

Abstract

Bumblebees (genus *Bombus*) belong to family Apidae and superfamily Apoidea. The world bumblebee fauna consists of approximately 250 known species. These bees live in different parts of the world such as mountainous parts of Iran and they are known as important pollinators of natural and greenhouse plants. During lately decade, there have been some modifications in classification of these bees such as justifying in number of subgenera to 15 subgenera and some species names known as synonyms and called as one species name. During years 2008 to 2015 by sampling from various regions of Iran, more localities of living area of these bees determined. These regions were in provinces of Kohgiluyeh & Boyer Ahmad (Kakan, Sisakht), Fars (Sepidan, Sarbast), Chaharmahal & Bakhtiari (Cheshmeh Shaykhalikhan, Baba Haidar, Farsan) and West Azarbaydjan (Urmia, Silvana). Also in these samplings most of casts of various species were completed which now deposited in Iranian Pollinator Insects Museum, in faculty of Agriculture of Yasouj University. Confirmations of species of new records for Iranian bumblebees carried out by Pierre Rasmont in Laboratory of Zoology of Mons University, Belgium. New records were *B. (Melanobombus) sichelii* B. (*Psithyrus*) *rupestris* and *B. (Thoracobombus) velox*. The first species, *B. (Ml.) sichelii*, was collected from Tehran (Dizin), Golestan (Gorgan, Shah kuh), Ardabil (Sabalan, Alvares, Sarein, Moeil), Ghazvin (Moalem kelayeh, Verk). The second species, *B. (Ps.) rupestris*, was collected from Ghazvin (Moalem kelayeh, Verk), and the third one, *B. (Th.) velox*, collected from Alborz (Chalous road, Kamarbon, Ileka), Ghazvin (Moalem kelayeh, Verk). According to the last changing in taxonomy of bumblebees by now existence of 34 species and 11 subgenera in Iran are confirmed. Final list of these bees is as bellows. Furthermore, specimens of *B. (Mendacibombus) handlirschianus* which is a rare species and only had been recorded from north of Iran by Skorikov in 1938 were collected from Ardabil Province (Moeil, Alvares, Shabil, and Kasra mountains).

Introduction

Bumblebees are crucial pollinators of both crops and native wildflowers. Thus, it is alarming that significant bumblebee declines have been documented in many parts of the world (Williams et al. 2009, Williams and Osborne 2009). The species number of bumblebees in the world, China more than (50), Europe (65), Great British (25), Poland (37), Turkey (49), France (46), Australia (45), Finland (28), Islands (1), Cyprus (2) (Iserbyt et al., 2008), Syria (3) (Khalid et al., 2012). Dombai region in the Caucasus Teberda 19 species (Dathe), United States (49), California, American with 26 species (Thorpe et al., 1983), north America (46) (www.bumblebee.org/NorthAmerica.htm). 47 species, Turkey is considered to be one of the countries with the highest species richness in the West-Palaearctic region (Aytekin et al., 2007). First research in Iran Pittioni (1937), Skorikov (1938), Reinig (1939), Popov (1967), Rasmont (1983), Baker (1996), Williams (1998). 32 bumblebee species (28 true bumblebees and 4 cuckoo bumblebees) have been reported from Iran. *B. (Ps.) maxillosus* and *B. (Ps.) sylvestris* are reported from Iran for the first time (Monfared et al., 2007). In Chaharmahal and Bakhtiari (Baba Haidar, Kuhrang, Abshar, Chelgerd, and Cheshmehshaykhalikhan), These bumblebees were identified as: *B. (Sb.) niveatus*, *B. armeniacus*, *B. zonatus*, *B. (Mg.) argillaceus*, *B. (Mg.) portchinsky*, *B. (Th.) ruderarius*, and *B. zonatus*. In the northwest of Fars (Saran plains and Sepidan), Three species were recorded: *B. (Sb.) niveatus*, *B. (Th.) armeniacus* and *B. (Th.) zonatus*. In Zanjan province, a survey collected seven bumblebee species from one new locality. The species included: *B. argillaceus*, *B. zonatus* (both yellow- and white-banded patterns), *B. niveatus* (both yellow- and white-banded patterns), *B. armeniacus*, *B. maxillosus*, *B. persicus*, and *B. fragrans* (Monfared et al., Report IUCN, 2013). *Bombus (Md.) handlirschianus* (Vogt, 1909), Little is known on this strictly alpine species. It lives in the highest alpine steppes of Anatolia, Transcaucasia, Caucasus and N. Iran (Rasmont and Iserbyt, 2010-2013).

