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Identification and Distribution of Bumblebees (Hymenoptera: Apidae, *Bombus* spp.) in Central Elburz Mountains of Iran

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Abstract

The Bumblebees (*Bombus* spp.) are important pollinators of agriculture crops and also pastures plants in the mountain regions. Because of their vital role in pollination and increasing the farm and greenhouses productions, During the last years, their commercial rearing were done in some countries. Because of less information about bombus spp In Iran, this research was carried out to supply suitable background for using the bumblebees in farm and specialy in the greenhouses. Species of bumble bees were collected in the different regions of central Elburz consist of Qazvin, Tehran, Mazandaran and Guilan provinces. Collected speciements (samples) were identified by morphological characteristics especially reproductive system of male and female, consist of seventh and eight sternite of males and sting sheath of females. After prelminary identification, the samples were sent to natural history museum of London and finally identifications were approved by Dr. Paul H. Williams the world specialist of bumblebees in museum. After final confirmation of bumblebees species the determination key was provided by drawn figures that indicated color models consist of head, thorax and abdomen coloration at back body of samples. Totally 16 species consist

of 16 species of *Bombus* (including *Psithyrus*) of 10 subgenera were identified in the central Elburz. *Bombus* (*Psithyrus*) *sylvestris* is a new species of Iran and has reported for first time. Identified species were consisting of: *Bombus terrestris* (LINNAEUS), *Bombus lucorum* (LINNAEUS), *Bombus persicus* RADOSZKOWSKY, *Bombus niveatus* KRIECHBAUMER, *Bombus haematurus* KRIECHBAUMER, *Bombus argillaceus* (SCOPOLI), *Bombus hortorum* (LINNAEUS), *Bombus humilis* ILLIGER, *Bombus ruderarius* (MÜLLER), *Bombus sylvarum* (LINNAEUS), *Bombus zonatus* SMITH, *Bombus incertus* MORAWITZ, *Bombus subterraneus* (LINNAEUS), *Bombus mesomelas* GERSTAECKER, *Bombus vestalis* (GEOFFROY), *Bombus sylvestris* (LEPELETIER).

Key words: Bumblebee, Pollinator, *Bombus*, identification, distribution, Central Elburz, Iran.

Introduction

The bumblebees '*Bombus* spp. (Apidae, Hymenoptera)' are known as important pollinators. Body skeleton of bumblebees almost are blacked and covered with shaggy hairs and various color band (WILLIAMS et al. 1987). *Bombus* genus has 250 know species in the world (WILLIAMS 1998). Except of social parasite species other bees are real eusocial. Most species of bumblebees lives under ground and free nest of rodents and birds (ALFORD 1975, MICHENER 2000). These bees are dependent the nectar and pollen plants because of their nutrition behavior. Bumblebees rearing were done in different countries because of their importance of commercial crops pollination.

Asian countries have different species of bumblebees (WILLIAMS 1975). WILLIAMS (1991) mentioned the bumblebees exist in different places of the world even in cold and dry regions like Arctic regions. He reported 199 species in Asia, 85 species in Europe, 41 species in Northern America, 43 species in Mexico, Central and South America. HIROSHIMA (1989) and LEE & DUMONCHEL (2005) introduced 21 species of Japan and Korea. AYTEKIN & CAGATAY (2003) collected different bumblebees in central Anatolia and identified three subgenus consist of *Megabombus*, *Rodobombus* and *Thoracobombus*.

The first record of bumblebees in Iran related to PITTINONI (1937) and REINIG (1939), who listed some species of Elburz. SKORIKOV (1938) published short report on biogeography relationships of northern Iranian bumblebees. He reported 20 species of *Bombus* consist of some new records. POPOV (1967) introduced some species of *Bombus* and *Psithyrus* but without new records. ESMAILI & RASTEGAR (1974) reported eleven species of Iranian bumblebees including 2 new species but without more details about their localities and distributions.

Material and Methods

Collections

During 2005-2006, about 1.224 specimens were collected from the provinces of: Qazvin, Tehran, Mazandaran, and Guilan. Species of bumble bees were collected in the different regions of central Elburz consist of Qhazvin, Tehran, Mazandaran and Guilan provinces. Because much spread longitudinal central Elburz from west to east and much elevation have many role in assignment conditions wheather and habitat for Iran. Because of Bumblebees have exclusively daily activity and is selected regions with suitable cover plants and eliminated regions, therefore sampling is carried out in different times including morning and afternoon. Collecting method of sampling was using net swiming from differented flowers. Collections were mode during the period May-September by netting adults (♀, ☿ and ♂), wich spans much of their colony cycle in each region. All specimens were deposite in the museum of Institute researchs farm animal science (Honey bee Part) Karadj, Iran. Also a small collection of bumblebees held at the museum of the Department of Entomology, Tarbiat Modares University, was examined.

Identification

To find species recorded previously for the fauna of Iran, library and internet searches were carried out and other researchers contacted. So, we catch five important source reported Iranian bumblebees. These sources included PITTIONI (1938), SKORIKOV (1938), REINIG (1939), POPOV (1967), ESMAILI & RASTEGAR (1974) and BAKER (1996). Species identification was based on colour pattern, male and female genital morphology (genital capsule in male and sting sheath in Female), and on other diagnostic characters taken from keys from other regions [ALFORD 1975, MICHENER 2000, BENTON 2001 and INTOPPA 2003]. Species were identified by morphological characteristics specially reproductive system of male and female, consist of seventh and eight sternite of males and sting sheath of females. After primary identification, the samples were sent to Natural History Museum of London and finally identifications were approved by Dr. Paul H. Williams the world specialist of bumblebees in this museum.

Results

Totally 16 species consist of 14 species of *Bombus* (2 species of subgenus *Psithyrus*) of 10 subgenera were identified in the central Elburz that one species of *Bombus* (*B. sylvestris*) was a new species for Iran fauna. Identified species were consisting of:

Table 2: Localities of bumblebees' distribution in different provinces for every species.

