. H. Saadati, 1 ♂.

Distribution- Europe, Turkey, Africa (Morocco), Siberia, Central and Eastern Asia (Caldara, 2013).

Biological notes- This species is generally collected on *Melilotus*: *M. Alba* Lam., *M. officinalis* (L.) Lam. (Caldara, 1990). However it might feed on *Medicago* too.

Remarks- This species was already known from two other Iranian North-Western provinces: Kurdistan (Ghahari & Legalov, 2011) and Lorestan (Ghahari & Arzanov, 2012).

***Tychius intrusus* Faust, 1889**

Material examined- Iran: Qom, Palang Dareh, N 34° 20' 26.4" E 50° 25' 23.9", 25.iv.2011, on *Astragalus compylorrhynchus* Fischer & Meyer (Fabaceae), leg.

A. Mohamadpour, 1 ♂ and 1 ♀. Qom, Varzaneh, N 34° 30' 50.9" E 50° 19' 26.7", 22.v.2010, on *Astragalus campylorrhynchus* Fischer & Meyer (Fabaceae), leg. A. Mohamadpour, 1 ♂. Qom, Gazeran, N 34° 43' 59.4" E 50° 27' 44.3", 12.v.2011, on *Onobrychis aucheri* Boiss. (Fabaceae), leg. A. Mohamadpour, 1 ♂. Ghazvin, Ghazvin, N 36° 24' 65" E 50° 5' 55", 25.v.2009, on *Astragalus campylorrhynchus* Fischer & Meyer (Fabaceae), leg. A. Zarnegar, 1 ♂. Kohgiluyeh and Boyer Ahmad, Kooh Gol, N 30° 50' 9.9" E 51° 32' 19.7", on Fabaceae, leg. A. Salahi, 1 ♂.

Distribution- North Africa, Caucasus, Central Asia, Middle East (Caldara, 2013).

Biological notes-The host plant of this species was previously unknown, although it was supposed that it belongs to Astragaleae, on which all other closely related species live (Clark & Burke, 1977; Caldara, 1990). Our data confirm this hypothesis, since this weevil was collected on *Astragalus* and *Onobrychis*.

Remarks-Already quoted from some north-western Iranian provinces: Hamadan, Markazi, Tehran (Legalov *et al.*, 2010). Our data strengthened the presence of this species also in other regions of Iran.

Tychius meliloti Stephens, 1831

Material examined- Iran: West Azarbaijan, Oshnavieh, 20.ix.2011, on *Melilotus officinalis* (L.) Lam. (Fabaceae), leg. M. R. Zargaran, 5 ♀♀. West Azarbaijan, Ghasemloo valley, 11.viii.2011, on *Melilotus officinalis* (L.) Lam. (Fabaceae), leg. M. R. Zargaran, 3 ♀♀. West Azarbaijan, Soluk, 15.viii.2011, on *Melilotus officinalis* (L.) Lam. (Fabaceae), leg. M. R. Zargaran, 12 ♂♂ and 3 ♀♀.

Distribution- Quoted from the Iberian peninsula to Russian Far East, North Africa and Middle East (Caldara, 2013).

Biological notes- This common species is generally collected on various species of *Melilotus*: *M. alba* Lam., *M. altissima* Thuill. and *M. officinalis* (L.) Lam. (Clark & Burke, 1977; Caldara, 1990). We consider *Vicia sativa* as its refuge plant.

Remarks- This species was already quoted from various Northern Iranian provinces: Tehran (Broumand, 1998), Chaharmahal and Bakhtiari (Ghahari *et al.*, 2010), Lorestan (Ghahari & Arzanov, 2012). Its collection in Fars province widens its distribution to the southern Iran.

