LECH BOROWIEC^a – HASSAN GHAHARI^bAN ANNOTATED CHECKLIST OF THE IRANIAN CASSIDINAE
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Borowiec L., Ghahari H. - An annotated checklist of the Iranian Cassidinae (Coleoptera Chrysomelidae).

Checklist for the Iranian Cassidinae Gyllenhal (Coleoptera: Chrysomelidae) is proposed. Based upon a literature review, a total of 47 species within two groups (former Cassidinae and Hispinae) and 13 genera, *Cassida* Linnaeus (27 species), *Chiridula* Weise (one species), *Hypocassida* Weise (2 species), *Ischyronota* Weise (5 species), *Macromonycha* Spaeth (one species), *Oocassida* Weise (one species), *Oxylepus* Desbrochers des Loges (one species), *Pilemostoma* Desbrochers des Loges (one species), *Rhytidocassis* Spaeth (2 species), *Acmenychnus* Weise (2 species), *Di cladispa* Gestro (one species), *Hispia* Linnaeus (2 species), and *Rhoptrisa* S.-H. Chen & Tan (one species) are given for the Iranian Cassidinae. Among the listed species, *Cassida prasina* Illiger, 1798 is new record for the fauna of Iran.

KEY WORDS: Tortoise beetles, catalogue, distribution, new record, Iran

INTRODUCTION

Chrysomelidae Latreille, 1802 is the second largest family of Coleoptera, including around 37.000 species grouped into 19 subfamilies (LOPES *et al.*, 2016) - with estimate to 60.000 species around the world (JOLIVET, 2015; YEONG *et al.*, 2018).

The Cassidinae s.l. (including former members of the subfamily Hispinae) is the second largest subfamily in Chrysomelidae after Galerucinae s.l., (about 12,800 species) currently comprises nearly 6400 species within ca. 312 genera (BOROWIEC, 1999; CHABOO, 2007; BOROWIEC & ŚWIĘTOJAŃSKA, 2014, 2018; SEKERKA, 2016), with approximately 16% of chrysomelid species diversity (CHABOO, 2007). The insects of the former subfamily Cassidinae are called “tortoise beetles” because they have an oval- or round-shaped body, generally distinctly convex dorsally and flattened ventrally, with flat and dilated elytra and pronotum margins (CHABOO, 2007; MARUCCI *et al.*, 2017). The adults of Cassidinae exhibit various peculiar external morphologies, such as spines on the dorsal surface and explanate margins of the pronotum and elytra. These external morphologies are hypothesized to be anti-predator adaptations (JOLIVET & VERMA, 2002; CHABOO, 2007; SHINOHARA & TAKAMI, 2017).

Tortoise beetles are wide spread over the world but with the greatest diversity in tropical and subtropical regions (WINDSOR *et al.*, 1992; BOROWIEC & MORAGUES, 2005). Although cassidines have been studied intensively on a global scale, especially members of the former subfamily Cassidinae, a large number of enigmatic taxa still exist, especially in the former subfamily Hispinae (SEKERKA, 2016). Morphological and phylogenetic studies indicated that Cassidinae s. str. (cassidines) and Hispinae s. str. (hispines) are a single chrysomelid

subfamily, namely Cassidinae Gyllenhal (REID, 1995; BOROWIEC, 1995; STAINES, 2002).

The majority of Cassidinae are specialized feeders (narrowly oligophagous), with few species which could be considered either truly monophagous or polyphagous in habits. Members of the cassidoid Cassidinae are mainly associated with host plants in the dicotyledonous families Convolvulaceae, Asteraceae, Bignoniaceae, Boraginaceae, Lamiaceae and Solanaceae. It is interesting to note how few potential plant families present in any particular area are actually exploited by these beetles. Of those plant families, most are members of a single clade of Eudicotyledonae (JOLIVET, 1988; JOLIVET & HAWKESWOOD, 1995; SOLTIS *et al.*, 2011; FLINTE *et al.*, 2011). Its representatives also stand out for having unique morphological, ecological and biological characteristics (VASCONCELLOS-NETO, 1988). Although the majority is solitary, various species are subsocial (GOMES *et al.*, 2012). Members of the hispid Cassidinae are mainly associated with host plants in the monocotyledons families Arecaceae, Poaceae, Heliconiaceae, Zingiberaceae and Marantaceae but members of some large tribes feed on Convolvulaceae, Asteraceae, Boraginaceae and Solanaceae (BOROWIEC & ŚWIĘTOJAŃSKA, 2014).

Larvae of many species of the cassidoid Cassidinae are slow-moving, leaf-feeders whose concealment and defense is enhanced by the accumulation of fecal matter and exuviae on a caudal fork held over the body and used against natural enemies. Larvae of the hispid Cassidinae are mostly leaf-miners or are cryptic and live in and scrape rolled young leaves, or live in leaf envelopes, where larvae crop or mine the surrounding stem or leaf. (EISNER *et al.*, 1967; VENCL *et al.*, 2005; ŚWIĘTOJAŃSKA, 2009; BOROWIEC & ŚWIĘTOJAŃSKA, 2014). The adults of many Cassidinae are conspicuous,

diurnally-active insects especially abundant on young or rapidly growing vegetation (WINDSOR, 1987; WINDSOR *et al.*, 1992).

Iran forms a large part of the Iranian plateau, and covers an area of 1 623 779 km². Climatologically, Iran is a predominantly arid and semi-arid country, but the northern slopes of the Alburz ranges and the Caspian lowland receive 800 to 2000 mm annual rainfall, making them the most humid parts of the country. The Dasht-e Kavir and Dasht-e Lut deserts are the driest areas with an annual precipitation of less than 150 mm. The highlands receive between 250 and 800 mm (ZEHZAD *et al.*, 2002; HAKIMZADEH KHOEI *et al.*, 2011).

The objective of the present work is cataloguing of all the data on Iranian Cassidinae in continuing of the checklists of Iranian Chrysomelidae (GHAHARI & BOROWIEC, 2017; ASLAN & GHAHARI 2017a, 2019).

MATERIALS AND METHODS

The published data on distribution of the subfamily

Cassidinae (Coleoptera: Chrysomelidae) in Iran are summarized by province. Tribes, genera and species are listed alphabetically.

The following data are included in the catalogue for each species: (1) valid name, (2) published Iranian records synthesized by province (classified by alphabetical order of Iranian province names) and the relevant references, (3) synthetical information on general distribution on a world scale. The material examined in this work, are preserved in the collections of A. Warchałowski (collection now stored in the Natural History Museum, London, UK) and L. Borowiec (collection is now stored in the Museum of Natural History, University of Wrocław, Poland). Data about classification, nomenclature and distribution are mainly based on BOROWIEC & SEKERKA (2010). When accurate data about local distribution in Iran are lacking in a quoted reference, the mention "Iran (no exact locality cited)" is used. Locality data reported as "Persien" was retained because this is traditional synonym of Iran. The provinces of Iran are shown in Fig. I.