Materials and Methods

By samplings of various regions of Iran areas in spring and summer of 2008 to 2015 bees were collected from the provinces of: Ardabil, Ghazvin, Mazandaran, Guilan, Kohgiluyeh & Boyerahmad, Azarbijan Gharbi and Tehran, etc. Following sampling bumblebees were killed with ethyl acetate and later mounting procedures were done in laboratory. Sampling locations were recorded by Garmin eTrix Hc GPS. After collecting, bumblebees identified to subgenera and species were deposited in the "Iranian Pollinator Insects Museum", of Plant Protection Group at the faculty of Agriculture, Yasouj University, Iran (Figs 1-2, 8). Then final identifications and confirmations on species carried out in Mons University, Belgium, during a professor visit with Prof. P. Rasmont.



Fig 1. Pictures of sampling Forage plants (a = *Salvia* sp., b = *Trifolium* sp., c = *Stachys* sp., d = *Echinops* sp.) on which specimens were collected.



Fig 2. a) Sampling, b) Iranian pollinator Insect Museum

Results

In this study, samples were collected of *Bombus* 11 subgenus 34 species.

Species diagnosis:

Bombus (Melanobombus) sichelii (Radoszkowski, 1859)

Thorax collar and scutellum white, Between the base of the wing black; head black hairs and some white hairs; Metasoma (abdomen) T1-2 white, T3 black, T 4-6 red-orange; Mid basitarsus with the distal posterior corner as without narrow tooth or spine (Fig 3,4). Male: Thorax collar and scutellum white hairs, Between the base of the wing black; Genitalia, Volsella with the inner distal process forming a broad short stump; Metasoma (abdomen) T1-2 white, T3 black, T4-6 yellow or orange; Head white hairs (Fig 5).

Bombus (Psithyrus) rupestris (Fabricius, 1793)

Length 2.40, wingspan 2.80; Thorax collar and scutellum yellow, Between the base of the wing black; Wings dark; Metasoma (abdomen) T1-3 black, T4-6 orange-red; Hind tibia with the outer surface covered with long hairs; Callosities V-shaped; head black hairs (Fig 6).

Bombus (Thoracobombus) velox (Skorikov, 1914)

Thorax collar and scutellum yellow long hairs, Between the base of the wing black; head yellow hairs; Metasoma (abdomen) T1-6 yellow long hairs; Mid basitarsus with the distal posterior corner as narrow tooth or spine (Fig 7).



Fig 3. *B. (Ml.) sichelii* (Queen) a, b) Full body shape, c) Face, d) Metasoma (abdomen), e) Basitarsus of middle legs, f) Tibia of hind leg.

Fig 4. *B. (Ml.) sichelii* (Worker) a, b, d) Full body shape, c) Face, e) Tibia of hind leg, f) Basitarsus of middle legs.



Fig 5. *B. (Ml.) sichelii* (Male) a, b) Full body shape, c) Genitalia, d) Face, e) Mandible, f) Gonostylus and volsella.



Fig 6. *B. (Ps.) rupestris* (Female) a) Full body shape, b) Thorax, c) Metasoma (abdomen), d) Tibia of hind leg, e) callosities, f) Face.



Fig 7. *B. (Th.) velox* (Female) a, b) Full body shape, c) Face, d) Thorax, e) Metasoma (abdomen), f) Basitarsus of middle leg, e) Tibia of hind leg.



Fig 8. First author in Mons University during a Professor visit due to an invitation by Prof. Pierre Rasmont: working on bumblebees in Lab of zoology in Mon and visiting Paris Natural History Museum with students.

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