Tychius picirostris (Fabricius, 1787)

Material examined- Iran: West Azarbaijan, Ghareh bolagh, 23.viii.2011, on *Trifolium pratense* L. (Fabaceae), leg. M. R. Zargaran, 1 ♂. East Azarbaijan, Sahand Ski resort, 22.vi.2010, on *Trifolium montanum* L. (Fabaceae), leg. M. Nikdel, 5 ♀♀. East Azarbaijan, Shahyurdi, 22.vi.2010, on *Trifolium resupinatum* L. (Fabaceae), leg. M. Nikdel, 1 ♂. East Azarbaijan, Sahand Ski resort, 19.vi.2011, on *Trifolium* sp. (Fabaceae), leg. M. Nikdel, 1 ♂. East Azarbaijan, Sahand Ski resort, 1.vii.2011, on *Trifolium montanum* L. (Fabaceae), leg. M. Nikdel, 1 ♂.

Distribution- Europe, Siberia, Anatolia, Central Asia (Kazakhstan, Turkmenistan), East Asia (Mongolia, Russian Far East), North America (Caldara, 2013).

Biological notes-This species damages various species of *Trifolium* but especially *T. repens* L. (Clark & Burke, 1977).

Remarks-This common species was previously cited from Iran only from Lorestan province (Ghahari & Arzanov, 2012). Our data confirm its presence in North-Western Iran.

**Tychius reitteri* Faust, 1889

Material examined-Iran: Isfahan, Fereydun shahr, 22.v.2009, on *Astragalus effusus* Bunge (Fabaceae), leg. A. R. Haghshenas, 1 ♂.

Distribution- States of the Southern Balkans and of Caucasus (Caldara, 2013).

Biological notes-This species was previously collected on *Astragalus* (*A. brachycarpus* M. Bieb., *A. hajastanus* Grossh.) (Karasyov, 1994). It is probable that also *A. effusus* is its another host plant.

Remarks-This species was not previously reported from Iran.

***Tychius squamulatus* Gyllenhal, 1836**

Material examined- Iran: East Azarbaijan, Sarab, 3.vii.2012, on *Lotus corniculatus* L. (Fabaceae), leg. M. Nikdel, 4 ♂♂ and 1 ♀. Hamadan, Cheshme Malek, 3.vii.2012, on *Lotus corniculatus* L. (Fabaceae), leg. N. A. Rajabi Mazhar, 1 ♂. Ardabil, Ardabil, N 37° 59' 73" E 48° 35' 60", 27.XI.2010, on *Lotus corniculatus* L. (Fabaceae), leg. D. Aligolizadeh, 6 ♂♂ and 7 ♀♀. Qom, Tinuj, N 34° 34' 20.1" E 50° 06' 50", 3.viii.2012, on *Lotus corniculatus* L. (Fabaceae), leg. A. Mohammadpour, 1 ♂.

Distribution- Europe, Western Siberia, Middle East (Caldara, 2013).

Biological notes- The generally reported host plant of this species is *Lotus corniculatus*, on which the immatures were collected (Caldara, 1990).

Remarks- This species was reported by Caldara (1990) from some provinces of North-Western Iran (Tehran, Alborz, Khuzestan). Our data confirm the presence of this species also in other provinces of Iran

****Tychius tridentinus* Penecke, 1922**

Material examined-Iran: East Azarbaijan, Samiran, 22.vi.2010, on *Astragalus tabrisianus* Boiss. & Buhse (Fabaceae), leg. M. Nikdel, 1 ♂. East Azarbaijan, Samiran, 22.vi.2010, on *Astragalus seidabadensis* Bunge (Fabaceae), leg. M. Nikdel, 1 ♂. East Azarbaijan, Sarab, 22.vi.2010, on *Astragalus persicus* Fischer & Meyer (Fabaceae), leg. M. Nikdel, 1 ♂.

Distribution- Western and Central Europe, Turkey, Central Asia (Caldara, 2013).

Biological notes-The reported host plants of this species in Western Europe belong to the genus *Astragalus*: *A. monspessulanus* L. and *A. aristatus* L'Hér. (Hoffmann, 1958; Caldara, 1990). Therefore, the three other species of *Astragalus*, on which this weevil was collected in Iran, demonstrate that *T. tridentinus* is an oligophagus species.