Fig. I - Map of Iran with provincial boundaries.

RESULTS

In total, 47 species of Cassidinae (Coleoptera: Chrysomelidae) are listed for the fauna of Iran. Among them, *Cassida prasina* Illiger, 1798 is a new country record. Additionally, new material examined is given for 12 species. The list of species is given below alphabetically with related distributional data, together with new material examined.

Family Chrysomelidae Latreille, 1802
Subfamily Cassidinae Gyllenhal, 1813
Tribe Cassidini Gyllenhal, 1813
Genus *Cassida* Linnaeus, 1758

Cassida atrata Fabricius, 1787

Distribution in Iran: Northern Khorasan (SAMIN *et al.*, 2018).

General distribution: Albania, Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Italy, Latvia, North Macedonia, Montenegro, Moldavia, Poland, Romania, Serbia, Slovakia, Slovenia, Turkey, Ukraine.

Cassida azurea Fabricius, 1801

Distribution in Iran: West Azarbaijan (SAKENIN CHELAV *et al.*, 2019).

General distribution: Algeria, Austria, Belgium, Bulgaria, Croatia, Czech Republic, France, Germany,

Hungary, Italy, Kazakhstan, Poland, Romania, Russia (East Siberia, West Siberia), Slovakia, Spain, Switzerland, Turkey, Ukraine.

***Cassida brevis* Weise, 1884**

Distribution in Iran: Fars, Markazi (BOROUMAND, 2000; MODARRES AWAL, 2012).

General distribution: Afghanistan, Armenia, Georgia, Iran, Iraq, Israel, Lebanon, Syria, Turkey, Turkmenistan.

***Cassida canaliculata* Laicharting, 1781**

Distribution in Iran: Alborz (ASLAN *et al.*, 2018).

General distribution: Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Italy, Kazakhstan, Moldavia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia, Switzerland, Turkey, Ukraine.

***Cassida flaveola* Thunberg, 1794**

Distribution in Iran: Guilan (ASLAN & GHAHARI, 2017b).

New material examined: West Azarbaijan province, Chaldoran (Qazalbelagh), 2 ex, 5.vii.2008.

General distribution: Albania, Algeria, Austria, Belgium, Bosnia Herzegovina, Bulgaria, Belarus, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, North Macedonia, Moldavia, The Netherlands, Norway, Poland, Romania, Russia (Far East), Serbia and Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, Ukraine.

***Cassida hablitziae* Motschulsky, 1838**

Distribution in Iran: Kuhgiloyeh & Boyerahmad (SAMIN, 2018).

General distribution: Armenia, Georgia, Russia (South European Territory), Turkey.

***Cassida inquinata* Brullé, 1832**

Distribution in Iran: Guilan (ASLAN & GHAHARI, 2017b).

General distribution: Albania, Algeria, Armenia, Austria, Azerbaijan, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, France, Georgia, Greece, Hungary, Israel, Italy, Lebanon, North Macedonia, Morocco, Portugal, Romania, Russia (South European Territory), Serbia and Montenegro, Slovakia, Slovenia, Spain, Syria, Tunisia, Turkey, Turkmenistan.

***Cassida margaritacea* Schaller, 1783**

Distribution in Iran: Guilan (GHAHARI & JĘDRYCZ-KOWSKI, 2016).

New material examined: Ardabil province, Nameen (Ulaghan), 3 ex, 25.viii.2009.

General distribution: Albania, Algeria, Austria, Azerbaijan, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Great Britain, Greece, Hungary, Italy, Latvia, Lithuania, North Macedonia, Netherlands, Poland, Romania, Slovakia,

Slovenia, Spain, Switzerland, Syria, Turkey, Ukraine, former Yugoslavia.

***Cassida murraea halophila* Spaeth, 1926**

Distribution in Iran: "Persien" (SPAETH, 1926).

General distribution: Iran, Russia.

***Cassida nebulosa* Linnaeus, 1758**

Distribution in Iran: Alborz (MIRZAEI *et al.*, 2015), Northern and northwestern areas of Iran (MODARRES AWAL, 1997, 2012).

General distribution: Albania, Austria, Belgium, Bosnia Herzegovina, Bulgaria, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany, Greece, Hungary, Italy, Kazakhstan, Latvia, Lithuania, North Macedonia, Moldavia, Mongolia, Montenegro, Netherlands, North Korea, Norway, Poland, Romania, Russia (East Siberia, Far East, North European Territory, West Siberia), Serbia, Slovakia, South Korea, Spain, Sweden, Switzerland, Tadjikistan, Turkey, Ukraine, Uzbekistan.

Plant associations in Iran: *Beta vulgaris* (sugar beet) (Amaranthaceae), *Chenopodium album* (Chenopodiaceae) (MODARRES AWAL, 1997, 2012).

***Cassida nobilis* (Linnaeus, 1758)**

Distribution in Iran: Ardabil (KHEYRI & BOROUMAND, 1992; MODARRES AWAL, 1997, 2012).

General distribution: Albania, Algeria, Austria, Bosnia Herzegovina, Bulgaria, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Israel, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldavia, Mongolia, Netherlands, North Korea, Norway, Poland, Romania, Russia (East Siberia, North European Territory, West Siberia), Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, Ukraine, Uzbekistan, former Yugoslavia.

Plant associations in Iran: *Beta vulgaris* (Amaranthaceae) (KHEYRI & BOROUMAND, 1992; MODARRES AWAL, 1997, 2012).

***Cassida palaestina* Reiche, 1858**

Distribution in Iran: East Azarbaijan (LOPATIN, 1981), Fars, Isfahan, Kermanshah, Markazi, Mazandaran (BOROUMAND, 2000; MODARRES AWAL, 2012), Golestan (=Shahpasand) (BERTI & RAPILLY, 1973; BOROUMAND, 2000; GHADIRI RAD & KEYHANIAN, 2010a, b; MODARRES AWAL, 2012), Kuhgiloyeh & Boyerahmad (MORADIAN *et al.*, 2009; ŚWIĘTOJAŃSKA *et al.*, 2013; MORADIAN & OSTOVAN, 2018).

New material examined: Northern Khorasan province, Esfarayen (Kalateh-Sanjari), 1 ex, 6.vi.2010; Semnan province, Shahrud (Jangal-e Abr), 2 ex, 14.vi.2011.

General distribution: Afghanistan, Armenia, Cyprus, Greece, Iran, Iraq, Israel, Kazakhstan, Kyrgyzstan, Lebanon, Syria, Tadjikistan, Turkey, Turkmenistan.

