

**WEEVILS (COLEOPTERA: CURCULIONIDAE)
FROM IRANIAN RICE FIELDS
AND SURROUNDING GRASSLANDS**

Hassan Ghahari*, Yury Genrikh'vich Arzanov,
Andrei Aleksandrovich Legalov***, Mehrdad Tabari****
and Hadi Ostovan*******

* Department of Agriculture, Islamic Azad University; Shahre Rey Branch, Tehran, IRAN, h_ghahhari@yahoo.com

** South Scientific Centre of RAS, Chekhov str., 41, Rostov-on-Don 344006 RUSSIA, arz99@mail.ru

*** Siberian Zoological Museum, Institute of Animal Systematics and Ecology, SB RAS, Frunze street-11, Novosibirsk 630091 RUSSIA, legalov@ngs.ru

**** Iran Rice Research Institute, Amol, Mazandaran, IRAN, ma_tabari@yahoo.com

***** Department of Entomology, Islamic Azad University, Fars Science & Research Branch, IRAN, ostovan2001@yahoo.com

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ABSTRACT: In a total of 45 species of 22 genera including, *Stenocarus*, *Tychius*, *Ceutorhynchus*, *Curculio*, *Archarius*, *Coniatus*, *Donus*, *Hypera*, *Limobius*, *Conorhynchus*, *Pachycerus*, *Cleonis*, *Coniocleonus*, *Chromoderus*, *Bothynoderes*, *Rhinocyllus*, *Bangasternus*, *Microlarinus*, *Eustenopus*, *Larinus*, *Lixus*, *Hypolixus*, *Otirohynchus* and 5 subfamilies including, Ceutorhynchinae, Curculioninae, Hyperinae, Lixinae and Entiminae were collected from Iranian rice fields and surrounding grasslands.

KEY WORDS: Curculionidae, Fauna, Rice field, Iran

The number of described beetle species is about 400,000 (Spangler, 1982; Hammond, 1992), with weevils (Coleoptera: Curculionoidea) (62,000) comprising 15.5% of this number. Interestingly, this is about the same proportion encountered by Linnaeus 250 years ago, when barely 100 weevil species were known (Oberprieler et al., 2007). The most recent comprehensive tally of the number of Curculionoidea (Kuschel, 1995) yielded a total of 5,087 described genera and 56,920 species (status at about 1988). Adding the genera and species newly described in the last 20 years raises these numbers to 5,604 and 61,868, an increase of 10% and 8.7%, respectively. The recent comprehensive world catalogue of weevil genera (Alonso-Zarazaga & Lyal, 1999, 2002; Lyal & Alonso-Zarazaga, 2006) recognizes 5,464 valid weevil genera (status at 1999), including fossils but excluding Scolytinae and Platypodinae, which number 225 genera (5 837 species) and 41 genera (1,463 species), respectively, after Wood & Bright (1992) and Bright & Skidmore (1997). Excluding fossils (about 100 genera) and including the latter two groups yields a total of 5,630 genera of weevils, slightly more than the number extrapolated from Kuschel's count but more accurate (though excluding genera described after 1999). A figure of 5,800 genera and 62,000 species is therefore a best estimate of the described diversity of Curculionoidea, comparable with Lawrence's (1982) and Watt's (1982) respective earlier estimates of 60,000 and 65,000.

The family Curculionidae is an order of magnitude larger than any other in weevils and comprises in excess of 80% of all weevil species (with about 4,600 genera and 51,000 described species). Its stupendous species richness is a

principal factor in the large size of the hytophaga and in fact of all Coleoptera, thus in Haldane's Inordinate Fondness for beetles. Curculionidae occur all over the world, from the arctic zone in the north to the subtropical islands in the south, from beaches to mountain tops, from deserts to rainforests. They feed on virtually all plants, mainly ngiosperms but also gymnosperms, pteridophytes, bryophytes and lichens and occasionally they even browse on algae and cyanobacteria. Unlike all other weevil families, curculionids also make extensive use of monocotyledons as hosts, the basal subfamilies Dryophthorinae and Brachycerinae being predominantly associated with them and several taxa of other subfamilies as well. It is therefore likely that monocotyledons constitute the ancestral hosts of Curculionidae and that they may have played a pivotal role in the diversification of the family (Marvaldi et al., 2002; Oberprieler, 2004).