***Tychius urbanus* Faust, 1885**

Material examined- Iran: Hamadan, Sari Bolagh, N 35° 15' 56" E 48° 52' 48", 20.xii.2010, on *Alhagi maurorum* Medik. (Fabaceae), leg. N. A. Rajabi

Mazhar, 2 ♂♂ and 2 ♀♀. Bushehr, Bushehr, 20.ix.2010, on *Alhagi camelorum* Fischer (Fabaceae), leg. N. Farrar, 1 ♂ and 1 ♀.

Distribution- Desertic regions of southern Asia from Turkey to Kazakhstan, Egypt (Caldara, 1986).

Biological notes- As all the other species of the *T. morawitzi* group, this species is generally reported as living on *Alhagi* spp. (Caldara, 1986; Karasyov, 1994). Our specimens confirm these data.

Remarks- Previously, it was reported from Mazandaran province and Sistan and Baluchistan province in Iran. Our data suggests that this species might be distributed in the desertic areas of Iran.

****Sibinia aureofulva* (Desbrochers des Loges, 1875)**

Material examined- Iran: East Azarbaijan, Sarab, 19.vi.2011, on *Silene cholorifolia* Smith (Caryophyllaceae), leg. A. A. Dordaei, 1 ♀.

Distribution- South-Eastern Europe, Middle East (Caldara, 1985).

Biological notes- This species was already reported as collected on *Silene chlorifolia* (Caldara, 1985).

****Sibinia pellucens* (Scopoli, 1772)**

Material examined-Iran: East Azarbaijan, Sahand ski resort, 1.vii.2012, on *Silene latifolia* Poiret (Caryophyllaceae), leg. A. A. Dordaei, 2 ♀♀.

Distribution-Europe; Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan), North-Western Africa (Caldara, 1985).

Biological notes- Usually collected on *Silene* spp.: *S. dioica* (L.), *S. alba* (Mill.), *S. vulgaris* (Moench) (Caldara, 1985). Therefore *S. latifolia* might be its another host plant in Iran.

****Sibinia unicolor* Fähræus, 1843**

Material examined- Iran: East Azarbaijan, Bostanabad, 15.vi.2011, on *Silene spergulifolia* (Willd.) (Caryophyllaceae), leg. A. A. Dordaei, 1 ♂.

Distribution-Central and Southern Europe including the Caucasian States, Turkey, Eastern Asia (Caldara, 1985).

Biological notes- This species is known to feed on *Gypsophila muralis* L. and *Minuartia verna* (L.) Hiern. (Caldara, 1985). Adults were collected occasionally also on other Caryophyllaceae belonging to the genus *Silene* (*S. conica* L., *S. maritima*) (Caldara, 1985), as our single specimen.

Discussion

This study was performed in the rangelands of 12 Iranian provinces representing all the four ecozones of Iran (DoE, 2010): the Irano-Turanian (Hamadan, Qom, Ghazvin, Razavi Khorasan), Zagrosian (West Azarbaijan, Lorestan, Isfahan, Fars, and Kohgiluyeh and Boyer Ahmad), Hyrcanian (East Azarbaijan and Northwest Ardabil), and Khalij-Omanian (Bushehr) biomes.

The 11 new records for Iran and all other 18 species which are at least new records for one province, belonging only to two weevil tribes, show that the knowledge of weevils inhabiting Iran is still inadequate and many new species could be collected in the future. Concerning Tychiini, only two among the ten species of *Tychius* collected- *T. reitteri* and *T. tridentinus*- have not known for Iran, but it is noteworthy that all the three species of *Sibinia* here collected- *S. aureofulva*, *S. pellucens*, and *S. unicolor*- are new for Iran and those may add to the only seven taxa of this genus previously quoted. Only few Mecinini were previously recorded from Iran including two species of *Gymnetron*, four species of *Mecinus*, five species of *Rhinusa*, one species of *Cleopomiarus* and one species of *Miarus* (Legalov *et al.*, 2010). With the addition of *Mecinus crassifemur*, *M. simus*, *Gymnetron linkei*, *Rhinusa antirrhini*, *R. brondelii*, and *R. florum*, the number of species in this tribe increased about 50%. Some of this species are known to have a large distribution, others are more localized mainly in the Caucasian countries, Anatolia and the Balkans such as *M. crassifemur*, *G. linkei*, *R. brondelii* and *R. florum*.