Plant associations in Iran: *Carthamus tinctorius* (Asteraceae) (GHADIRI RAD & KEYHANIAN 2010a, b), *Cirsium arvense* and *Silybum marianum* (Asteraceae)

(GHADIRI RAD & KEYHANIAN 2010b), *Centaurea behen* (Asteraceae) (MORADIAN *et al.*, 2009; ŚWIĘTOJAŃSKA *et al.*, 2013).

Comments: *Cassida palaestina* ab. *nigrofemorata* Spaeth (in SPAETH & REITTER, 1926) was recorded from Mazandaran (Chalus) by BERTI & RAPILLY (1973). Two weed species, *Cirsium arvense* and *Silybum marianum* (Asteraceae) are the alternative hosts of *Cassida palaestina*. Additionally, *Brachymeria inermis* (Hymenoptera: Chalcididae) is the most important parasitoid of *Cassida palaestina* (GHADIRI RAD & KEYHANIAN, 2010b).

Larvae of two closely related species, *Cassida palaestina* and *Cassida rubiginosa* Müller, 1776 were described in details including SEM microstructures by ŚWIĘTOJAŃSKA *et al.*, (2013).

***Cassida pannonica* (Suffrian, 1844)**

Distribution in Iran: Kuhgiluyeh & Boyerahmad (SAKENIN CHELAV *et al.*, 2019).

General distribution: Austria, Bosnia Herzegovina, Bulgaria, Czech Republic, France, Germany, Greece, Hungary, Israel, Kazakhstan, Kyrgyzstan, Latvia, Lebanon, North Macedonia, Montenegro, Poland, Romania, Russia (West Siberia), Serbia, Slovakia, Syria, Tibet, Turkey, Ukraine, Uzbekistan.

***Cassida persica* Spaeth, 1926**

Distribution in Iran: Hormozgan, Khuzestan (Boroumand 2000; Modarres Awal 2012), Kuhgiluyeh & Boyerahmad (MORADIAN & OSTOVAN, 2018).

General distribution: Armenia, Iran, Iraq.

Plant associations in Iran: *Platycheat mucronifolia* Boiss. Boiss. (Asteraceae) (MORADIAN & OSTOVAN, 2018)

***Cassida persicana* Borowiec, 1999**

= *Cassida persica* Medvedev in Ogloblin and Medvedev, 1956: 898 not *C. persica* Spaeth, 1926: 59.

Distribution in Iran: Mazandaran (MEDVEDEV, 1956).

General distribution: Endemic to Iran.

***Cassida prasina* Illiger, 1798**

Material examined: Chaharmahal and Bakhtiari province, Sarkhoon, 31°74'N 50°56'E, 2 ex, 17.viii.2011. New record for Iran.

General distribution: Albania, Austria, Belgium, Bosnia Herzegovina, China, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Kazakhstan, Latvia, Lithuania, North Macedonia, Netherlands, Poland, Romania, Russia (East Siberia, North European Territory, West Siberia), Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, former Yugoslavia.

***Cassida rubiginosa rubiginosa* O.F. Müller, 1776**

Distribution in Iran: Northern Khorasan, Razavi Khorasan (ROSTAMI *et al.*, 2016).

General distribution: Albania, Algeria, Austria, Bosnia Herzegovina, Bulgaria, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Israel, Italy, Japan,

Kazakhstan, Latvia, Lithuania, North Macedonia, Morocco, Netherlands, North Korea, Norway, Poland, Romania, Russia (East Siberia, Far East, North European Territory, West Siberia), Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, Ukraine, former Yugoslavia.

Comments: *Cassida rubiginosa* is a biological control agent of brushed dad, *Onopordum acanthium* (Asteraceae) (ROSTAMI *et al.*, 2016).

***Cassida sanguinolenta* Müller, 1776**

Distribution in Iran: Fars (ASLAN *et al.*, 2018).

General distribution: Albania, Algeria, Armenia, Austria, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany, Greece, Hungary, Italy, Kazakhstan, Latvia, Lithuania, North Macedonia, Montenegro, Netherlands, Norway, Poland, Romania, Russia (North European Territory, South European Territory), Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine.

***Cassida saucia* Weice, 1889**

Distribution in Iran: West Azarbaijan (LOPATIN, 1981).

General distribution: Armenia, Azerbaijan, Iran, Turkey.

***Cassida seraphina* Ménétries, 1836**

Distribution in Iran: Golestan (SAMIN, 2018).

New material examined: Ardabil province, Germi (Soleymanlu), 1 ex, September 2008.

General distribution: Armenia, Greece, Kazakhstan, Russia (South European Territory), Turkey.

***Cassida stigmatica* Suffrian, 1844**

Distribution in Iran: Guilan (ASLAN & GHAHARI, 2017b).

New material examined: Mazandaran province, Tonkabon (Jangal-e 2000), 3 ex, 5.vi.2013.

General distribution: Afghanistan, Austria, Belgium, Bosnia Herzegovina, China, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Kazakhstan, Kyrgyzstan, Latvia, North Macedonia, The Netherlands, Poland, Romania, Russia (East Siberia, West Siberia), Slovakia, Spain, Switzerland, Tunisia, Turkey, Ukraine.

***Cassida subreticulata* Suffrian, 1844**

Distribution in Iran: Golestan (Spaeth 1914 - type locality of *Cassida subreticulata* ssp. *helva* Spaeth: Astrabad [now Gorgan]), Iran (no exact locality cited) (GRUEV, 2004).

General distribution: Albania, Austria, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Iran, Italy, Japan, Kazakhstan, Latvia, North Macedonia, Mongolia, Serbia, Poland, Romania, Russia (East Siberia, Far East, West Siberia), Serbia, Slovakia, Switzerland, Tibet, Turkmenistan, Ukraine.

Cassida transcaucasica

Borowiec & Swietojańska, 2001

Distribution in Iran: Kuhgiluyeh & Boyerahmad (MORADIAN & OSTOVAN, 2018), Sistan & Baluchestan, West Azarbaijan (BOROWIEC & SWIETOJAŃSKA, 2001a), Tehran (BOROWIEC & SWIETOJAŃSKA, 2001a; MIRZAEI *et al.*, 2015).

General distribution: Armenia, Azerbaijan, Georgia, Iran.

Plant associations in Iran: *Centaurea behen* L. (Asteraceae) (MORADIAN & OSTOVAN, 2018).

Cassida turkmenica Weise, 1892

Distribution in Iran: Kerman (SAMIN, 2018).

New material examined: Razavi Khorasan province, Neyshabur, 1 ex, v.2003.

General distribution: Afghanistan, Kazakhstan, Mongolia, Tibet, Turkmenistan, Uzbekistan.