Rice, the daily food of nearly half the world's population, is the foundation of national stability and economic growth in many developing countries. It is the source of one quarter of global food energy and - for the world's poor - the largest food source. It is also the single largest use of land for producing food and the biggest employer and income generator for rural people in the developing world. Rice production has been described as the single most important economic activity on Earth. Because rice occupies approximately 9% of the planet's arable land, it is also a key area of concern - and of opportunity - in environmental protection (Heinrichs and Barrion, 2004). Several insects are active in the rice fields and around lands all over the world which one of them are weevils. Since the fauna of weevils' fauna was not studied in Iranian rice fields so far, their fauna is studied in this research.

MATERIAL AND METHOD

Materials have been collected by sweeping net and aspirator from the rice fields and surrounding grasslands in different regions of Iran. The sampled regions were East Azarbaijan, Guilan, Mazandaran, Golestan, Zanjan, Chaharmahal & Bakhtiari, Isfahan and Khuzestan provinces. In addition to the collected specimen by the authors, several other collected specimens by many researchers and amateur students have also been included in this study. The information concerning the species' name, describer, locality and the date of collection, place/plant on which the species were collected and the number of species (in brackets) was also given. Although the name of the plants on which the specimens collected has been given, this doesn't necessarily mean that they are the host of the species. In this paper, classification and nomenclature of Curculionids suggested by Alonso-Zarazaga & Lyal (1999) and Colonnelli (2003) have been followed.

RESULTS

In this study, 45 species of 22 genera and 5 subfamilies were collected from Iranian rice fields and surrounding grasslands. The list of species is given below:

Subfamily Ceutorhynchinae Gistel, 1848

Tribe Ceutorhynchini Gistel, 1848

Genus *Stenocarus* Thomson, 1859

***Stenocarus ruficornis* (Stephens, 1831)**

Material: East Azarbaijan province, Arasbaran (2), 24.VII.2005, *Amaranthus* sp. (Amaranthaceae).

Distribution: Western and Central Palaearctic.

Genus *Ceutorhynchus* Germar, 1824***Ceutorhynchus aenescens* Schultz, 1895**

Material: Mazandaran province, Savadkooh (1), 2.V.1999, Rice field.

Distribution: Kazakhstan, Middle Asia, Asia minor.

***Ceutorhynchus coarctatus* Gyllenhal, 1837**

Material: Zanjan province, Zanjan (1), 8.VIII.2002, Rice field.

Distribution: Western and Central Palaeartic.

***Ceutorhynchus difficilis* Schultz, 1898**

Material: Chaharmahal & Bakhtiari province, Shahrekord (1), 24.VI.2006, *Amaranthus graecizans* (Amaranthaceae).

Distribution: South-eastern Europe, Caucasus, Transcaucasia, Middle Asia, Asia minor.

***Ceutorhynchus rapae* Gyllenhal, 1837**

Material: East Azarbaijan province, Arasbaran (3), 24.VII.2005, *Myrtus communis* (Myrtaceae).

Distribution: Palaeartic.

Subfamily Curculioninae Latreille, 1802**Tribe Tychiini Gistel, 1848****Genus *Tychius* Germar, 1817*****Tychius aureolus* Kiesenwetter, 1851**

Material: Isfahan province, Najaf-Abad (2), 21.V.2000, *Cucurbita pepo* (Cucurbitaceae).

Chaharmahal & Bakhtiari province, Shahrekord (1), 25.VI.2006, Rice field.

Distribution: Western and Central Palaeartic.

***Tychius caldarai* Dieckmann, 1986**

Material: Mazandaran province, Amol (2), 11.IV.2002, *Amaranthus graecizans* (Amaranthaceae).

Distribution: Europe, Asia minor.

***Tychius graecus* Kiesenwetter, 1864**

Material: East Azarbaijan province, Arasbaran (3), 26.VII.2005, *Adiantum capillus - veneris* (Adiantaceae).