Data on host plants of these herbivorous tribes are of particular interest. Therefore, it is very important to

establish which plant may be really considered as host and which is only simply refuge or occasional. It is noteworthy that one can establish a host plant only if the immatures and not only adults are collected. Unfortunately, most plants considered as host for several species which often quoted in literatures do not follow this role. Therefore, we carefully followed this requisite for the considered weevils here. In fact, as previously quoted, all the species of Mecinini and Tychiini are oligophagous and sometimes strictly monophagous and many groups are strongly host conservative. So, the knowledge on the host plants may add further characters useful for the phylogenetic study of the species. Some of the collected species of *Rhinusa*, such as *R. antirrhini* and *R. brondelii*, are particularly interesting, since they were demonstrated to exert some biological control of the Palaearctic species Yellow Toadflax (*Linaria vulgaris* L.) and Dalmatian Toadflax (*L. genistifolia* (L.) Mill.) presently invasive in north America (Caldara *et al.*, 2014). After intensive taxonomic and molecular studies, it was shown that specimens previously checked as *R. antirrhini* and *R. brondelii*, belong actually to different cryptic species as each of them live on different host plants (Hernandez-Vera *et al.*, 2010; Tosevski *et al.*, 2015). It would be therefore very interesting to further investigate morphologically and molecularly these species in Iran, since their possible host plants in this country, such as *L. michauxi* and *L. kurdica*, were not yet known in other countries.

Acknowledgments

We thank D. Aligolizadeh, N. A. Rajabi Mazhar, F. Piruzi, M. Tavakoli, E. Alizadeh, M. R. Zargarani, M. Afrozian, A. Zarnegar, S. H. Saadati and N. Farrar of the Research Center for Agricultural and Natural Resources of Ardabil, Hamadan, Lorestan, West Azarbaijan, Razavi Khorasan, Ghazvin, Fars and Bushehr for their co-operation in this study. This research was supported by Research Institute of Forests and Rangelands of Iran, project number 01-09-09-8705

References

- Broumand, H.** (1998) *Insects of Iran. The list of Coleoptera in the insect collection of Plant Pests and Diseases Research Institute*. 116 pp. Ministry of Agriculture, Agricultural Research, Education and Extension Organisation, Insect Taxonomy Research Department.
- Caldara, R.** (1985) Revisione delle *Sibinia* paleartiche (Coleoptera Curculionidae). *Memorie della Società Entomologica Italiana* 62/63, 24-105.
- Caldara, R.** (1986) Revisione dei *Tychius* precedentemente inclusi in *Lepidotychius* (n. syn.) (Coleoptera Curculionidae). *Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano* 127, 141-194.
- Caldara, R.** (1990) Revisione tassonomica delle specie paleartiche del genere *Tychius* Germar (Coleoptera Curculionidae). *Memorie della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano* 25, 51-218.
- Caldara, R.** (2001) Phylogenetic analysis and higher classification of the tribe Mecinini (Coleoptera: Curculionidae, Curculioninae). *Koleopterologische Rundschau* 71, 171-203.
- Caldara, R.** (2008) Revisione delle specie paleartiche del genere *Gymnetron* (Insecta, Coleoptera: Curculionidae). *Aldrovandia* 4, 27-104.
- Caldara, R.** (2010) Taxonomic notes on some Palaearctic species of the weevil genus *Tychius* with the description of five new species (Coleoptera, Curculionidae). *Fragmenta Entomologica* 42, 507-520.
- Caldara, R.** (2013) Curculionidae: Curculioninae, pp. 51-56; 117-172 in Löbl, I. & Smetana, A. (Eds) *Catalogue of Palaearctic Coleoptera*. Vol. 8. Brill, Leiden.
- Caldara, R.** (2014) *Rhinusa* Stephens: a taxonomic revision of the species belonging to the *R. tetra* and *R. bipustulata* groups (Coleoptera Curculionidae). *Journal of Insect Biodiversity* 2 (19), 1-46.
- Caldara, R. & Fogato, V.** (2013) Systematics of the weevil genus *Mecinus* Germar, 1821 (Coleoptera: Curculionidae). I. Taxonomic treatment of the species. *Zootaxa* 3654, 1-105.
- Caldara, R., Franz, N. & Oberprieler, R. G.** (2014) 3.7.10. Curculioninae Latreille, 1802. pp. 589-628 in Leschen, R. A. B. & Beutel R. G. (Eds) *Coleoptera, Beetles. Vol. 3. Morphology and Systematics (Phytophaga). Handbook of Zoology: Arthropoda: Insecta*. De Gruyter, Berlin/Boston.
- Clark, W. E. & Burke, H. R.** (1977) The curculionid genus *Tychius* Germar: natural history and coevolution with leguminous host plants. *Southwestern Entomologist* 2, 106-120.
- DOE (Department of Environment). 2010. Islamic Republic of Iran, Fourth National Report to the Convention on Biological Diversity, 145 pp.
- Ghahari, H., Legalov, A. A. & Arzanov, Yu. G.** (2009) An annotated list of the weevils (Coleoptera: Curculionidae) from the Arasbaran Biosphere Reserve and vicinity, north-western Iran. *Baltic Journal of Coleopterology* 9(2), 177-182.
- Ghahari, H. & Arzanov, Yu. G.** (2012) Curculionidae (Coleoptera: Curculionoidea) from Lorestan province, western Iran. *Archives of Biological Sciences, Belgrade* 64 (1), 359-364.
- Ghahari, H., Arzanov, Yu. G., Legalov, A. A., Tabari, M. & Ostovan, H.** (2010) Weevils (Coleoptera: Curculionidae) from Iranian rice fields and surrounding grasslands. *Munis Entomology & Zoology* 5 (1), 163-169.
- Ghahari, H. & Legalov, A. A.** (2011) Contribution to the knowledge of Curculionidae (Coleoptera) from Kurdistan province (western Iran). *Amurian Zoological Journal* 3 (4), 345-348.

