The first records of the subfamily Beridinae (Diptera: Stratiomyidae) from Iran

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Abstract

Based on collected specimens from Arasbaran Forests during 2013, four species belonging to 3 genera of the subfamily Beridinae (Diptera; Stratiomyidae) [Actina chalybea Meigen, 1804; Beris schaposchnikowi Pleske, 1926; Beris clavipes (Linnaeus, 1767) and Chorisops nagatomii Rozkošný, 1979] were recognised, which are recorded for the first time from Iran. A key to the studied species is provided, as well as diagnostic characters along with photos of the studied species; their geographical distributions are discussed.

Introduction

Soldier flies of the subfamily Beridinae are small to moderate sized flies and have a worldwide distribution (Woodley, 2011). This subfamily includes more than 30 known species in the Palearctic region (Woodley, 2011). Beridinae generally prefer rather shaded places in damp woods; few known larvae live in moss, leaf litter, and upper layers of soil (Rozkošný, 1983). Adults feed on nectar and pollen of flowers; in numerous species, males have been seen forming mating swarms (Rozkošný, 1998).

Materials and methods

This study was conducted in Arasbaran Forests during 2013. Arasbaran is a registered biosphere in East Azerbaijan province, northern Iran (Figure 1) and located at 38° 40’ 22.054” to 39° 08’ 24.235” N; 46° 39’ 21.023” to 47° 02’ 20.125” E. This area has semi-arid steppes, rangelands and forests, rivers and springs with an altitude varying from 256 m to 2896 m, and covering an area of 78,560 hectares. It has been registered as a world heritage site by UNESCO since 1976. Specimens were collected using a sweep net. Collected specimens were killed in killing jars with cyanide. During collecting, the collection date, locality name and altitude were noted for every specimen. Some of the specimens were pinned with 00 and 000 mounted pins, dried, and put into collection boxes, and others were kept in 75% ethanol. All specimens are deposited in the Insect Museum of Tabriz University (IMTU). In order to identify specimens, reference was made to Rozkošný & Nartshuk (1980); Bei-Bienko (1988); Rozkošný (1983) and Mason (2013). The general distribution for each species was followed by Pape & Thompson (2011) and Woodley (2001).

Results

A total of 4 species belonging to 3 genera of the subfamily Beridinae, Actina chalybea Meigen, 1804; Beris schaposchnikovi Pleske, 1926; Beris clavipes (Linnaeus, 1767) and Chorisops nagatomii Rozkošný, 1979, are identified. All studied species are newly recorded for the Iranian insect fauna.
Figure 1. *Actina chalybaea* Meigen, 1804; A) dorsal view of male, B) dorsal view of female; C) lateral view of male, D) lateral view of female, E) dorsal view of head (male), F) wing venation (male), G) male genitalia, H) female terminalia.
Key to the studied species of the subfamily Beridinae

i) Palpi absent or very small; male eyes contiguous; M; absent (Beris Latreille): 2

- Palpi well-developed, three-segmented; male eyes separated; M; present: 3

ii) Ground colour of abdomen orange to yellowish brown, with a dark brown preapical transverse stripe on each tergite (Figure 2A and B); male genitalia as in Figure 2G: B. clavipes (Linnaeus)

- Ground colour of abdomen brown or black (Figure 3A and B); male genitalia as in Figure 3G: B. schaposnikowi (Pleske)

iii) Legs mainly black (in European species) (Figure 1C and D); male frons and face with long black hairs; wing-membrane entirely covered with dense microtrichia (Actina Meigen) (Figure 1F); epandrium very narrow, median process of synsternum poorly developed, covered with small spines on inner surface, parameres rather slender, longer than aedeagus (Figure 1G): A. chalybea Meigen

- Legs predominantly yellow (Figure 4B); frons and face with only very short pale hairs; cells bm and Cu partly bare, with reduced wing microtrichia (Figure 4C) (Chorisops Rondani): abdomen with an extensive yellow pattern (Figure 4A); genitalia as Figure 4F: C. nagatomii Rozkošný

List of studied species

Genus Actina Meigen, 1804

Actina chalybea Meigen, 1804

MATERIAL EXAMINED: (15♂♀, 10♂♂): Chichekli (located in west part of Qaradagh forests), 38° 40’ 58.68” N, 46° 31’ 53.64” E, 2243 m, 4 Jun 2013; (6♂♀, 4♂♂): Aynali region (located in almost west of Qaradagh forests), 38° 40’ 58.68” N, 46° 31’ 53.64” E, 2243 m, 4 Jun 2013; leg. S. Khaghaninia.

