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Biodiversity of rove beetles (Coleoptera: Staphylinoidea: Staphylinidae) from the Arasbaran biosphere reserve and vicinity, northwestern Iran

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A b s t r a c t : The fauna of rove beetles was studied in Arasbaran biosphere reserve and vicinity, northwestern Iran. In a total of 45 species from 33 genera and 10 subfamilies including, Omaliinae, Proteininae, Pselaphinae, Tachyporinae, Aleocharinae, Oxytelinae, Scaphidiinae, Steninae, Paederinae, Staphylininae were collected.

K e y w o r d s : Rove beetle, Staphylinidae, Fauna, Arasbaran, Iran.

Introduction

Staphylinidae is one of the largest families of Coleoptera which occupy almost all moist environments throughout the world. They live in leaf litter of woodland and forest floors and grasslands. They concentrate in fallen decomposing fruits, the space under loose bark of fallen, decaying trees, drifted plant materials on banks of rivers and lakes, and dung, carrion, and nests of vertebrate animals (BLACKWELDER 1952; COIFFAIT 1978, 1984). Classification of over than 46,000 staphylinid species is ongoing and controversial, with some workers proposing an organization of as many as ten separate families, but the current favored system is one of 31 subfamilies, about 100 tribes (some grouped into supertribes), and about 3,200 genera. About 400 new species are being described each year, and some estimates suggest 3/4 of tropical species are as yet undescribed. In addition, recent advances in the phylogeny of Staphylinidae have led to major modifications of higher classification that have been published more recently in different regions of the world. For example, the Staphylinidae are now generally accepted to include the Pselaphinae and the Scaphidiinae, which both were accorded full family status in earlier lists. Remarkably, the boundaries of the staphylinid subfamilies in POPE (1977) have survived intact. However, the tribes within some of these subfamilies have been very fluid. Similarly, a large number of genera across many subfamilies have been split, usually by raising former subgenera to full generic rank. There is a well developed tribal classification for most subfamilies in the Staphylinidae. Supertribes were introduced by NEWTON & THAYER (1995) for the Pselaphinae in order to accommodate the former subfamily classification previously applied to the Pselaphidae as a separate family, and they have been included here (LOTT 2008).

Arasbaran is an important region in East Azarbayjan province. This biosphere reserve situated in the north of Iran at the border to Armenia and Azerbaijan belongs to the Caucasus Iranian Highlands. In-between the Caspian, Caucasus and Mediterranean region, the area covers mountains up to 2,200 meters, high alpine meadows, semi-arid steppes, rangelands and forests, rivers and springs. Arasbaran is the territory of about 23,500 nomads who are mainly living in the buffer and transition zones. Economic activities in the biosphere reserve are mainly agriculture, animal husbandry, horticulture, apiculture, handicrafts and tourism, but business activities can also be found in urbanized areas. The location of Arasbaran is 38°40' to 39°08'N; 46°39' to 47°02'E and its Altitude (meters above sea level) is +250 to +2,887. With attention to the importance of Staphylinidae in almost ecosystems and on the other hand, high diversity of Arthropoda in Arasbaran region, the fauna of these beneficial insects was studied in some regions of northwestern Iran.

Materials and Methods

Materials have been collected by sweeping net and aspirator from different regions of Arasbaran (East Azarbayjan province, Northwestern Iran) and vicinity. The sampled regions were Ardabil, East Azarbayjan and West Azarbayjan 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 specific name, describer, locality and date of collection, and number of species (in brackets) is given. In this paper, Classification and nomenclature suggested by NEWTON & THAYER (1992), HERMAN (2001) and LÖBL & SMETANA (2004) have been followed. The World Catalogue of Staphylinidae (HERMAN 2001) is based on extensive research of the literature and should serve as a basis for a standard nomenclature for some years to come. It covers all subfamilies except for the Pselaphinae, Aleocharinae, Scaphidiinae and Paederinae. The world Scaphidiinae has been covered by LÖBL (1997). The Palaearctic catalogue (LÖBL & SMETANA 2004) covers the Palaearctic fauna including those families missing from the world catalogue.

Results

Totally 45 staphylinid species from 33 genera and 10 subfamilies were collected from Arasbaran and vicinity. The list of species is given below.