Cassida undecimnotata Gebler, 1841

Distribution in Iran: Kermanshah (SPAETH, 1914), Razavi Khorasan (BOROWIEC & SWIETOJAŃSKA, 2001a).

General distribution: Afghanistan, Armenia, Georgia, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Tadjikistan, Tibet, Turkmenistan, Uzbekistan.

Cassida viridis Linnaeus, 1758

Distribution in Iran: Mazandaran (MEDVEDEV, 1983), Alborz (MIRZAEI *et al.*, 2015), East Azarbaijan (SAMIN *et al.*, 2018), Guilan (BOROUMAND, 2000; MODARRES AWAL, 2012), Tehran (MODARRES AWAL, 1997, 2012; MIRZAEI *et al.*, 2015).

General distribution: Albania, Austria, Belgium, Bosnia Herzegovina, Bulgaria, China, Croatia, Denmark, Estonia, Finland, France, Great Britain, Germany, Greece, Hungary, Italy, Japan, Kazakhstan, Latvia, Lithuania, North Macedonia, Montenegro, Morocco, Netherlands, North Korea, Norway, Poland, Portugal, Romania, Russia (East Siberia, Far East, North European Territory, West Siberia), Serbia, Slovakia, Slovenia, South Korea, Sweden, Switzerland, Syria, Tibet, Turkey, Ukraine, Uzbekistan.

Plant associations in Iran: *Beta vulgaris* (Amaranthaceae) (KHEYRI, 1989; MODARRES AWAL, 1997, 2012).

Cassida vittata Villers, 1781

Distribution in Iran: Golestan (LOPATIN, 1981).

General distribution: Algeria, Austria, Belgium, Bosnia Herzegovina, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Great Britain, Hungary, Israel, Italy, Japan, Kazakhstan, Latvia, Lithuania, Morocco, Poland, Portugal, Romania, Russia (East Siberia, West Siberia), Slovakia, South Korea, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine, Uzbekistan.

Genus *Chiridula* Weise, 1889

Chiridula semenovi Weise, 1889

Distribution in Iran: Kerman (SAMIN, 2018).

General distribution: Afghanistan, Armenia, Kazakhstan, Kyrgyzstan, Pakistan, Tadjikistan, Tibet, Turkmenistan.

Genus *Hypocassida* Weise, 1893

Hypocassida convexipennis Borowiec, 2000

Distribution in Iran: Lorestan (Holotype: Khorram-Abad) (BOROWIEC, 2000).

General distribution: Endemic to Iran.

Hypocassida subferruginea Shrank, 1776

Distribution in Iran: Alborz, Qazvin (MIRZAEI *et al.*, 2015), Ardabil, Fars, Guilan, Kerman, Markazi, Mazandaran, Sistan & Baluchestan (BOROUMAND, 2000; MODARRES AWAL, 2012), East Azarbaijan (MEDVEDEV, 1983), Kermanshah (CHERAGHIAN, 2002), Kordestan (SEIFI *et al.*, 2017), Tehran (FARAHBAKHS, 1961; BOROUMAND, 2000; MODARRES AWAL, 1997, 2012).

New material examined: Isfahan province, Najaf-Abad (Kheyr-Abad), 2 ex, 15.vi.2002; Razavi Khorasan province, Mashhad (Zoshk), 2 ex, August 2010; Golestan province, Golestan National Park, 5 ex, July 2012.

General distribution: Afghanistan, Albania, Algeria, Austria, Belgium, Bosnia Herzegovina, Bulgaria, China, Croatia, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, North Macedonia, Mongolia, Montenegro, Morocco, Netherlands, Poland, Portugal, Romania, Russia (East Siberia, Far East, North European Territory), Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tibet, Tadjikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan.

Plant associations in Iran: *Cicer arietinum* (Fabaceae), *Convolvulus* sp. (Convolvulaceae) (Modarres Awal, 2012), *Beta vulgaris* (Amaranthaceae) (FARAHBAKHS, 1961; KHEYRI, 1989; MODARRES AWAL, 1997, 2012), *Convolvulus arvensis* (SEIFI *et al.*, 2017).

Comments: Morphology and host preference of *Hypocassida subferruginea* was studied by SEIFI *et al.* (2017) on *Convolvulus arvensis*.

Genus *Ischyronota* Weise, 1891

Ischyronota conicicollis Weise, 1890

Distribution in Iran: Iran (no exact locality cited) (BOROWIEC & SEKERKA, 2010).

New material examined: Semnan province, Shahrud (Jangal-e Abr), 1 ex, 14.vi.2008.

General distribution: Iran, Kazakhstan, Mongolia, Tadjikistan, Tibet.

Ischyronota desertorum Gebler, 1833

Distribution in Iran: Isfahan (LOPATIN, 1981), East Azarbaijan (BOROUMAND, 2000; MODARRES AWAL, 2012).

General distribution: Afghanistan, Armenia, Iran, Israel, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Romania, Russia (South European Territory), Syria, Tibet, Turkey, Turkmenistan, Ukraine, Uzbekistan.

***Ischyronota elevata* Reitter, 1890**

Distribution in Iran: Ardabil, Tehran (BOROUMAND, 2000; MODARRES AWAL, 2012), Fars (LOPATIN, 1981), Northern Khorasan (SPAETH, 1914 as Persien: Kopet-Dagh), Razavi Khorasan (MODARRES AWAL, 1997, 2012; BOROUMAND, 2000).

General distribution: Armenia, Iran, Israel, Kazakhstan, Turkmenistan, Uzbekistan.

Plant associations in Iran: *Beta vulgaris* (Amaranthaceae) (KHEYRI, 1989; MODARRES AWAL, 1997, 2012).

***Ischyronota schusteri* Spaeth, 1914**

Distribution in Iran: Northern Khorasan (SPAETH, 1914 as Persien: Kopet-Dagh).

General distribution: Iran, Kazakhstan, Mongolia, Tibet, Turkmenistan.

***Ischyronota spaethi* Reitter, 1901**

Distribution in Iran: Northern Khorasan (SPAETH, 1914 as Persien: Kopet-Dagh).

General distribution: Kazakhstan, Russia (South European Territory).

Comments: *Ischyronota spaethi* is not listed in the catalogue of Palaearctic Coleoptera (BOROWIECH & SEKERKA, 2010) as belonging to the fauna of Iran.

Genus *Macromonycha* Spaeth, 1911***Macromonycha apicalis* (Gebler, 1845)**

Distribution in Iran: "Persien" (SPAETH, 1926), Razavi Khorasan, Sistan & Baluchestan, West Azarbaijan (SEKERKA, 2008a).

New material examined: Lorestan province, Borujerd (Nasir-Abad), 3 ex, 5.viii.2012.