No.	Species	Locations
1	*B. argillaceus*	Tehran (Sirachall, Damavand, Asara, Plur, Fasham, Zayegan, Karadj, Shahrestanak, Rasnan, Lalun, Chaharbagh, Niknamdeh, Lavasan) Mazandaran (Ielaka) Qazvin (Alamoot, Wikan, Rajaeedasht, Khosrude Alamoot, Zarabade Alamoot, Zereshk)
2	*B. haematurus*	Mazandaran (Sari, Baharestan) Guilan (Tonekabon,Goleijan,Kelachai,Sephidab, Aghughimahale) Qazvin (Alamoot, Tarome Hoseinabad)
3	*B. hortorum*	Qazvin (Werk)
4	*B. humilis*	Tehran (Tizkooh, Tange titaloon, Damavand) Mazandaran (Marzanabad, Ielaka, Duna) Qazvin (Alamoot, Wikan, Werk, Khosrude Alamoot, Zarabade Alamoot, Evan)
5	*B. incertus*	Tehran (Fasham, Zayegan, Damavand, Tizkooh, Plur) Qazvin (Alamoot, Evanak, Wikan)
6	*B. lucorum*	Tehran (Damavand, Karadj, Zayegan, Niknamdeh, Fasham) Mazandaran (Ielaka) Qazvin (Alamoot, Wikan, Khosrude Alamoot, Evan)
7	*B. mesomelas*	Qazvin (Alamoot, Wikan)
8	*B. niveatus*	Tehran (Fasham, Zayagan, Karadj, Shahrestanak) Mazandaran (Marzanabad, Ielaka) Qazvin (Alamoot, Wikan)
9	*B. persicus*	Tehran (Karaj, Fasham, Zayegan, Lalun, Naserabad, Sade Larr, Asara, Sirachall, Chaharbagh, Damavand, Shahrestanak) Mazandaran (Kamarbon, Marzanabad,Gachsar, Duna) Qazvin (Alamoot, Wikan, Khosrude Alamoot, Evan)
10	*B. ruderarius*	Tehran (Fasham, Zayegan, Damavand, Plur) Qazvin (Alamoot, Wikan, Evanak)
11	*B. subterraneus*	Tehran (Damavand, Tizkooh, Tange titaloon) Qazvin (Alamoot, Zereshk, Wikan)
12	*B. sylvarum*	Tehran (Karadj, Shahrestanak, Fasham, Zayegan) Qazvin (Alamoot, Werk, Zarabade Alamoot)
13	*B. terrestris*	Mazandaran (Marzanabad, Ielaka, Duna, Pole Zangule) Tehran (Damavand, Zayegan, Jajrood, Sade Larr, Sorkhedeh, Karadj, Shahrestanak, Golabdareh, Tizkooh, Asara, Rudehen, Naserabad, Chaharbagh, Niknamdeh) Guilan (Sephidab, Kelachai) Qazvin (Alamoot, Wikan, Werk, Ferdose Tarom, Pichebon)
14	*B. zonatus*	Tehran (Fasham, Zayagan) Qazvin (Alamoot, Zereshk, Sialan, Rajaeedasht)
15	*B.* (*P.*) *vestalis*	Tehran (Fasham, Zayagan, Damavand, Tizkooh) Qazvin (Alamoot, Wikan) Mazandaran (Ielaka)
16	*B.* (*P.*) *sylvestris*	Semnan (Shahrood, Abr Forest) Mazandaran (Gachsar)

***Bombus* (*Bombus*) *terrestris* (LINNAEUS, 1758)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Wikan, 2050 m, 2.VIII.2005, 8♂♂ and 15☿☿. 16.IV.2006, 19♀♀. 12.V.2006, 17♀♀. 26.V.2006, 2♀♀ and 1☿. 23.VI.2006, 11☿☿. 30.VII.2006, 2♀♀ and 6☿☿ and 8♂♂. 10.VIII.2006, 8♂♂. 19.IX.2006, 1♀; Alamoot, Rajaeedasht, 1300 m, 25.VII.2005, 1♀. 2.VIII.2005, 2♂♂; Alamoot, Werk, 2000 m, 25.VII.2005, 1♀; Alamoot, Evan, 1420 m, 25.VII.2005, 2♂♂; Alamoot, Ferdose Tarom, 2300 m, 5.VIII.2005, 2♂♂; Alamoot, Pichebon, 2650 m, 16.VI.2005, 1☿; Tehran: Fasham, Zayegan, 2407 m, 1.V.2006, 10♀♀. 24.V.2006, 7♀♀. 4.VI.2006, 8♀♀. 5.VII.2006, 3☿☿. 17.VII.2006, 5♀♀ and 4☿☿ and 6♂♂. 26.VIII.2006, 1♀ and 3☿☿ and 2♂♂. 1.VIII.2006, 6☿☿ and 3♂♂. 12.VIII.2006, 3☿☿ and 4♂♂; Damavand, Sade Larr, 2000 m, 28.V.2006, 6♀♀; Damavand, Plur, 2150 m, 19.V.2006, 4♀♀; Damavand, Sorkhedeh, 2192 m, 19.V.2006, 3♀♀; Karadj, Shahrestanak, 2184 m, 13.IV.2006, 2♀♀. 21.VIII.2005, 2☿☿; Darband, Golabdareh, 2100 m, 21.VIII.2006, 1♀; Damavand, Tizkooh, 3200 m, 29.V.2006, 1♀; Karadj, Asara, 2190 m, 19.VII.2006, 5☿☿; Damavand, Rudehen, 1820 m, 21.VII.2006, 6☿☿; Lavasan, Naserabad, 2850 m, 1.VIII.2006, 2☿☿; Jajrood, Chaharbagh, 2020 m, 26.VI.2006, 1☿. 18.VII.2006, 2♂♂; Jajrood, Niknamdeh, 1940 m, 18.VII.2006, 3♂♂. Guilan: Kelachai, Sephidab, 1370 m, 28.IV.2006, 5☿☿; Kelachai, 1200 m, 28.IV.2006, 3☿☿. Mazandaran: Marzanabad, 553 m, 9.V.2006, 3♀♀; Chaloos Road, Polezangule, 2350 m, 9.V.2006, 1♀; Chaloos Road, Duna, 2450 m, 9.V.2006, 2♀♀; Chaloos Road, Ielaka, 2550 m, 9.V.2006, 1♀.