Distribution: Greece, Asia minor.

***Tychius junceus* (Reich, 1797)**

Material: Isfahan province, Lenjan (1), 17.VIII.2000, Rice field.

Distribution: Western and Central Palaeartic.

***Tychius meliloti* Stephens, 1831**

Material: Chaharmahal & Bakhtiari province, Shahrekord (2), 22.VI.2006, *Eragrostis poaeoides* (Gramineae).

Distribution: Western and Central Palaeartic.

Tribe Curculionini Latreille, 1802**Genus *Curculio* Linnaeus, 1758*****Curculio glandium* Marsham, 1802**

Material: East Azarbaijan province, Arasbaran (4), 24.VII.2005, *Rosa persica* (Rosaceae).

Distribution: Western Palaeartic.

Genus *Archarius* Gistel, 1856***Archarius crux* (Fabricius, 1776)**

Material: Mazandaran province, Sari (2), 19.IX.2001, Rice field.

Distribution: Western and Central Palaeartic.

***Archarius salicivorus* (Paykull, 1792)**

Material: Mazandaran province, Savadkooh (1), 21.IX.2001, *Rubus hyrcanus* (Rosaceae).

Distribution: Palaeartic.

Subfamily Hyperinae Marseul, 1863**Tribe Hyperini Marseul, 1863****Genus *Donus* Jekel, 1845*****Donus comatus* (Boheman, 1842)**

Material: East Azarbaijan province, Arasbaran (2), 25.VII.2005, *Rumex crispus* (Polygonaceae).

Distribution: Europe.

Genus *Hypera* Germar, 1817

***Hypera constans* (Boheman, 1834)**

Material: Isfahan province, Lenjan (1), 17.VIII.2000, *Tribulus terrestris* (Zygophyllaceae).

Distribution: Western Palearctic.

***Hypera cumana* (Petri, 1901)**

Material: Guilan province, Fooman (1), 14.IV.2004, Rice field.

Distribution: South-eastern Europe, Asia minor.

***Hypera maculipennis* (Fairmaire, 1859)**

Material: Golestan province, Gorgan (1), 11.VII.2003, *Urtica dioica* (Urticaceae).

Distribution: Southern Europe, North Africa, Asia minor.

Genus *Antidonus* Bedel, 1886

***Antidonus zoilus* (Scopoli, 1763)**

Material: Mazandaran province, Behshahr (2), 15.V.2005, Rice field; Chaharmahal &

Bakhtiari province, Shahrekord (1), 25.VI.2006, *Amaranthus retroflexus* (Amaranthaceae).

Distribution: Holarctic.

Genus *Limobius* Schönherr, 1843

***Limobius borealis* (Paykull, 1792)**

Material: East Azarbaijan province, Arasbaran (2), 24.VII.2005, Rice field.

Distribution: Western and Central Palearctic.

Genus *Coniatus* Germar, 1817

***Coniatus tamarisci* (Fabricius, 1787)**

Material: Golestan province, Gorgan (2), 11.VII.2003, *Corchorus olitorius* (Tilliaceae).

Distribution: Canary Islands, Mediterranean, Asia minor.

Subfamily Lixinae Schoenherr, 1823

Tribe Rhinocyllini Lacordaire, 1863

Genus *Rhinocyllus* Germar, 1817

***Rhinocyllus conicus* (Frölich, 1792)**

Material: East Azarbaijan province, Arasbaran (2), 26.VII.2005, *Sonchus asper* (Compositae).

Distribution: Western and Central Palearctic.

Genus *Bangasternus* Gozis, 1882

***Bangasternus fausti* (Reitter, 1890)**

Material: Guilan province, Roodsar (1), 17.IV.2004, Rice field. Zanjan province, Zanjan (1), 24.V.2005, *Medicago polymorpha* (Leguminosae).

Distribution: Europe, Transcaucasia, Iran.

***Bangasternus planifrons* (Brullè, 1832)**

Material: Chaharmahal & Bakhtiari province, Shahrekord (1), 25.VI.2006, *Ricinus communis* (Euphorbiaceae).