Subfamily O m a l i i n a e MACLEAY 1825

Tribe A n t h o p h a g i n i THOMSON 1859

Genus *Anthobium* LEACH 1819

***Anthobium Anthobium atrocephalum* (GYLLENHAL 1827)**

M a t e r i a l : East Azarbayjan province: Kalibar (2), August 2006.

Genus *Geodromicus* REDTENBACHER 1857

***Geodromicus major* (MOTSCHULSKY 1860)**

M a t e r i a l : East Azarbayjan province: Ahar (1), July 2005.

Tribe E u s p h a l e r i n i HATCH 1957

Genus *Eusphalerum* KRAATZ 1857

***Eusphalerum sareptanum* (EPPELSHEIM 1878)**

M a t e r i a l : Ardabil province: Pars-Abad (1), June 2004. East Azarbayjan province: Khodafarin (2), July 2006.

Tribe O m a l i i n i MACLEAY 1825

Genus *Omalium* GRAVENHORST 1802

***Omalium falsum* EPPELSHEIM 1889**

M a t e r i a l : East Azarbayjan province: Horand (1), October 2006.

Subfamily P r o t e i n i n a e ERICHSON 1839

Tribe P r o t e i n i n i ERICHSON 1839

Genus *Megarthrus* CURTIS 1829

***Megarthrus denticollis* (BECK 1817)**

M a t e r i a l : East Azarbayjan province: Aynalo (1), June 2005.

Subfamily P s e l a p h i n a e LATREILLE 1802

Supertribe C l a v i g e r i t a e LEACH 1815

Tribe C l a v i g e r i n i LEACH 1815

Genus *Claviger* PREYSSLER 1790

***Claviger merkli* REITTER 1885**

M a t e r i a l : West Azarbayjan province: Ourmieh (2), August 2005.

Tribe E u p l e c t i n i STREUBEL 1839

Genus *Plectophloeus* REITTER 1891

***Plectophloeus nubigena nubigena* (REITTER 1877)**

M a t e r i a l : East Azarbayjan province: Abshahmad (1), June 2006. West Azarbayjan province: Mahabad (1), September 2003.

Tribe T r i c h o n y c h i n i REITTER 1882

Genus *Zibus* SAULCY 1874

***Zibus leiocephalus* (AUBÈ 1833)**

M a t e r i a l : East Azarbayjan province: Tabriz (1), June 2006. East Azarbayjan province: Khomarloo (2), Augut 2006.

Supertribe G o n i a c e r i t a e REITTER 1882

Tribe B r a c h y g l u t i n i RAFFRAY 1904

Genus *Brachygluta* THOMSON 1859

***Brachygluta fossulata* (REICHENBACH 1816)**

M a t e r i a l : East Azarbayjan province: Aras boundary (2), September 2006.

***Brachygluta xanthoptera* (REICHENBACH 1816)**

M a t e r i a l : East Azarbayjan province: Aynalo (3), June 2005.

Genus *Tribatus* MOTSCHULSKY 1851

***Tribatus creticus* REITTER 1884**

M a t e r i a l : East Azarbayjan province: Horand (1), October 2006.

Tribe B y t h i n i n i RAFFRAY 1890

Genus *Bryaxis* KUGELANN 1794

***Bryaxis anatolicus* (SAULCY 1878)**

M a t e r i a l : Ardabil province: Meshkinshahr (1), June 2004. East Azarbayjan province: Khodafarin (1), July 2006.

Subfamily T a c h y p o r i n a e MACLEAY 1825

Tribe M y c e t o p o r i n i THOMSON 1859

Genus *Bolitobius* LEACH 1819

***Bolitobius insignis* HOCHHUTH 1849**

M a t e r i a l : West Azarbayjan province: Ourmieh (2), August 2003.

Genus *Ischnosoma* STEPHENS 1829

***Ischnosoma longicorne* (MÄKLIN 1847)**

M a t e r i a l : East Azarbayjan province: Khomarloo (1), September 2007.

Genus *Mycetoporus* MANNERHEIM 1830

***Mycetoporus lepidus* (GRAVENHORST 1806)**

M a t e r i a l : Ardabil province: Meshkinshahr (1), June 2004.

***Mycetoporus reichei* (PANDELLÉ 1869)**

M a t e r i a l : East Azarbayjan province: Ahar (1), July 2005.

Subfamily A l e o c h a r i n a e FLEMING 1821

Tribe A l e o c h a r i n i FLEMING 1821

Genus *Aleochara* GRAVENHORST 1802

***Aleochara milleri* KRAATZ 1862**

M a t e r i a l : East Azarbayjan province: Khomarloo (1), Augut 2006.