- Hernández-Vera, G., Mitrović, M., Jović, J., Toševski, I., Caldara, R., Gassmann, A. & Emerson, B. C.** (2010) Host-associated genetic differentiation in a seed parasitic weevil *Rhinusa antirrhini* (Coleoptera: Curculionidae) revealed by mitochondrial and nuclear sequence data. *Molecular Ecology* 19, 2286-2300.
- Hoffmann, A.** (1954) Coléoptères Curculionides (deuxième partie). *Faune de France* 59, 487-1207.
- Hoffmann A.** (1958) Coléoptères Curculionides (troisième partie). *Faune de France* 62, 1209-1839.
- Karasyov, V. P.** (1994) Trophic connections and economic importance of the *Tychius* weevil genus (Coleoptera, Curculionidae) of eastern Europe and Caucasus. *Vestnik Zoologii* [1994] (6), 35-40. [In Russian].
- Legalov, A. A., Ghahari, H. & Arzanov, Yu. G.** (2010) Annotated catalogue of Curculionid beetles (Coleoptera: Anthribidae, Rhynchitidae, Attelabidae, Brentidae, Brachyceridae, Dryophoridae and Curculionidae) of Iran. *Amurian Zoological Journal* 2 (3), 191-244.
- Modarres Awal, M.** (1997) *List of Agricultural pests and their Natural Enemies in Iran*. 429 pp. Ferdowsi University Press.
- Oberprieler, R. G.** (2014) 3.7. Curculionidae Latreille, 1802. pp. 423-424 in Leschen R. A. B. & Beutel, R. G. (Eds) *Coleoptera, Beetles. Vol. 3: Morphology and Systematics (Phytophaga). Handbook of Zoology: Arthropoda: Insecta*. De Gruyter, Berlin/Boston.
- Toševski, I., Caldara, R., Jović, J., Hernández-Vera, G., Baviera, C., Gassmann, A. & Emerson, B. C.** (2015) Host-associated genetic divergence and taxonomy in the *Rhinusa pilosa* Gyllenhal species complex: an integrative approach. *Systematic Entomology* 40, 268-287.

Received: 7 January 2015

Accepted: 10 April 2015