***Bombus* (*Bombus*) *lucorum* (LINNAEUS, 1761)**

D i s t r i b u t i o n : Palaearctic, Arctic, Oriental, Japanese, W Nearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Wikan, 2050 m, 2.VIII.2006, 6♂♂. 14.VI.2006, 1♀. 26.V.2006, 1♀ and 3☿☿. 23.VI.2006, 3☿☿. 30.VII.2006, 1☿ and 9♂♂. 10.VIII.2006, 12♂♂. 19.IX.2006, 1♀; Alamoot, Evan, 1420 m, 1.IX.2005, 3♂♂; Alamoot, Ghestinlarr, 1600 m, 16.VIII.2005, 2♂♂; Alamoot, Zawarak, 1710 m, 16.VIII.2005, 1♂. Tehran: Fasham, Zayegan, 2407 m, 1.V.2006, 1♀. 24.V.2006, 1♀. 4.VI.2006, 1♀. 5.VII.2006, 1☿. 17.VII.2006, 1♀. 1.VIII.2006, 1♀ and 3♂♂. 12.VIII.2006, 1♀ and 1☿ and 6♂♂. 26.VIII.2006, 1☿ and 4♂♂. 17.IX.2006, 2♂♂; Jajrood, Niknamdeh, 1940 m, 18.VII.2006, 5♂♂. Mazandaran: Chaloos Road, Ielaka, 2550 m, 9.V.2006, 2♀♀.

***Bombus* (*Eversmannibombus*) *persicus* (RADOSZKOWSKY, 1881)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Wikan, 2050 m, 2.VIII.2005, 7☿☿ and 3♂♂. 13.V.2006, 2♀♀. 26.V.2006, 1♀. 23.VI.2006, 2♀♀ and 10☿☿. 30.VII.2006, 8☿☿ and 2♂♂. 10.VIII.2006, 1☿ and 9♂♂. 30.VII.2006, 7☿☿. 19.IX.2006, 5♂♂; Alamoot, Khosrude Alamoot, 1005 m, 8.V.2005, 1♀; Alamoot, Evan, 1420 m, 25.VII.2005, 4☿☿. 2.VII.2005, 4♂♂; Alamoot, Werk, 2000 m, 25.VII.2005, 6☿☿. Tehran: Fasham, Zayegan, 2407 m, 4.VI.2006, 4♀♀. 26.VI.2006, 3♀♀ and 11☿☿. 5.VII.2006, 7♀♀ and 33☿☿. 7.VII.2006, 49☿☿. 1.VIII.2006, 72☿☿ and 5♂♂. 12.VIII.2006, 1♀ and 25☿☿ and 26♂♂. 26.VIII.2006, 18☿☿ and 27♂♂. 17.IX.2006, 1☿; Fasham, 1966 m, 17.VII.2006, 3♂♂; Fasham, Lalun, 2460 m, 5.VII.2006, 3♀♀; Karadj, Shahrestanak, 2184 m, 9.V.2006, 2♀♀. 5.VIII.2006, 6☿☿; Lavasan, Naserabad, 2850 m, 24.VI.2006, 3♀♀; Damavand, Sadelarr, 2000 m, 28.X.2006, 1♀; Karadj, Asara, 2190 m, 5.VIII.2006, 2☿☿; Karadj, Sirachall, 2960 m, 5.VIII.2006, 2☿☿; Jajrood, Chaharbagh, 2020 m, 18.VII.2006, 3☿; Mazandaran: Chaloos Road, Kamarbon, 2810 m, 9.V.2006, 1♀; Marzanabad, 553 m, 9.V.2006, 1♀; Ielaka, 2550 m, 9.V.2006, 2♀♀; Chaloos Road, Duna, 2450 m, 9.V.2006, 7♀♀; Chaloos Road, Gachsar, 2250 m, 14.VII.2006, 4♂♂.

***Bombus* (*Sibiricobombus*) *niveatus* (KRIECHBAUMER, 1870)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Wikan, 2050 m, 2.VIII.2006, 1☿ and 3♂♂. 13.V.2006, 4♀♀. 7.VI.2006, 2♀♀ and 18☿☿. 23.VI.2006, 1♀ and 3☿☿. 30.VII.2006, 35♂♂. 10.VIII.2006, 8♂♂. Tehran: Fasham, Zayegan, 2407 m, 24.V.2006, 4♀♀. 4.VI.2006, 1♀. 26.VI.2006, 2♀♀ and 1☿. 5.VII.2006, 14☿☿. 17.VII.2006, 3☿☿. 8.VI.2006, 3♂♂. 1.VII.2006, 1♂; Karadj, Shahrestanak, 2184 m, 5.VIII.2006, 10☿☿. Mazandaran: Marzanabad, 553 m, 9.V.2006, 1♀. 5.VIII.2006, 1♂; Chaloos Road, Ielaka, 2550 m, 9.V.2006, 1♀.

***Bombus* (*Pyrobombus*) *haematurus* (KRIECHBAUMER, 1870)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Tarome Hoseinabad, 1700 m, 13.V.2005, 1♀. Guilan: Tonekabon, 1050 m, 29.IV.2006, 1♀ and 25☿☿ and 2♂♂; Tonekabon, Goleyjan, 1100 m, 29.IV.2006, 14☿☿ and 1♂; Kelachai, 1200 m, 28.IV.2006, 8☿☿ and 1♂; Kelachai, Sephidab, 1370 m, 28.IV.2006, 6☿☿; Tonekabon, Aghughimahaleh, 1170 m, 29.IV.2006, 5☿☿. Mazandaran: Sari, Baharestan, 950 m, 21.V.2005, 2☿☿. 23.V.2005, 1☿. 29.V.2005, 4☿☿.