Tribe A t h e t i n i CASEY 1910

Genus *Atheta* THOMSON 1858

***Atheta longicornis* (GRAVENHORST 1802)**

M a t e r i a l : East Azarbayjan province: Horand (3), October 2006.

***Atheta volans* (SCRIBA 1859)**

M a t e r i a l : West Azarbayjan province: Ourmieh (2), August 2005.

Genus *Pseudosemiris* MACHULKA 1935

***Pseudosemiris kaufmanni* (EPPELSHEIM 1887)**

M a t e r i a l : East Azarbayjan province: Kalibar (1), August 2006. East Azarbayjan province: Khomarloo (2), September 2007.

Tribe F a l a g r i i n i MULSANT & REY 1873

Genus *Myrmecopora* SAULCY 1865

***Myrmecopora uvida* (ERICHSON 1840)**

M a t e r i a l : East Azarbayjan province: Khomarloo (1), Augut 2006.

Subfamily O x y t e l i n a e FLEMING 1821

Tribe T h i n o b i i n i SAHLBERG 1876

Genus *Bledius* LEACH 1819

***Bledius atricapillus* (GERMAR 1825)**

M a t e r i a l : West Azarbayjan province: Salmas (1), July 2004. East Azarbayjan province: Aras boundary (1), September 2006.

***Bledius tibialis* HEER 1839**

M a t e r i a l : Ardabil province: Meshkinshahr (1), June 2004.

Genus *Thinodromus* KRAATZ 1857

***Thinodromus arcuatus* (STEPHENS 1834)**

M a t e r i a l : West Azarbayjan province: Salmas (1), July 2004.

Subfamily S c a p h i d i i n a e LATREILLE 1807

Tribe S c a p h i s o m a t i n i CASEY 1894

Genus *Scaphisoma* LEACH 1815

***Scaphisoma boleti* (PANZER 1793)**

M a t e r i a l : East Azarbayjan province: Aynalo (2), June 2005.

Subfamily S t e n i n a e MACLEAY 1825

Genus *Stenus* LATREILLE 1797

***Stenus binotatus* LJUNGH 1804**

M a t e r i a l : West Azarbayjan province: Mahabad (2), September 2003.

***Stenus crassus* STEPHENS 1833**

M a t e r i a l : East Azarbayjan province: Kalibar (1), August 2006.

***Stenus morio* GRAVENHORST 1806**

M a t e r i a l : West Azarbayjan province: Ourmieh (2), August 2005. East Azarbayjan province: Horand (1), October 2006.

***Stenus paludicola* KIESENWETTER 1858**

M a t e r i a l : Ardabil province: Ardabil (1), June 2004.

***Stenus stigmula* ERICHSON 1840**

M a t e r i a l : East Azarbayjan province: Kalibar (3), August 2006.

Subfamily P a e d e r i n a e FLEMING 1821

Tribe P a e d e r i n i FLEMING 1821

Subtribe C r y p t o b i i n a CASEY 1905

Genus *Cryptobium* MANNERHEIM 1830

***Cryptobium fracticorne* (PAYKULL 1800)**

M a t e r i a l : East Azarbayjan province: Khomarloo (2), September 2005.

Subtribe L a t h r o b i i n a LAPORTE 1835

Genus *Lobrathium* MULSANT & REY 1878

***Lobrathium rugipenne* (HOCHHUTH 1851)**

M a t e r i a l : East Azarbayjan province: Aras boundary (4), September 2006.

Genus *Lathrobium* GRAVENHORST 1802

***Lathrobium furcatum* CZWALINA 1888**

M a t e r i a l : East Azarbayjan province: Ahar (1), September 2005.

Genus *Scymbalium* ERICHSON 1839

***Scymbalium minimum* EPPELSHEIM 1888**

M a t e r i a l : East Azarbayjan province: Aynalo (3), June 2006.

Subtribe M e d o n i n a CASEY 1905

Genus *Medon* STEPHENS 1833

***Medon fusculus* (MANNERHEIM 1830)**

M a t e r i a l : West Azarbayjan province: Ourmieh (2), August 2003. Khodafarin (1), July 2006.

***Medon semiobscurus* (FAUVEL 1875)**

M a t e r i a l : East Azarbayjan province: Horand (1), October 2006.