Distribution: Southern Europe, Middle Asia, Asia minor.

Tribe Lixini Schoenherr, 1823

Genus *Microlarinus* Hochhuth, 1847

***Microlarinus lareynii* (Jacquilin du Val, 1852)**

Material: Isfahan province, Lenjan (2), 17.VIII.2000, *Berberis vulgaris* (Berberidaceae).

Distribution: North Africa, Southern Europe, Iran.

Genus *Eustenopus* Petri, 1907

***Eustenopus villosus* (Boheman, 1843)**

Material: Golestan province, Kordkoy (2), 3.V.2003, Rice field.

Distribution: Greece, Caucasus, Asia minor.

Genus *Larinus* Dejean, 1821***Larinus brevis* (Herbst, 1795)**

Material: Khuzestan province, Ahwaz (3), 10.IV.2001, *Sorghum halepense* (Gramineae).
Distribution: Western and Central Palaearctic.

***Larinus cynarae* (Fabricius, 1787)**

Material: Guilan province, Rasht (2), 16.IV.2004, *Mentha piperita* (Labiatae).
Distribution: North Africa, Southern Europe, Iran.

***Larinus latus* (Herbst, 1784)**

Material: East Azarbaijan province, Arasbaran (5), 25.VII.2005, *Raphanus raphanistrum* (Brassicaceae).
Distribution: Southern Europe, Caucasus, Transcaucasia, Asia minor.

***Larinus rudicollis* Petri, 1907**

Material: Golestan province, Kordkoy (2), 3.V.2003, *Lactuca scariola* (Asteraceae).
Distribution: North Africa, Caucasus, Asia minor.

***Larinus ursus* (Fabricius, 1792)**

Material: Zanjan province, Zanjan (3), 8.VIII.2002, *Carthamus tinctorius* (Compositae).
Distribution: Western Palaearctic.

Genus *Lixus* Fabricius, 1801***Lixus circumcinctus* Boheman, 1836**

Material: East Azarbaijan province, Arasbaran (3), 24.VII.2005, Rice field.
Distribution: Transcaucasia, Middle Asia, Asia minor.

***Lixus incanescens* Boheman, 1836**

Material: Chaharmahal & Bakhtiari province, Shahrekord (1), 24.VI.2006, *Euphorbia heteradenia* (Euphorbiaceae).
Distribution: South-eastern Europe, Caucasus, Middle Asia, Iran.

***Lixus obesus* Petri, 1904**

Material: Mazandaran province, Ghaemshahr (2), 26.VI.2004, Rice field.
Distribution: Caucasus, Asia minor.

***Lixus speciosus* Miller, 1861**

Material: Zanjan province, Zanjan (1), 9.VIII.2002, *Avena fatua* (Gramineae).
Distribution: Caucasus, Asia minor.

Genus *Hypolixus* Desbrochers, 1898***Hypolixus nubilosus* (Boheman, 1836)**

Material: Guilan province, Amlash (2), VII.2003, *Amaranthus blitoides* (Amaranthaceae).
Mazandaran province, Chalus (1), 6.X.2004, *Daucus carota* (Apiaceae).
Distribution: Africa, Asia minor, Arabia.

Tribe Cleonini Schoenherr, 1826**Genus *Conorhynchus* Motschulsky, 1860*****Conorhynchus nigrivittis* (Pallas, 1781)**

Material: Khuzestan province, Ahwaz (1), 10.IV.2001, *Carthamus oxyacantha* (Compositae).
Mazandaran province, Nooshahr (2), 10.IV.2003, *Glycyrrhiza glabra* (Leguminosae).
Distribution: The south and southeast of the European part of Russia, Kazakhstan, Turkmenistan, Western Siberia, Iran, China.

Genus *Pachycerus* Schönherr, 1823***Pachycerus cordiger* (Germar, 1819)**

Material: Chaharmahal & Bakhtiari province, Shahrekord (2), 24.VI.2006, Rice field.
Distribution: Europe, the Mediterranean, Caucasus, Transcaucasia, Kazakhstan, Middle Asia, Iran.