***Bombus* (*Megabombus*) *argillaceus* (SCOPOLI, 1763)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Rajaeedasht, 1300 m, 25.VII.2005, 1♂. 27.VII.2005, 1♀; Alamoot, Khosrude Alamoot, 1005 m, 31.V.2005, 1♀; Alamoot, Zarabade Alamoot, 1552 m, 14.VI.2005, 1♀. 27.VII.2005, 2♂; Alamoot, Zereshk, 1830 m, 18.VIII.2005, 1♀; Wikan, 2050 m, 16.IV.2006, 6♀♀. 13.V.2006, 9♀♀. 26.V.2006, 2☿☿. 7.VI.2006, 2☿☿. 30.VII.2006, 2☿☿ and 2♂♂. 10.VIII.2006, 1♂. Tehran: Karadj, Sirachall, 2960 m, 13.V.2006, 1♀. 25.VI.2005, 1♀; Karadj, Asara, 2910 m, 25.VI.2005, 2♀♀; Damavand, Plur, 2150 m, 9.VII.2005, 3☿☿; Fasham, Zayegan, 2407 m, 24.V.2006, 1♀. 16.VI.2006, 1♀. 25.VII.2006, 1♀. 5.VII.2006, 6☿☿. 1.VIII.2006, 2☿☿ and 6♂♂. 12.VIII.2006, 3☿☿ and 16♂♂. 26.VIII.2006, 2☿☿ and 6♂♂; Karadj, Shahrestanak, 2184 m, 13.V.2006, 3♀♀; Rasnan, 1920 m, 18.VII.2006, 2☿☿; Fasham, Lalun, 2460 m, 26.VIII.2006, 3☿☿; Jajrood, Chaharbagh, 2020 m, 18.VII.2006, 3☿☿; Jajrood, Niknamdeh, 1940 m, 18.VII.2006, 6♂♂. Mazandaran: Chaloos Road, Ielaka, 2550 m, 9.V.2006, 1♀.

***Bombus* (*Megabombus*) *hortorum* (LINNAEUS, 1761)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Werk, 2000 m, 13.V.2006, 2♀♀.

***Bombus* (*Thoracobombus*) *humilis* (ILLIGER, 1806)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Wikan, 2050 m, 2.VIII.2005, 1♀ and 3☿☿ and 7♂♂. 13.V.2006, 15♀♀. 26.V.2006, 1♀ and 14☿☿. 7.VI.2006, 28☿☿. 23.VI.2006, 13☿☿. 30.VII.2006, 5☿☿ and 15♂♂. 10.VIII.2006, 6☿☿ and 4♂♂. 19.IX.2006, 4♂♂; Alamoot, Werk, 2000 m, 23.VI.2006, 2♀♀. 10.VIII.2006, 2♂♂; Alamoot, Khosrude Alamoot, 1005 m, 1.VI.2006, 1☿; Alamoot, Zarabade Alamoot, 1552 m, 12.VII.2006, 1♀. 2.VIII.2006, 2☿☿; Alamoot, Evan, 1420 m, 2.VIII.2006, 2♀♀ and 4☿☿ and 3♂♂. Tehran: Damavand, Tizkooh, 3200 m, 29.V.2006, 4♀♀; Damavand, Tange titaloon, 2920 m, 27.V.2006, 4♀♀. Mazandaran: Marzanabad, 553 m, 9.V.2006, 4♀♀,Chaloos Road, Ielaka, 2550 m, 9.V.2006, 1♀; Chaloos Road, Duna, 2450 m, 9.V.2006, 6♀♀.

***Bombus* (*Thoracobombus*) *ruderarius* (MÜLLER, 1776)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Evanak, 2200 m, 12.VI.2005, 1♀; Alamoot, Wikan, 2050 m, 13.V.2006, 1♀. 23.VI.2006, 1♀ and 1☿. Tehran: Fasham, Zayegan, 2407 m, 26.VI.2006, 1☿. 5.VII.2006, 2☿☿. 26.VIII.2006, 2☿☿, 1♂; Damavand, Tizkooh, 3200 m, 29.V.2006, 3♀♀ and 1☿; Damavand, Plur, 2150 m, 19.V.2006, 1♀.

***Bombus* (*Thoracobombus*) *sylvarum* (LINNAEUS, 1761)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Zarabade Alamoot, 1552 m, 2.VIII.2005, 1☿; Alamoot, Evan, 1420 m, 2.VIII.2005, 2☿☿; Alamoot, Werk, 2000 m, 2.VIII.2005, 3♂♂. Tehran: Karadj, Shahrestanak, 2184 m, 5.VIII.2006, 2☿☿; Fasham, Zayegan, 2050 m, 2.VIII.2005, 1worker. 30.VII.2006, 3♂♂. 10.VIII.2006, 2♂♂.

***Bombus* (*Thoracobombus*) *zonatus* (SMITH, 1854)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Zereshk, 1830 m, 16.VIII.2005, 2☿☿. 18.VIII.2005, 3☿☿; Alamoot, Tarome Hoseinabad, 1700 m, 13.V.2005, 1☿; Sialan, 3348 m, 16.VIII.2005, 2☿☿; Alamoot, Rajaeedasht, 1300 m, 24.VII.2005, 2☿☿. Tehran: Fasham, Zayegan, 2407 m, 12.VIII.2006, 1☿.