Subfamily S t a p h y l i n i n a e LATREILLE 1802

Tribe P l a t y p r o s o p i n i LYNCH ARRIBÁLZAGA 1884

Genus *P l a t y p r o s o p u s* MANNERHEIM 1830

***Platyprosopus hierochonticus* REICHE & SAULCY 1856**

M a t e r i a l : East Azarbayjan province: Ahar (1), July 2005.

Tribe S t a p h y l i n i n i LATREILLE 1802

Subtribe P h i l o n t h i n a KIRBY 1837

Genus *Gabronthus* TOTTENHAM 1955

***Gabronthus thermarum* (AUBÈ 1850)**

M a t e r i a l : East Azarbayjan province: Khomarloo (2), September 2005.

Genus *Philonthus* STEPHENS 1829

***Philonthus minutus* BOHEMAN 1848**

M a t e r i a l : East Azarbayjan province: Abshahmad (1), June 2006.

***Philonthus splendens splendens* (FABRICIUS 1793)**

M a t e r i a l : West Azarbayjan province: Ourmieh (2), August 2005. East Azarbayjan province: Kalibar (1), August 2006.

Subtribe Q u e d i i n a KRAATZ 1857

Genus *Quedius* STEPHENS 1829

***Quedius atricapillus* REITTER 1900**

M a t e r i a l : Ardabil province: Ardabil (1), June 2004.

***Quedius lucidulus* ERICHSON 1839**

M a t e r i a l : West Azarbayjan province: Salmas (3), July 2004.

Quedius ochripennis **(MÉNÉTRIÉS 1802)**

M a t e r i a l : East Azarbayjan province: Khodaafrin (1), July 2007.

Tribe X a n t h o l i n i n i ERICHSON 1839

Genus *Gyrohypnus* LEACH 1819

Gauropterus punctulatus **(PAYKULL 1789)**

M a t e r i a l : East Azarbayjan province: Aras boundary (1), September 2006.

Genus *Nudobius* THOMSON 1860

Nudobius lentus **(GRAVENHORST 1806)**

M a t e r i a l : West Azarbayjan province: Ourmieh (2), August 2005. East Azarbayjan province: Horand (1), October 2006.

Discussion

The result of this research indicated that there is a rich biodiversity for rove beetles in Arasbaran and vicinity. In the present study, a total of 86 staphylinid specimens were collected from Arasbaran and adjacent counties of Northwestern Iran. Among the mentioned specimens, 45 species from 33 genera and 10 families (Omaliinae, Proteininae, Pselaphinae, Tachyporinae, Aleocharinae, Oxytelinae, Scaphidiinae, Steninae, Paederinae, Staphylininae) were determined. Arasbaran is a large and diverse area with an unknown fauna still close of borders three countries including, Armenia, Azerbaijan and nearly Turkey. Future studies on Staphylinidae, especially the subfamilies not included in this paper, should result new interesting findings such new records and new species for Iran.

Biodiversity can be defined as a wide variety of living organisms in their natural environment. Today most societies are aware of activities that threaten biodiversity and are acting to reduce the risks. Because production increases require either agricultural expansion or intensified production within existing areas, the two broad areas of concern are the effects of conversion of natural habitat to agriculture and the effects of agricultural intensification. Habitat conversion is particularly harmful to biodiversity, since it substantially modifies natural areas. Agricultural landscapes also contain biodiversity, however, and intensification of land use can affect this remaining biodiversity. In each case, effects experienced on-site must be distinguished from effects experienced off-site; agriculture can have effects far beyond the area actually cultivated (BAMBARADENIYA & AMERASINGHE 2003; GHAHARI et al. 2008).

Current patterns of agricultural development are undermining biodiversity and the many valuable services it provides. By destroying threatens the survival of many species, some of which are valuable in themselves and some of which are critical to ecosystem functions. Conversion or modification of natural habitats for agricultural use also affects the services provided by ecosystems and their stability and resilience.

Agriculture is highly dependent on ecosystem products and services, including genetic information for development of new crop varieties, crop pollination, soil fertility services provided by microorganisms, and pest control services provided by insects and wildlife. Yet agricultural practices often threaten the ecosystem's ability to continue providing

these services, thus jeopardizing the long-term sustainability of agricultural production (BOWMAN 1995).