DIAGNOSTIC CHARACTERS: Body pile pale yellow, legs mainly yellow; abdominal tergites 2-5 virtually without pollen.

MALE: antennae inserted just below middle of head profile (Figure 3E); eyes contiguous with short and dense hairs; thorax shining black, metallic green on mesonotum, edges of numeri yellowish and postalar cali brownish; scutellum with 6 spines; legs mainly pale yellow, but fore and hind coxae black; hind tibiae entirely yellow, hind basitarsus long but not swollen as in male (Figure 2D); haltere yellow; abdomen ochre-yellow, including base, the black preapical lines distinct (Figure 2B); female terminalia as in Figure 2H.

FEMALE: eyes with very short but relatively dense pale hairs; frons and face black, subshining, with dense but short, yellowish hairs; thorax shining black with pale pile yellow, metallic green reflections on mesonotum and scutellum; legs yellow, darkened only on fore coxae and all tarsi, but hind basitarsus yellow (Figure 3D); wings almost hyaline, all veins pale yellow, only pterostigma dark brown (Figure 3B); abdomen shining brown, only 1st tergite and the narrow anterior margin of tergite 2 greyish dusted, other tergites virtually without any pollen (Figure 3B); female terminalia as in Figure 3H.

Genus Chorisops Rondani, 1856

Chorisops nagatomii Rozkošný, 1979

MATERIAL EXAMINED: (19): Oskulu region (located in near center of Qaradagh forests); 38° 51’ 48.78” N, 46° 50’ 45.54” E, 1667 m, 02 Aug 2009; leg. Khaghaninia.

DIAGNOSTIC CHARACTERS: pterostigma usually pale, yellow (Figure 4C); abdominal tergites mainly yellow (Figure 4A), two basal segments also with dorsal yellow patches; wing with bare area in cell Cu extending beyond cubital fork; male sternum without median
Figure 2. *Beris clavipes* (Linnaeus, 1767); A) dorsal view of male, B) dorsal view of female, C) lateral view of male, D) lateral view of female, E) dorsal view of head, F) wing venation, G) male genitalia, H) female terminalia.
Figure 3. *Beris schaposchnikowi* Pleske, 1926; A) dorsal view of male, B) dorsal view of female, C) lateral view of male, D) lateral view of female, E) dorsal view of head, F) wing venation, G) male genitalia, H) female terminalia.
process (Figure 4F).

MALE: face entirely whitish pollinose; antennae about as long as head in lateral view, black inner part of pedicel and first segments of flagellomere yellow, inserted slightly above middle of head, last flagellomere cylindrical (Figure 4D); thorax dark, metallic green to shining violet with yellowish pile; humeri, postalarcalli and scutellar spines contrasting yellow (Figure 4E); Legs mainly yellow including coxae, hind femur thickened in apical half and darkened except basal part, hind tibia brown, except for base, elongate-conical, gradually thickened towards apex, all tarsi brown, only posterior basitarsus yellowish basally to varying degrees (Figure 4B); wings hyaline with pale brown veins and pale pterostigma, vein M reduced (Figure 4C); halteres pale yellow; abdomen subshining brown in ground-colour, tergites 3-6 with extensive yellow median patches that only leave the lateral margins brown, narrow preapical transverse lines distinct at tergites 3-6, posterior margins of tergite 6 darkened (Figure 4A); male genitalia as in Figure 4F.

Discussion and conclusions

Woodley (1995) studied the relationships of the 33 genera of
Beridinae based on 22 adult morphological characters, using a parsimony analysis and as a result of this analysis, the subfamily was divided into the Beris and Actina groups. Among the studied species in this study, the species of the genus Beris are grouped in the Beris group and the species of the genera Actina and Chorisops are situated in the Actina group.