***Bombus* (*Melanobombus*) *incertus* (MORAWITZ, 1881)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Evanak, 2200 m, 12.VI.2005, 1♀; Alamoot, Wikan, 2050 m, 13.V.2006, 1♀. 23.VI.2006, 1♀ and 1☿. Tehran: Fasham, Zayegan, 2407 m, 26.VI.2006, 1☿. 5.VII.2006, 2☿☿. 26.VIII.2006, 2☿☿; Damavand, Tizkooh, 3200 m, 29.V.2006, 3♀♀ and 1☿; Damavand, Plur, 2150 m, 19.V.2006, 1♀.

***Bombus* (*Subterraneobombus*) *subterraneus* (LINNAEUS, 1758)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Zereshk, 1830 m, 16.VIII.2004, 1☿; Alamoot, Wikan, 2050 m, 13.V.2006, 1♀. Tehran: Damavand, Tizkooh, 3200 m, 29.V.2006, 4♀♀; Damavand, Tange titaloon, 2920 m, 27.V.2006, 3♀♀.

***Bombus* (*Rhodobombus*) *mesomelas* (GERSTAECKER, 1869)**

D i s t r i b u t i o n : Palaearctic Region.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Wikan, 2050 m, 25.VII.2005, 1♂.

***Bombus* (*Psithyrus*) *vestalis* (GEOFFROY, 1758)**

D i s t r i b u t i o n : Iran, Qazvin, Tehran.

M a t e r i a l e x a m i n e d : Qazvin: Alamoot, Wikan, 2050 m, 30.VII.2006, 11♂. Tehran: Fasham, Zayegan, 2050 m, 30.VII.2006, 11♂♂. 26.VIII.2006, 2♂♂; Damavand, Tizkooh, 3200 m, 29.V.2006, 2♀♀. Mazandaran: Chaloos Road, Ielaka, 2550 m, 9.V.2006, 1♀.

***Bombus* (*Psithyrus*) *sylvestris* (LEPELETIER, 1833) [New Record]**

D i s t r i b u t i o n : Palaearctic Region, Oriental Border.

M a t e r i a l e x a m i n e d : Mazandaran: Chaloos Road, Gachsar, 2250 m, 14.VIII.2005, 2♂♂. Semnan: Shahroud, Abr forest, 1370 m, 14,VII.2005, 1♀.

Identification key of Bumblebees in central Elburz Mountains of Iran

(adapted from BENTON, 2001 and INTOPPA, 2003)

A Antennae 12-segmented. Mandibles well developed fig.1 (A). Claws of legs divided in two elements clearly different in length fig.2 (A). Abdomen with 6 visible segments from above.....Female

B. Antennae 13-segmented. Mandibles small fig.1 (B), generally with hair fringe along inferior edge (beard). Claws of legs divided in two elements about parallel, one slightly shorter than other fig.2 (B). Abdomen with 7 visible segments from above. Male

♀♀

1 Mandibles with distal margin clearly obligue in respect of longitudinal axis fig.1 (D). Outer surface of hind tibia distinctly flat, dull, always densely covered with branched hairs more or less long. Corbiculum and pollen press absent. Sixth sternite with two evident lateral-distal callosities more or less developed fig.3 (A)...*Psithyrus* (2)

- Mandibles with distal margin at right angles to the longitudinal axis fig.1 (C). Outer surface of hind tibia more or less concaves. Corbiculum and pollen press present fig.2 (C). Sixth sternite without callosities.....*Bombus* (3)

2 Coat relatively shorter and even. Callosities on ventral surface of final abdominal segment very small in sides fig.3 (C).....*B.*(*P.*) *vestalis*

- Coat relatively long and uneven. Callosities on ventral surface of final abdominal segment very small and don't raise fig.3 (B).....*B.* (*P.*) *sylvestris*

3 Thorax with only one yellow band on collar..... 14

- Thorax with two bands on collar and scutellum..... 4

4 Thorax with two white bands on collar and scutellum..... 5

- Thorax with two yellow bands on collar and scutellum..... 10

5 Mid basitarsus with a spine..... 6

- Mid basitarsus without spine..... 9

6 Tail black. Abdominal segments (T1-T3) white. Labrum without furrow hollow. Sting sheath as in fig.5 (C).....*B. zonatus*

- Tail with other colors..... 7

7 Tail yellow and same color abdomen. Labrum with furrow hollow. Sting sheath as in fig.5 (D).....*B. persicus*

- Tail red or orange..... 8

8 Face hairs greenish white. Sting sheath high hallow in sides as in fig.5 (B)... *B. sylvarum*

- Face hairs black. Sting sheath low hallow in sides as in fig.5 (A).....*B. ruderarius*

9 Hairs of basitarsus covered from shaggy and branched hairs. Outer surface of auricle without shaggy and branched hairs. Sting sheath as in fig.5 (H).....*B. incertus*

- Hairs of basitarsus not above. Outer surface of auricle with shaggy and branched hairs. Sting sheath as in fig.5 (G).....*B. niveatus*

10 St_6 with clearly keel fig.3 (D). Sting sheath as in fig.5 (F).....*B. subterraneus*

- St_6 without distinct keel..... 11

11 Abdomen completely yellow and without distinct band. Sting sheath as in fig.5 (E) ..... *B. humilis*

- Abdomen completely black or with distinct colored bands 12

12 Tail orange. T1 and T2 yellow, T3 black. Sting sheath as in fig.5 (G) ..... *B. niveatus*

- Abdomen tergits not colored above 13

13 Malar area very long. T1 yellow, T2 and T3 black. Tail white. Sting sheath as in fig.5 (L) ..... *B. hortorum*

- Malar area average. Abdomen entirely black. Sting sheath as in fig.5 (K) ..... *B. argillaceus*

14 Tail orange. T3 and T4 yellow. Sting sheath simple as in fig.5 (J) ..... *B. haematurus*

- Tail white and T2 yellow 15

15 Yellow bands on collar and segment 2 of abdomen dull, golden yellow. Distance between ocelli and compound eyes with many punctures. Sting sheath as in fig.5 (I)..... *B. terrestris*

- Yellow bands on collar and segment 2 of abdomen pale lemon-yellow. Distance between ocelli and compound eyes with a little punctures. Sting sheath similar to *B. terrestris* fig.5 (M) ..... *B. lucorum*