Genus *Cleonis* Dejean, 1821***Cleonis piger* (Scopoli, 1763)**

Material: Mazandaran province, Kiakola (1), 28.VII.2003, Rice field.
Distribution: Europe, Morocco, Caucasus, Kazakhstan, Middle Asia, the Amur region.

Genus *Plagiographus* Chevrolat, 1873***Conioeleon nigrosuturatus* (Goeze, 1777)**

Material: Mazandaran province, Behshahr (1), 22.IV.2001, *Polygonum convolvulus* (Polygonaceae).

Distribution: Islands Balearskie, Portugal, Spain, France, Italy (including Sicily), Austria, Belgium, Bulgaria, Croatia, Czechia, Greece (including Cyprus), Hungary, Moldova, Poland, Ukraine, the south of the European part of Russia, Crimea, Caucasus and Transcaucasia, Turkmenistan, Uzbekistan, Asia Minor, Asia minor, Northern Africa (Egypt, Morocco), Bocr. India.

Genus *Bothynoderes* Schoenherr, 1823***Bothynoderes affinis* (Schrank, 1781)**

Material: Zanjan province, Zanjan (2), 8.VIII.2002, Rice field.

Distribution: France (including Corsica), Greece, Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, the Great Britain, Bulgaria, Croatia, Czechia, Denmark, Holland, Finland, Sweden, Germany, Hungary, Macedonia, Moldova, Poland, Slovakia, Slovenia, Ukraine, Crimea, the south of the European part of Russia, Caucasus, Kazakhstan, Turkmenistan, Uzbekistan, Western Siberia, where it is small. Asia, Iran.

Genus *Asproparthenis* Gozis, 1886***Bothynoderes carinatus* (Zoubkoff, 1829)**

Material: Guilan province, Rasht (1), 16.IV.2004, *Rosa hemisphaerica* (Rosaceae).

Distribution: The south of the European part of Russia, Kazakhstan, Asia minor

***Bothynoderes punctiventris* (Germar, 1794)**

Material: Mazandaran province, Ghaemshahr (1), 26.VI.2004, *Helianthus annuus* (Compositae).

Distribution: Western and Central Palaearctic.

Subfamily Entiminae Schoenherr, 1823**Genus *Otiorhynchus* (Germar, 1822)*****Otiorhynchus (Choilisanus) balcanicus* Stierlin, 1861**

Material: East Azarbaijan province, Arasbaran (1), 26.VII.2005, *Hedera helix* (Araliaceae).

Distribution: Greece, Caucasus, Asia minor.

***Otiorhynchus (Choilisanus) grandicollis* Boheman, 1843**

Material: Mazanaran province, Joibar (1), 11.VIII.2000, *Acer hyrcanum* (Aceraceae).

Golestan province, Kordkoy (1), 19.V.2003, *Amaranthus albus* (Amaranthaceae).

Distribution: Caucasus, Asia minor

***Otiorhynchus (Nehrodistus) turca* Boheman in Schönherr, 1843**

Material: Chaharmahal & Bakhtiari province, Shahrekord (2), 24.VI.2006, *Lactuca orientalis* (Asteraceae).

Distribution: Caucasus, Asia minor

DISCUSSION

The results of the present research indicated that there is a diverse fauna of weevils in Iranian rice fields and surrounding grasslands. In addition to the almost specimens which were collected from rice fields, several specimens were collected from different weeds from 20 families including, Aceraceae, Adiantaceae, Amaranthaceae, Apiaceae, Araliaceae, Asteraceae, Berberidaceae, Brassicaceae, Compositae, Cucurbitaceae, Euphorbiaceae, Gramineae, Labiatea, Leguminosae, Myrtaceae, Polygonaceae, Rosaceae, Tilliaceae, Urticaceae and Zygophyllaceae. Since Iran is a large country incorporating various geographical regions and climates, very diverse fauna of Curculionidae is expected to be in different agroecosystems. Surely, to find new species and distributional records, more studies and surveys should be conducted on this important insect group in different regions of Iran especially in agricultural fields and orchards.

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