General distribution: Afghanistan, Armenia, Azerbaijan, Iran, Iraq, Israel, Kazakhstan, Kyrgyzstan, Syria, Turkey, Uzbekistan.

Genus *Oocassida* Weise, 1897***Oocassida schultzei* Spaeth, 1917**

Distribution in Iran: Iran (no exact locality cited) (BOROWIECH & SEKERKA, 2010).

General distribution: Subsaharian area of Afrotropical Region, Iran.

Genus *Oxylepus* Desbrochers des Loges, 1884***Oxylepus deflexicollis* Boheman, 1862**

Distribution in Iran: Bushehr (LOPATIN, 1985).

General distribution: Croatia, Egypt, France, Great Britain, Iran, Israel, Italy, Morocco, Spain, Tunisia, Turkey.

Genus *Pilemostoma* Desbrochers des Loges, 1891***Pilemostoma fastuosum* Schaller, 1783**

Distribution in Iran: Guilan (SEKERKA, 2008b).

General distribution: Albania, Austria, Belgium, Bosnia Herzegovina, Bulgaria, Byelorussia, Croatia, Czech Republic, Denmark, France, Great Britain, Germany, Greece, Hungary, Iran, Italy, Kazakhstan, Kyrgyzstan, Latvia, North Macedonia, Moldavia, Mongolia, Montenegro, Netherlands, Poland, Romania, Russia (South

European Territory, East Siberia, West Siberia), Serbia, Slovenia, Spain, Sweden, Turkey, Ukraine.

Genus *Rhytidocassis* Spaeth, 1941***Rhytidocassis iranella* Lopatin, 1984**

Distribution in Iran: Hormozgan (BOROWIECH & SWIETOJAŃSKA, 2001b), Sistan & Baluchestan (LOPATIN, 1984 as *Cassida* (*Cassidulella*) *iranella*; BOROWIECH & SWIETOJAŃSKA, 2001b).

General distribution: Endemic to Iran.

***Rhytidocassis lopatini* Borowiech & Swietojańska, 2001**

Distribution in Iran: Bushehr (LOPATIN, 1985 as *Cassida infirma* Boheman, 1862; Borowiech & Swietojańska 2001b).

New material examined: Fars province, Marvdasht, 6 ex, v.2010.

General distribution: Endemic to Iran.

Tribe Hispini Gyllenhal, 1813**Genus *Acmenychus* Weise, 1905*****Acmenychus caucasicus* Heyden, 1878**

Distribution in Iran: East Azarbaijan (BOROUMAND, 2000; MODARRES AWAL, 2012).

General distribution: Armenia, Azerbaijan, Iran.

***Acmenychus inermis* Zubkov, 1833**

Distribution in Iran: Sistan & Baluchestan (BOROUMAND, 2000; MODARRES AWAL, 2012).

General distribution: Iran, Kyrgyzstan, Mongolia, Tibet, Turkmenistan.

Genus *Dicladispa* Gestro, 1897***Dicladispa iranica* Lopatin, 1984**

Distribution in Iran: Hormozgan (LOPATIN, 1984).

General distribution: Endemic to Iran.

Genus *Hispa* Linnaeus, 1767***Hispa atra* Linnaeus, 1767**

Distribution in Iran: Markazi ((BOROUMAND, 2000; MODARRES AWAL, 2012).

General distribution: Afghanistan, Albania, Austria, Belgium, Bosnia Herzegovina, Bulgaria, Byelorussia, China, Croatia, Czech Republic, Denmark, France, Germany, Greece, Iran, Italy, Kazakhstan, Kyrgyzstan, North Macedonia, Moldavia, Mongolia, Montenegro, Netherlands, Poland, Portugal, Romania, Russia (Central European Territory, East Siberia, West Siberia), Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Turkmenistan, Ukraine.

***Hispa tarsata* Swietojańska, 2001**

Distribution in Iran: East Azarbaijan (LOPATIN, 1981; ŚWIĘTOJAŃSKA, 2001), Khuzestan (Holotype: Kushk), Fars (MOHAMMADZADEH FARD, 2007), Kuhgiluyeh & Boyerahmad, Tehran (ŚWIĘTOJAŃSKA, 2001).

General distribution: Iran, Kazakhstan, Tadjikistan, Uzbekistan.

Comments: *Hispinae* material collected in Iran during Czechoslovakian-Iranian scientific expeditions in 1973-1977 were reexamined by J. Świętojańska. Although the material was determined and published by LOPATIN

(1981) as *Hispa atra* Linnaeus, 1767, ŚWIĘTOJAŃSKA (2001) believes that all of them are *Hispa tarsata*.

Genus *Rhoptrisp* S.-H. Chen & Tan, 1964

Rhoptrisp dilaticornis (Duvivier, 1891)

Distribution in Iran: Khuzestan (CHERAGHI & ESFANDIARI, 2017).

General distribution: Afghanistan, Bhutan, China, India, Nepal, Pakistan, Taiwan.

Comments: *Rhoptrisp dilaticornis* is a leaf miner of sugarcane (CHERAGHI & ESFANDIARI, 2017).

DISCUSSION

This catalogue indicates that the fauna of Iranian Cassidinae has poorly been studied since 47 (7.17%) of the 655 species occurring in the Palaearctic Region (BOROWIEC & SEKERKA, 2010), have been recorded from Iran so far. Among the 13 genera, *Cassida* with 27 recorded species is the most speciose (Fig. II). Five species, *Cassida persicana* Borowiec, 1999, *Hypocassida convexipennis* Borowiec, 2000, *Rhytidocassis iranella* Lopatin, 1984, *Rhytidocassis lopatini* Borowiec & Swietojańska, 2001 and *Dicladispa iranica* Lopatin, 1984 are endemic to Iran.

We present here records for 25 of the 31 Iranian provinces which have been not yet systematically searched

for Cassidinae. Among them, Fars and Guilan with 7 recorded species have the highest diversity (Fig. III). The exact localities in Iran are unknown for two species: *Cassida murraea halophila* Spaeth, 1926 and *Oocassida schultzei* Spaeth, 1917, so they do not appear in Fig. III.

Iran is a vast country with huge numbers of varieties in landscapes and weather conditions (ZEHZAD *et al.*, 2002; HAKIMZADEH KHOEI *et al.*, 2011). This rich environmental condition led to the high diversity of flora of Iran Plateau (GHAHREMAN & ATTAR 1999) that affects the species richness of herbivorous insects, like chrysomelids. More accurate faunistic surveys in different regions of Iran are necessary for increasing our knowledge about distribution of Cassidinae in Iran.