♂♂

1 Hind tibia narrow and convex, distally not very enlarged, with outer surface generally entirely covered with hairs dense and strongly branched. Genitalia with membranous volsellae and squama whose color is generally much lighter than dark brown stipes ..... *Psithyrus* (2)

- Hind tibia more or less flattened, generally distally enlarged; outer surface shiny, variable in pubescence; hairs, if present on disc, generally simple or only slightly branched. Genitalia with sclerous volsellae and squama, more or less the same color as brown stipes ..... *Bombus* (3)

2 Third segment of antennae shorter than fifth. Tail white with same hairs at the sides of T7. Genital capsule; volsellae pointed at apex fig.6 (A) ..... *B.* (*P.*) *vestalis*

- Third and fifth segments of antennae about equal in length. Tail white, but with orange hairs on the final (7th) segment. Genital capsule; volsellae small and narrowly elongate fig.6 (B) ..... *B.* (*P.*) *sylvestris*

3 Thorax with only one yellow band on collar 13

- Thorax with two bands on collar and scutellum 4

4 Thorax with two white bands on collar and scutellum 5

- Thorax with two yellow bands on collar and scutellum 9

5 Mandibles with very small hairs. Genital capsule as in fig.6 (C); Squama triangular and pointed ..... *B. mesomelas*

- Hairs on mandibles (beard) very long. Squama with different figures 6

6 Tail yellow. Genital capsule; volsellae very long fig.6 (D) ..... *B. persicus*

- Tail red. Volsellae not above 7

7 Third antennal segment roughly equal to or only slightly longer than the fourth. Genital capsule as in fig.6 (F) ..... *B. sylvarum*

- Third antennal segment not equal and much longer than fourth 8

8 Third antennal segment much longer than fourth. Genital capsule fig.6 (E) similar to *B. sylvarum* but with pointed inner projections of volsellae ..... *B. ruderarius*

- Third antennal segment much longer than the fifth. Genital capsule as in fig.6 (G)..... ..... *B. niveatus*

9 T1 black 10

- T1 yellow 11

10 Median legs basitarsus with longer hairs in sides. Genital capsule; sagittae tapered to outward-directed hooks fig.6 (H) ..... *B. haematurus*

- Median legs basitarsus with shorter hairs in sides. Usually with yellow hairs on the face. Genital capsule as in fig.6 (I) (Similar to *B. terrestris*) ..... *B. lucorum*

11 Genital capsule; sagittae serrated fig.6 (J)..... *B. argillaceus*

- Genital capsule; sagittae not serrated 12

12 Tail reddish orange. Genital capsule as in fig.6 (G)..... *B. niveatus*

- Tail same colored abdomen and yellow. Genital capsule as in fig.6 (K) ..... *B. humilis*

13 The base final of volsellae broader fig.4 (A). Genital capsule as in fig.6 (L) . *B. terrestris*

- The base final of volsellae narrowed fig.4 (B). Genital capsule as in fig.6 (I)..*B. lucorum*

Discussion

Bumblebees are most common pollinators in the central region of Elburz where their population reach the highest level between June and August. During this survey, 16 species of bumblebees were collected at different elevations, ranged form 553-3348 meters above the sea level. Our study also leads to the discovery of six *Bombus* species which are not listed in the latest faunistic work by BAKER (1996) in the same region, consist of *B. zonatus*, *B. humilis*, *B. sylvarum*, *B.* (*Psithyrus*) *sylvestris*, *B. hortroum* and *B. mesomelas*. Of course these species were introduced from other regions of Iran but didn't Identify in Elburz Mountains. *Bombus* (*Psithyrus*) *sylvestris* is a new species of Iran and has reported for first time. Our finding to confirm the results in west of Asia about *Bombus terrestris*. *Bombus terrestris* and *B. persicus* are widely distributed in this region. The resuts of GOULSON (2003) and VELTHUIS & VANDOORN (2006) studies on bumblebees in different regions showed *Bombus terrestris* has wide distribution area in different regions of Europe, North of Africa and West of Asia. Fourty nine species of *Bombus* have been listed by AYTEKIN in Turkey (1999), which reflects the affinity between Turkish and Elburz bumblebees fauna. The great diversity of natural habitats in the central region of Elburz, necessitates more faunistic research to improve the existing knowledge of bumblebees in this region.

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References

ALFORD, D.V. (1975): Bumblebees. – Davis-Poynter, London U.K: XXI + 352 pp.

AYTEKIN, A.M. (1999): Systematic studies on the familiy Apidae (Hymenoptera) in Ankara province. Part I: Bombinae. – Turk Journal Zoology **23**: 231-241.

AYTEKIN, A.M. & N. CAGATAY (2003): Systematical studies on Megabombus (Apidae: Hymenoptera) species in central Anatolia. – Turk Journal Zoology **27**: 195-204.

BAKER, D.B. (1996): On a collection of humblebees from northern Iran (Hymenoptera: Apoidea, Bombinae). – Beitrage Zur Entomologic **46**: 109-132.

BENTON, T. (2001): The Bumblebees of Essex. – Lopinga Books Publisher, Saffron Walden, UK.

ESMAILI, M. & R. RASTEGAR (1974): Identified species of aculeate Hymenoptera of Iran. – Journal of the Entomological Society of Iran **2**: 43-44 + PP. [41-52].

GOULSON, D. (2003): Bumblebees: Their behavior and ecology. – Oxford University Press, Oxford UK.

HIRASHIMA, Y. (1989): A checklist of Japanese Insects. – Entomological Laboratory, Faculty of Agriculture, Kyushu University. **II**: 691pp.

INTOPPA, F. & PIAZZA, M. G. & G. BOLCHISERINI (2003): Repertorio dei caratteri morfologici per uno chiave dicotomica dei sottogeneri di Bombinae presenti in Italia. – Redia. **LXXXVI**: 1-23.