Preventing loss or damage to biodiversity can be an important means to enhance agricultural production and development. For example, ecosystem resilience within agricultural landscapes may be safeguarded by maintaining spatial biodiversity (using relatively large numbers of species, preferably with significant genetic variation within each crop) and temporal biodiversity (frequently changing crops or varieties). Likewise, soil health may be maintained through the use of intercropping, cover crops, and increased use of manure and crop residues. Conversion of natural habitats and changes in agricultural landscapes can result in substantial reductions in biodiversity. These changes also bring benefits in the form of increased agricultural production. In some cases, the benefits may exceed the costs of biodiversity loss, making the trade-off a favorable one from a societal perspective. In others, the costs to society resulting from the reduction in biodiversity exceed the benefits obtained from increased production of food and fibre (MCNEELY et al. 1990; OLDFIELD & ALCORN 1991; MYERS 1993).

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Zusammenfassung

Die Kurzflüglerfauna (Coleoptera: Staphylinoidea: Staphylinidae) des Naturschutzgebietes Arasbaran und Umgebung im Nordwesten Irans wurde untersucht. 45 Arten aus 33 Gattungen der 10 Unterfamilien Omaliinae, Proteininae, Pselaphinae, Tachyporinae, Aleocharinae, Oxytelinae, Scaphidiinae, Steninae, Paederinae sowie Staphylininae wurden nachgewiesen.

References

BAMBARADENIYA C.N.B. & F.P. AMERASINGHE (2003): Biodiversity associated with the rice field agro-ecosystem in Asian countries: a brief review. — International Water Management Institute, Working paper **63**, 29 pp.

BLACKWELDER R.E. (1952): The generic names of the beetle family Staphylinidae: with an essay on genotypy. — U.S. National Museum Bulletin **200**, pp. iv+483.

BOWMAN D.M.S.J. (1995): So what is biodiversity? — The Biodiversity Letter **1**: 1 pp.

COIFFAIT H. (1978): Coléoptères Staphylinidae de la region paléarctique occidentale. III Sous famille Staphylininae Tribu Quediini Sous famille Paederinae Tribu Pinophilini. — Nouvelle Revue d'Entomologie 6 (supplément): 1-364.

GHAHARI H., HAYAT R., TABARI M., OSTOVAN H. & IMANI S. (2008): A contribution to the predator and parasitoid fauna of rice pests in Iran, and a discussion on the biodiversity and IPM in rice fields. Linzer biol. Beitr. **40/1**: 735-764.

HERMAN L.H. (2001): Catalog of the Staphylinidae (Insecta, Coleoptera): 1758 to the end of the Second Millennium. — Bulletin of the American Museum of Natural History **265**: vi+4218 pp.

LÖBL I. (1997): Catalogue of the Scaphidiinae (Coleoptera: Staphylinidae). — Geneva: Muséum d'Histoire Naturelle de Genève, 190 pp.

LÖBL I. & A. SMETANA (2004): Catalogue of Palaearctic Coleoptera. Vol. 2, Hydrophiloidea - Histeroidea-Staphylinoidea. Stenstrup: Apollo Books, 942 pp.

LOTT D.A. (2008): Staphylinidae. — In: DUFF A.G. (ed.), Checklist of Beetles of the British Isles, 2008 edition. Wells: A.G. Duff.

MCNEELY J.A., MILLER K., REID W. MITTERMEIER R. & T. WERNER (1990): Conserving the World's Biological Diversity Gland: IUCN. United Nations Environment Program (UNEP). 1995. Global Biodiversity Assessment. Cambridge: Cambridge University Press.

MYERS N. (1993): Biodiversity and the precautionary principle. — Ambio **22**: 2-3.

NEWTON A.F. & M.K. THAYER (1995): Protopselaphinae new subfamily for Protopselaphus new genus from Malaysia, with a phylogenetic analysis and review of of the Omaliinae group of Staphylinidae including Pselaphidae (Coleoptera). — In: PAKALUK J. & S.A. SLIPINSKI (eds) Biology, Phylogeny and Classification of Coleoptera. Museum of the Zoological Institute PAN, Warsaw: pp. 219-320.

OLDFIELD M.L. & J.B. ALCORN (1991): Biodiversity: Culture, Conservation, and Ecodevelopment. Boulder: Westview Press.

POPE R.D. (1977): Kloet and Hincks. A Check List of British Insects. Second edition (completely revised). Part 3: Coleoptera and Strepsiptera. — Handbooks for the Identification of British Insects **11**, xiv+105 pp.

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