Using the known country distribution of Cassidinae from BOROWIEC & SEKERKA (2010), among the adjacent countries of Iran, the fauna of Russia with 61 recorded species is more diverse than the others (Fig. IV). Additionally, Turkey shares the highest number of species with Iran, with 25 species in common, followed by Russia (21 of 61 recorded species), Armenia (15 of 17), Turkmenistan (13 of 14), Afghanistan (11 of 12), Azerbaijan (6 of 6), Iraq (4 of 5) and Pakistan (3 of 43). Also, no species have been reported thus far from Bahrain, Kuwait, Oman and Qatar primarily because they have not been systematically investigated. Field work in these and other countries will surely result in increasing the number of species occurring in them.

Fig. II - Number of species of Cassidinae known from Iran for each genus.

Fig. III - Number of reported species of Iranian Cassidinae by province.

Fig. IV. Comparison of species richness of Cassidinae in Iran and adjacent countries according to BOROWIEC & SEKERA (2010).

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REFERENCES

- ASLAN E.G., GHAHARI H., 2017a - *An Annotated Synopsis of the Flea Beetles of Iran with New Records (Coleoptera: Chrysomelidae: Galerucinae: Alticini)*. - Transaction of the American Entomological Society, 143: 633-667.
- ASLAN E.G., GHAHARI H., 2017b - *Contribution to the Chrysomelidae (Coleoptera) fauna of Guilan pro-*

- vince (Northern Iran) with new records. - Journal of the Entomological Research Society, 19(3): 85–94.
- ASLAN E.G., GHAHARI H., 2019 - *An annotated checklist of Criocerinae (Coleoptera: Chrysomelidae) of Iran*. - Acta entomologica serbica, 24(2): 1-10.
- ASLAN E.G., LEGALOV A.A., GHAHARI H., WARCHAŁOWSKI A., COLONNELLI E., JEDRYCZKOWSKI W.B., 2018 - *New records of Chrysomelidae and Curculionidae (Coleoptera) from Iran*. - Scientific Bulletin of the Uzhhorod University (Series Biology), 44: 58–63.
- BERTI N., RAPILLY M., 1973 - *Contribution a la faune de l'Iran voyages de MM. R. Naviaux et M. Rapilly (Col., Chrysomelidae)*. - Annales de la Société Entomologique de France (Nouvelle série), 9(4): 861-893.
- BOROUHAND H., 2000 - *Insects of Iran: The list of Coleoptera in the Hyke Mirzayans Museum of Iranian Research Institute of Plant Protection, Coleoptera: Chrysomelidae*. - Iranian Research Institute of Plant Protection, Insect Taxonomy Research Department, No. 4, 50 pp.
- BOROWIEC L., 1995 - *Tribal classification of the cassidoid Hispinae (Coleoptera: Chrysomelidae)*, pp. 541–558. In: Pakaluk J., Ślipinski S.A. (eds.), Biology, phylogeny, and classification of Coleoptera: Papers Celebrating the 80th Birthday of Roy A. Crowson, Warszawa. Muzeum i Instytut Zoologii PAN, Warszawa, 1092 pp.
- BOROWIEC L., 1999 - *A world catalogue of the Cassidinae (Coleoptera: Chrysomelidae)*. - Wrocław: Biologica Silesiae, 476 pp.
- BOROWIEC L., 2000 - *Hypocassida convexipennis, a new species from Iran (Coleoptera: Chrysomelidae: Cassidinae)*. - Genus, 11(4): 601–605.
- BOROWIEC L., ŚWIĘTOJAŃSKA J., 2001a - *Cassida undecimnotata - a species complex (Coleoptera: Chrysomelidae: Cassidinae)*. - Genus, 12(1): 63-79.
- BOROWIEC L., ŚWIĘTOJAŃSKA J., 2001b - *The palaearctic species of the genus Rhytidocassis Spaeth, 1941 (Coleoptera: Chrysomelidae: Cassidinae)*. - Annales Zoologici, 51: 325-329.
- BOROWIEC L., MORAGUES G., 2005 - *Tortoise beetles of the French Guyana - a faunistic review (Coleoptera: Chrysomelidae: Cassidinae)*. - Genus, 16(2): 247-278.
- BOROWIEC L., SEKERKA L., 2010 - *Subfamily Cassidinae Gyllenhal, 1813*, pp. 368–390. In: Löbl I., Smetana A. (eds.), Catalogue of Palaearctic Coleoptera. Vol. 6. Chrysomeloidea. Apollo Books, Stenstrup, Denmark, 924 pp.
- BOROWIEC L., ŚWIĘTOJAŃSKA J., 2014 - *Cassidinae Gyllenhal, 1813*, pp. 198 -217. In: Leschen, R.A.B., Beutel, R.G. (eds.), Coleoptera, Beetles. Vol. 3: Morphology and systematics (Phytophaga), Handbook of Zoology, Arthropoda, Insecta - Berlin/Boston: De Gruyter, 675 pp.
- BOROWIEC L., ŚWIĘTOJAŃSKA J., 2018 - *Cassidinae of the world - an interactive manual (Coleoptera: Chrysomelidae)*. Available from: www.cassidae.uni.wroc.pl/katalog%20internetowy/index.htm (Accessed in 2002, last modification 18 December 2018).
- CHABOO C.S., 2007 - *Biology and phylogeny of the Cassidinae Gyllenhal sensu lato (tortoise and leaf-mining beetles) (Coleoptera, Chrysomelidae)*. - Bulletin of the American Museum of Natural History, 305: 1-250.
- CHERAGHIAN A., 2002 - *The first report of Hypocassida subferruginea (Sch.) losses on chickpea from Kermanshah province*. - Proceedings of the 15th Iranian Plant Protection Congress, p. 56.
- CHERAGHI A., ESFANDIARI M., 2017 - *First report of a leaf minor beetle, Rhoptrispia dilaticornis (Duvivier) (Col.: Chrysomelidae) on sugarcane in Iran*. - Plant Pest Research, 6(4): 97-101.
- EISNER T., VAN TASSELL E., CARRELL J.E., 1967 - *Defensive use of a "fecal shield" by a beetle larva*. - Science, 158: 1471-73.
- FARAHBAKHS GH., 1961 - *Family Chrysomelidae*, pp. 89-92. In: Farahbakhsh G. (ed.), A checklist of economically important insects and other enemies of plants and agricultural products in Iran. The Ministry of Agriculture, Department Plant Protection, 1: 1-153.
- FLINTE V., DE FREITAS S., DE MACEDO M.V., MONTEIRO R.F., 2011 - *Altitudinal and temporal distribution of Plagiometrona Spaeth, 1899 (Coleoptera, Chrysomelidae, Cassidinae) in a tropical forest in southeast Brazil*. - ZooKeys, 157: 15–31.
- GHADIRI RAD S., KEYHANIAN A.A., 2010a - *Injury potential of Cassida palaestina Reich (Col.: Chrysomelidae) on cultivars and lines of safflower*. - Proceedings of the 19th Iranian plant protection congress, p. 428.
- GHADIRI RAD, S., KEYHANIAN A.A., 2010b - *On-farm biology of safflower defoliator beetle, Cassida palaestina Reich (Col.: Chrysomelidae)*. - Proceedings of the 19th Iranian plant protection congress, p. 570.
- GHAHARI H., JEDRYCZKOWSKI W.B., 2016 - *Four species of the leaf beetles (Coleoptera: Chrysomelidae) new for the fauna of Iran*. - Far Eastern Entomologist, 327: 14–16.
- GHAHARI H., BOROWIEC L., 2017 - *A checklist of seed-beetles (Coleoptera: Chrysomelidae: Bruchinae) from Iran*. - Zootaxa, 4268 (2): 215-237.
- GHAHREMAN A., ATTAR F., 1999 - *Biodiversity of plant species in Iran, the vegetation of Iran, plant species, red data of Iran, endemic species, rare species, species threatened by extinction*. - Central Herbarium of Tehran University, Tehran, Iran, 1: 1176 pp.
- GOMES P.A.A., PREZOTO F., FRIEIRO-COSTA F.A., 2012 - *Biology of Omaspides pallidipennis Boheman, 1854 (Coleoptera: Chrysomelidae: Cassidinae)*. - Psyche doi:10.1155/2012/290102
- GRUEV B.A., 2004 - *The leaf beetles (Insecta: Coleoptera: Chrysomelidae) of the Stara Planina ridge and the Fore-Balkan (Bulgaria). Fauna and Zoogeography*. - Travaux scientifiques de l'Université de Plovdiv, Animalia, 40(6): 37-75.
- HAKIMZADEH KHOEI M., KAYA M., ALTINDAG A., 2011 - *New records of Rotifers from Iran with biogeographic considerations*. - Turkish Journal of Zoo-