LEE, S.H. & L. DUMOUCHEL (2005): Taxonomic review of genus Bombus (Hymenoptera, Apidae) from Korea. – Available on the www.caithness.org/naturebeeindex.htm.

MICHENER, C.D. (2000): The bees of the world. – The John Hopkins University Press, Baltimore, USA: 793 pp.

PITTIONI, B. (1938): Ein Hummelausbeute aus dem Elburs-Gebrige (Iran). – Konowia (1937) **16**: 113-129.

POPOV, V.V. (1967): The bees (Hymenoptera, Apoidea) of Iran. – Trudy Zoologicheskogo Instituta, Akademiya Nauk soyuza sovetskikh Sotsia listicheskikh Respublik **43**: 184-216. [in Russian].

REINING, W.F. (1939): Die Hummeln der Reisen von E. Pfeiffer (1936) und E. Pfeiffer und Dr. W. Forster (1937) in den Elburs. – Mitteilungen der Münchner Entomologischen Gesellschaft e.v **29**: 145-148.

SKORIKOV, A.S. (1938): Zoogeographische Gesetzmassigkeithen der Hummelfauna im Kaukasus, Iran und Anatolien (Hymenoptera, Bombinae). – Entomologicheskoye Obozrenie **27**: 145-151. [in Russian with German Summary].

VELTHUIS, H.H. W. & A. van DOORN (2006): A century of advances in bumble bee domestication and the economic and environmental aspects of its commercialization for pollination. – Apidologie **37**: 421-451.

WILLIAMS, P.H. (1987): Habitat use by bumble bees (*Bombus* spp.). – Ecological Entomology **13**: 223-237.

WILLIAMS, P.H. (1991): The bumble bees of the Kashmir Himalaya (Hymenoptera: Apidae, Bombini). – Bulletin of the British Museum (Natural History), Entomology Series **60**: 1-204.

WILLIAMS, P.H. (1998): An annoted checklist of bumblebees with an analysis of patterns of description (Hymenoptera: Apidae; Bombinae). – Bulletin of the Natural History Museum, Entomology Department **67**: 79-152.

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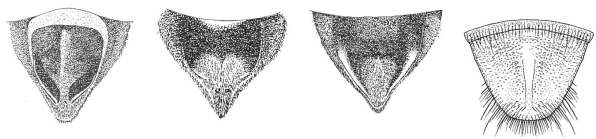
A: Mandibles in *Bombus* B: Mandibles in *Psithyrus* C: Longitudinal axis of mandibles in *Bombus* D : Longitudinal axis of mandibles in *Psithyrus*

Fig. 1: Mandible of Bumblebees

A: Claws of legs (Intoppa, 2003) B : Claws of legs (Intoppa, 2003) C: Corbiculum and pollen basket in *Bombus*

Fig. 2: Some legs characteristics of Bumblebees



A : Callosities in Psithyrus (Benton, 2001) B: Callosities in *B. (P.) sylvestris* (Benton, 2001) C: Callosities in *B. (P.) vestalis* (Benton, 2001) D: Keel in *B. subterraneus*

Fig. 3: Some abdominal characteristics of Bumblebees

A: The base final of volsellae in *B. terrestris* B: The base final of volsellae in *B. lucorum*

Fig. 4: Genitalia characteristic of Bumblebees

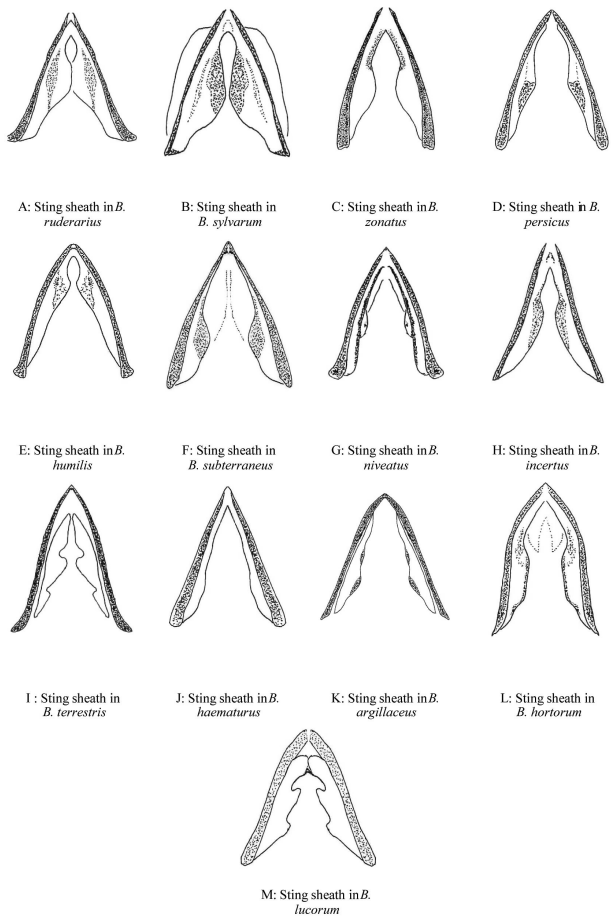
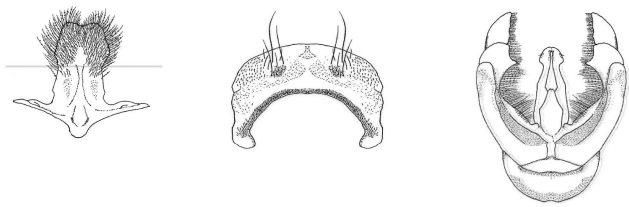
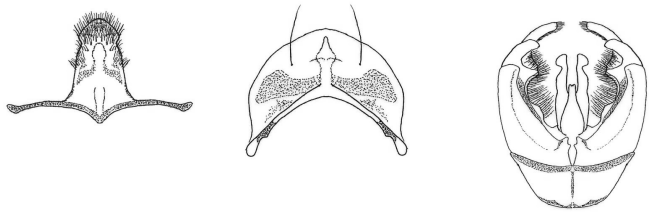