All studied species were collected from forest areas. Rozkošný (1998) stated that A. chalybea is common in open lowland deciduous forest and B. clavipes was found in wet moss near a spring, adults are rather frequent on the leaves of shrubs and low foliage near springs and streams; also, C. nagatomii was found in refuse washed up in a muddy stream.

Rozkošný (1998) noted that B. schaposchnikowi is probably restricted to the Caucasian region and our records extend the range of distribution of this species in the region.

Fauna of the subfamily Beridinae in adjacent countries like Turkey has been poorly studied (Üstüner & Hasbenli, 2003; Üstüner & Hasbenli, 2011). Comparing these studies with the results of the present study, it can be concluded that fauna of this subfamily in the Arasbaran Forests is relatively rich, and further studies are necessary in these forests and other forests in northern Iran.

References

BEI-BIENKO, G., 1988 - Keys to the insects of the European part of the USSR (Vol. V). Diptera and Siphonaptera (Part II). - Smithsonian Institution Libraries and the National Science Foundation, Washington DC: 987 pp.

MASON F., 2013 - Updated Italian checklist of Soldier Flies (Diptera, Stratiomyidae). - ZooKeys. 336: 61-78.

NAGATOMI A., TANAKA A., 1972 - The Japanese Beris (Diptera, Stratiomyidae). - Mem. Fac. Agric. Kagoshima Univ. 8: 87-113.

PAPE T., THOMPSON F.C., 2011 - Systema Dipterorum. Version 2.0. Available from: http://www.diptera.org Accessed: 20 Jul 2013.

ROZKOŠNÝ R., 1979 - Revision of the Palaeartic species of Chorisops, including the descriptions of a new species (Diptera, Stratiomyidae). - Acta Ent. Bohem. 76: 127-136.

ROZKOŠNÝ R., NARTSHUK E.P., 1980 - Two new species of Beris, with a key to the Palaeartic species of the genus (Diptera, Stratiomyidae). - Acta Ent. Bohem. 77: 408-418.

ROZKOŠNÝ R., 1983 - A biosystematic study of the European Stratiomyidae (Diptera), Introduction, Beridinae, Sarginae and Stratiomyinae (vol. 1). - Series Entomologica, Hague: 401 pp.

ROZKOŠNÝ R., 1998 - Family Stratiomyidae. Manual of Palaeartic Diptera (Chapter 24). - Science Herald, Budapest: 387-411.

ÜSTÜNER T., HASBENLI A., 2003 - First record of the Subfamily Beridinae (Diptera: Stratiomyidae) from Turkey. - Studia Dipterologica. 10: 186-188.

ÜSTÜNER T., HASBENLI A., 2011 - The first record for two species of the soldier flies (Diptera: Stratiomyidae) from Turkey. - J. Agr. Sci. Tec. 1: 231-237.

WOODLEY N.E., 1981 - A revision of the Nearctic Beridinae (Diptera: Stratiomyidae). - Bull. Mus. Comp. Zool. 149: 319-367.

WOODLEY N.E., 1987 - The Afrotropical Beridinae (Diptera: Stratiomyidae). - Ann. Natal. Mus. 28: 119-131.

WOODLEY N.E., 1995 - The genera of Beridinae (Diptera: Stratiomyidae). - Mem. Proc. Entomol. Soc. Wash. 16: 1-231.

WOODLEY N.E., 2001 - A world catalog of the Stratiomyidae (Insecta: Diptera). - North American Dipterists' Society, Washington, DC: 475 pp.

WOODLEY N.E., 2011 - A world catalog of the Stratiomyidae (Insecta: Diptera): a supplement with revisionary notes and errata. In: THOMPSON F.C., BRAKE I., LONSDALE O. (Eds.), Contributions to the biosystematic database of world Diptera. III ed. - MYIA, Sofia-Moscow: 485-521.

YANG D., NAGATOMI A., 1992 - A study on the Chinese Beridinae (Diptera: Stratiomyidae). - S. Pac. Stud. 12: 129-178.