- logy, 35: 395-402.
- JOLIVET P., 1988 - *Selection trophique chez les Cassidinae (Coleoptera Chrysomelidae)*. - Bulletin Mensuel de la Société Linnéenne de Lyon, 57: 301-320.
- JOLIVET P., 2015 - *Together with 30 years of symposia on Chrysomelidae! Memories and personal reflections on what we know more about leaf beetles*. In: Jolivet P., Santiago-Blay J., Schmitt M. (eds.), *Research on Chrysomelidae 5*. - ZooKeys, 547: 35-61.
- JOLIVET P., HAWKSWOOD T.J., 1995 - *Host-plants of Chrysomelidae beetles of the world an: essay about the relationships between leaf beetles and their food-plants*. Backhuys Publishers, Leiden, 281 pp.
- JOLIVET P., VERMA K.K., 2002 - *Biology of leaf beetles*. Intercept Publishers, Andover, 332 pp.
- KHEYRI M., 1989 - *An inventory of pests attacking sugar beet in Iran*. - Applied Entomology and Phytopathology, 56 (1, 2): 75-91.
- KHEYRI M., BOROUMAND H., 1992 - *First record of Cassida nobilis L. as sugar beet pest in Iran*. - Applied Entomology and Phytopathology, 59 (1, 2): 109.
- LÖBL I., SMETANA A., 2010 - *Catalogue of Palaearctic Coleoptera. Vol. 6. Chrysomeloidea*. Apollo Books, Stenstrup, Denmark, 924 pp.
- LOPATIN I.K., 1981 - *Ergebnisse der Tschechoslowakisch-Iranischen Entomologischen Expeditionen nach dem Iran (1970)*. - Acta Entomologica Musei Nationalis Pragae, 40: 371-376.
- LOPATIN I.K., 1984 - *Zhuki lystoedy (Coleoptera, Chrysomelidae) Irana. Rezultaty Chekhoslovatsko-Iranskikh ekspedycji 1973-1977 gg. III. Results of the Czechoslovak-Iranian expeditions in 1973-1977*. - Entomologicheskoe Obozrenie, 63: 79-93.
- LOPATIN I.K., 1985 - *Zhuki-lystoedy (Coleoptera, Chrysomelidae) Irana. Rezultaty Chekhoslovatsko-Iranskikh ekspedycji 1973-1977 gg. IV*. - Entomologicheskoe Obozrenie, 64: 760-772.
- LOPES A.T., FERNANDEZ F.R., SCHNEIDER M.C., 2016 - *Comparative cytogenetic analysis in 13 tortoise beetles (Coleoptera: Chrysomelidae: Cassidinae) from Brazil*. - European Journal of Entomology 113: 352-363.
- MARUCCI R.C., MOREIRA S.G., MENDES S.M., 2017 - *First report of Chalepus dorni (Coleoptera: Chrysomelidae: Cassidinae) in maize crops of Minas Gerais, Brazil*. - Acta Biológica Colombiana, 22(2): 246-248.
- MIRZAEI M., NOZARI J., NAVEH V.H., 2015 - *Leaf beetles (Coleoptera: Chrysomelidae) of Tehran, Alborz and Qazvin provinces, Iran*. - Acta Phytopathologica et Entomologica Hungarica, 50(2): 223-228.
- MODARRES AWAL M., 1997 - *Family Chrysomelidae*, pp. 151-153. In: Modarres Awal, M. (ed.), *List of agricultural pests and their natural enemies in Iran*. Ferdowsi University Press, 429 pp.
- MODARRES AWAL M., 2012 - *Family Chrysomelidae*, pp. 298-307. In: Modarres Awal, M. (ed.), *List of agricultural pests and their natural enemies in Iran*. Ferdowsi University Press, 759 pp.
- MOHAMMADZADEH FARD S., 2007 - *Report of Hispatarsata Swietojanska, 2001 from Fars province and its differences with Hispa atra L.* - Newsletter of Entomological Society of Iran, 35: p. 1. [in Persian]
- MORADIAN H., OSTOVAN H., HAGHANI M., 2009 - *Cassida palaestina (Coleoptera: Chrysomelidae), a new record for the chrysomelid fauna of Iran*. - Plant Protection Journal, 1(3): 321-325. [in Persian, English summary]
- MORADIAN H., OSTOVAN H., 2018 - *Study on the fauna and host plants of tortoise beetles, Cassida spp. (Col.: Chrysomelidae) in Gachsaran*. - Journal of Entomological Research, 10(2): 127-137. [in Persian, English summary]
- REID C.A.M., 1995 - *A cladistic analysis of subfamilial relationships in the Chrysomelidae sensu lato (Chrysomeloidea)*, pp. 559-631. In: Pakaluk, J., Slipinski, S.A. (eds), *Biology, phylogeny and classification of Coleoptera. Papers Celebrating the 80th Birthday of Roy A. Crowson*, Warszawa. Muzeum i Instytut Zoologii PAN, Warszawa, 1092 pp.
- ROSTAMI Z., ASADI G.A., KHORRAMDEL S., MOALLEM BAMHAMGI F., 2016 - *Introducing specific arthropods associated with brushed dad for identification of potential biological control agents*. - Proceedings of the 3rd National Conference of Biological Control in Agriculture and Natural Resources, pp. 271-277.
- SAKENIN CHELAV H., SAMIN N., WARCHALOWSKI A., HAWKESWOOD T.J., JĘDRYCKOWSKI W., 2019 - *A contribution to the study of Carabidae, Cerambycidae, Chrysomelidae and Staphylinidae (Coleoptera) of Iran*. - Calodema, 729: 1-6.
- SAMIN N., 2018 - *Nineteen new records of species of the family Chrysomelidae (Coleoptera: Chrysomeloidea) for the fauna of Iran*. - Acta Zoologica Bulgarica, 70(4): 459-464.
- SAMIN N., JĘDRYCKOWSKI W.B., WARCHALOWSKI A., HAWKESWOOD T.J., SAKENIN CHELAV H., 2018 - *A faunistic study of Buprestidae and Chrysomelidae (Coleoptera) from Iran*. - Euroasian Entomological Journal 17(4): 276-279.
- SEIFI S., SADEGHI A., GHOBARI H., 2017 - *Study of morphology and host preference of field bindweed leaf-feeding beetle Hypocassida subferruginea (Col., Chrysomelidae) in Kurdistan province*. - Biological Control of Pests Plant Diseases, 6(1): 53-62. [in Persian, English summary]
- SEKERKA L., 2008a - *Review of the genus Macromonycha (Coleoptera: Chrysomelidae: Cassidinae)*. - Acta Entomologica Musei Nationalis Pragae, 48(1): 95-102.
- SEKERKA L., 2008b - *Revision of the genus Pilemostoma Desbrochers, 1891 (Coleoptera: Chrysomelidae: Cassidinae: Cassidini)*. - Zootaxa, 1859: 40-48.
- SEKERKA L., 2016 - *Taxonomic and nomenclatural changes in Cassidinae (Coleoptera: Chrysomelidae)*. - Acta Entomologica Musei Nationalis Pragae, 56(1): 275-344.
- SHINOHARA T., TAKAMI Y., 2017 - *Adult leaf beetles of the subfamily Cassidinae (Coleoptera: Chrysomelidae) preyed on by the digger wasp Cerceris albofasciata (Hymenoptera: Crabronidae) in Japan*. -