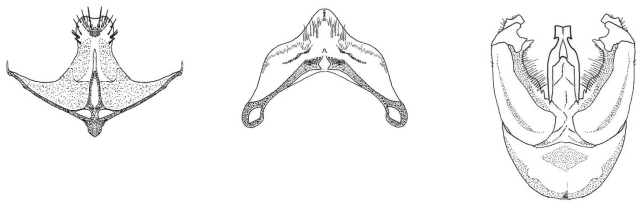
Fig. 5: Sting sheath of *Bombus* genus



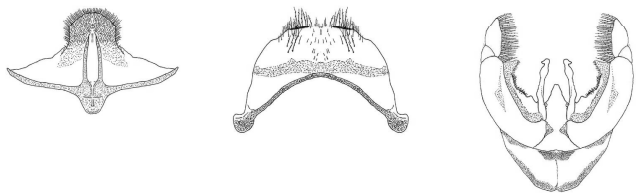
A : Genital capsule, St_7 and St_8 of *B. (P.) vestali*



B: Genital capsule, St_7 and St_8 of *B. (P.) sylvestris*

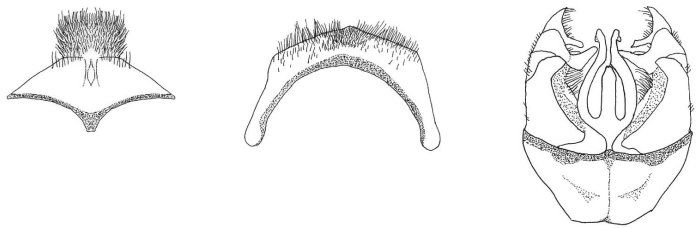


C: Genital capsule, St_7 and St_8 of *B. mesomelas*

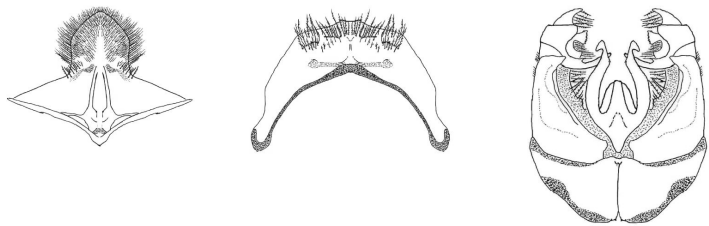


D: Genital capsule, St_7 and St_8 of *B. persicus*

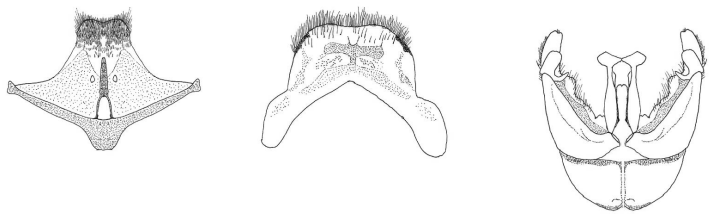
Fig. 6:Genital capsulate, St $_7$ and St_8 of Bumblebees



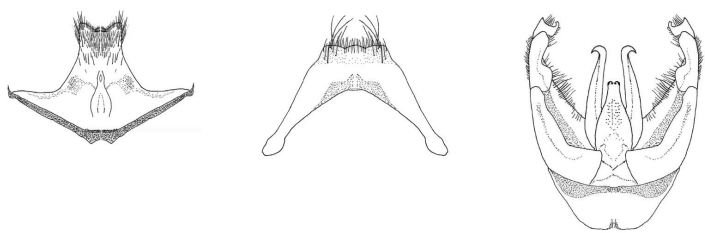
E: Genital capsule, St_7 and St_8 of *B. ruderarius*



F: Genital capsule, St_7 and St_8 of *B. sylvarum*

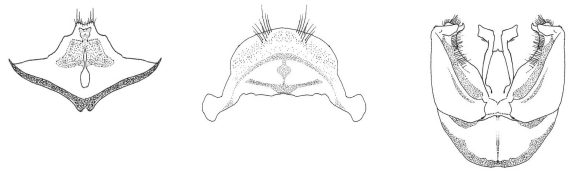


G : Genital capsule, St_7 and St_8 of *B. niveatus*

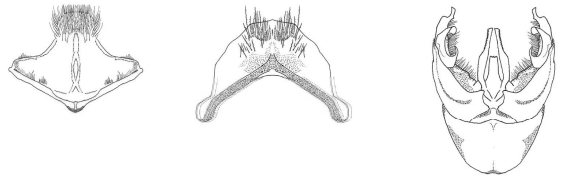


H: Genital capsule, St_7 and St_8 of *B. haematurus*

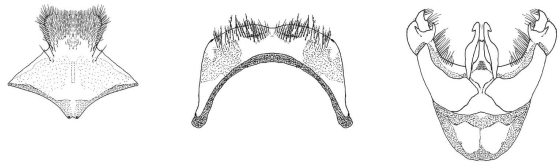
Fig. 6: Genital capsulate, St_7 and St_8 of Bumblebee



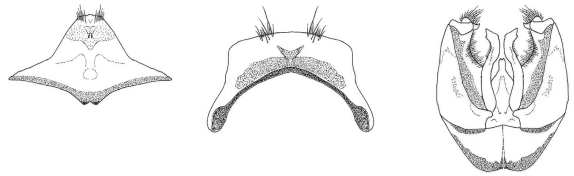
I: Genital capsule, St_7 and St_8 of *B. lucorum*



J: Genital capsule, St_7 and St_8 of *B. argillaceus*



K : Genital capsule, St_7 and St_8 of *B. humilis*



L: Genital capsule, St_7 and St_8 of *B. terrestris*

Fig. 6:Genital capsulate, St $_7$ and St_8 of Bumblebees

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