- Entomologische Blätter für Biologie und Systematik der Käfer, 113 (1): 213–218.
- SOLTIS D.E., SMITH S.A., CELLINESE N., WURDACK K.J., TANK D.C., BROCKINGTON S.F., REFULIO-RODRIGUEZ N.F., WALKER J.B., MOORE M.J., CARLSWARD B.S., BELL C.D., LATVIS M., CRAWLEY S., BLACK C., DIOUF D., XI Z., RUSHWORTH C.A., GITZENDANNER M.A., SYTSMA K.J., QIU Y., HILU K.W., DAVIS C.C., SANDERSON M.J., BEAMAN R.S., OLMSTEAD R.G., JUDD W.S., DONOGHUE M.J., SOLTIS P.S., 2011 - *Angiosperm phylogeny: 17 genes, 640 taxa*. - American Journal of Botany, 98: 704–730.
- SPAETH F., 1914 - *Über die paläarktischen Cassiden mit besonderer Berücksichtigung jener von Asien*. - Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien, 64: 128–147.
- SPAETH, F., 1926 – In: Spaeth, F., Reitter, E. Cassidinae der paläarktischen Region. Bestimmungs-Tabellen der europäischen Coleopteren. 95. Troppau, 68 pp.
- STAINES C.L., 2002 - *The New World tribes and genera of hispines (Coleoptera: Chrysomelidae: Cassidinae)*. - Proc. Entomol. Soc. Washington, 104(3): 721–784.
- ŚWIĘTOJAŃSKA J., 2001 – *Hispa tarsata, a new species from Iran (Coleoptera: Chrysomelidae: Hispinae)*. - Genus, 12(4): 479–482.
- ŚWIĘTOJAŃSKA J., 2009 – *The immatures of tortoise beetles with bibliographic catalogue of all taxa (Coleoptera: Chrysomelidae: Cassidinae)*. - Polish Taxonomical Monographs vol. 16, Biologica Silesiae, Wrocław, 157 pp.
- ŚWIĘTOJAŃSKA J., MORADIAN H., BOROWIEC L., OSTOVAN H., 2013 - *Description of larvae of two closely related species Cassida palaestina Reiche, 1858 and Cassida rubiginosa Müller, 1776 (Coleoptera: Chrysomelidae: Cassidinae)*. - Zootaxa, 3741(4): 511–537.
- VASCONCELLOS-NETO J., 1988 - *Genetics of Chelymorpha cribraria, Cassidinae: colour patterns and their ecological meaning*, pp. 217–232. In: Jolivet P., Petitpierre E., Hsiao T.H. (eds.), Biology of Chrysomelidae. Kluwer Academic, London, UK, 615 pp.
- VENCL F., NOGUEIRA-DE-SÁ F., ALLEN B.J., WINDSOR D., FUTUYMA D., 2005 - *Dietary specialization influences the efficacy of larval tortoise beetle shield defenses*. - Oecologia, 145(3): 404–414.
- WINDSOR D.M., 1987 - *Natural history of a subsocial tortoise beetle, Acromis sparsa Boheman (Chrysomelidae, Cassidinae) in Panama*. - Psyche, 94: 127–150.
- WINDSOR D.M., RILEY E.G., STOCKWELL H.P., 1992 - *An introduction to the biology and systematics of Panamanian Tortoise Beetles (Coleoptera: Chrysomelidae: Cassidinae)*, pp. 372–391. In: Quintero D., Aiello A. (eds.), Insects of Panama and Mesoamerica, Selected studies. Oxford University Press, Oxford, New York, Tokyo, 720 pp.
- YEONG K.C., TAKIZAWA H., LIEW T.S., 2018 - *Investigating leaf beetles (Coleoptera, Chrysomelidae) on the west coast islands of Sabah via checklist-taking and DNA barcoding*. - PeerJ 6:e5811; DOI 10.7717/peerj.5811
- ZEHZAD B., KIABI B.H., MADJNOONIAN H., 2002 - *The natural areas and landscape of Iran: an overview*. - Zoology in the Middle East, 26: 7–10.