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Faunistic work on bumblebees (Hymenoptera: Apidae) of district Kharmang, Sakardu, Pakistan

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Abstract

Bumblebees are important pollinators in wild and managed cropping system. There are about 250 known species worldwide. Present study was designed to explore the fauna of bumblebees and their geographical distribution from district Kharmang, Skardu, Pakistan. Six (06) bumblebee species were reported *viz.* *Bombus asiaticus*, *B. branickii*, *B. tunicatus*, *B. lucorum*, *B. rufofasciatus*, *B. melanurus*. Among these 01 species *B. branickii* is new country record from Pakistan. This study will be helpful for future in conservation program of bumblebees in this region and provide the basis for ecological studies on this important pollinator species.

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Introduction

Bumblebees are important pollinators belonging to insect order Hymenoptera comprise about 250 known species worldwide (Williams *et al.*, 2008). The majority of these species are true bumblebees having social worker caste. These bees have ability to pollinate at high speed by opening the pollen sacs with vibration as buzzing behavior. They are important and competent pollinators (Abak *et al.*, 2000; Semida, and Elbanna, 2006) with ability to forage in unfavorable weather conditions being unsuitable to honeybees and other solitary bees. Their efficiency to forage at low temperature and light makes them the most reliable and efficient pollinators both in enclosed and field cultivated crops (Heinrich, 1979).

Different *Bombus* species like *Bombus terrestris*, *B. impatiens*, *B. occidentalis* and some others have been utilized for commercial pollination of different crops worldwide. Crops like tomato, pepper, cucumber, strawberries etc under plastic tunnel and systematic hydroponics farms need such pollinators to get low cost constituents (Abak *et al.*, 1997; Kwon and Saeed, 2003; Velthuis and van Doorn, 2006;). Pollination by these important contributors help in better fruit production, weight, size and other chemical characters to get cost effective production (Klein *et al.*, 2007; Aizen *et al.*, 2008). Increased world human population stresses the use of such crop pollinators especially for commercial crops grown under intensive cultivation (Griffiths and Robberts, 1996). Bumblebee species which were recorded so far from these regions, in ascending order remained as 05 (each from Sumatra and Southern Neotropical), 09 (Northern Neotropical), 11 (Eastern Neotropical), 18 (Southern Nearctic), 19 (Western Neotropical), 23 (Japan), 24 (each from Arctic and Eastern Nearctic) and 43 (Western Nearctic), 104 (Oriental) and 119 (Palearctic). From oriental region true bumblebees (excluding subgenus *Psithyrus*) 37, 35, 28, 19 and 12 species, respectively were recorded from India, China, Iran (Monfared *et al.*, 2007), Pakistan and Afghanistan. A check list of 239 bumblebee species

over the world which were prepared in 1922, revised (Williams, 1998) and later on the sub genera of 250 bumblebee species were simplified to ten (Williams *et al.*, 2008). Williams (1991) recorded 29 bumblebee species from Kashmir Himalaya and prepared their keys.

In northern Pakistan, Thirteen indigenous species has been reported from Northern Pakistan ranging from 2291m to 5344m above the sea level and has been observed under agricultural and non-agricultural areas with four most dominant species including *B. asiaticus*, *B. avinoviellus*, *B. biroi* and *B. haemorrhoidalis* (Sabir *et al.*, 2008; Suhail *et al.*, 2009; Makhdoom, 2011) which may have some interaction with their existed diversity at altitude stratum and possible floral searching behavior to a certain limit (Cannani *et al.*, 2006).

In keeping view the importance of bumblebees the present was conducted to explore the fauna of bumblebees of district Kharmang, Sakardu, Pakistan. This study will provide the basis for further taxonomic studies in this region and also helpful in future conservation program of this important pollinator.

Materials and methods

Present study was conducted in district Kharmang, Sakardu Gilgit Baltistan, Pakistan. Gilgit Baltistan occupies a unique bio-geographic position in the country as nature has blessed it with high mountains, massive glaciers, superb rivers and splendid valleys which is located between 35- 37° N and 72- 75° E and is divided in to six administrative Districts, Gilgit, Diamir, Ghizar, Skardu, Ganche and Astore. Kharmang is one of the five biggest valleys of Baltistan; recently it became a district, whose temporary headquarter is Tolti.

The valley is located about 100 km from the capital city of Baltistan Skardu. Indus river enter in Pakistan from Kharmang district, it is connected with Kargil district of India.

The adult specimens were collected from the different flowers viz. *Mentha longifolia*, *Senecio jacobaea*, *Trifolium repens*, *Calluna vulgaris*, *Rubus armeniacus*, *Cistaceae sp*, *Mentha longifolia*, and *Silybum marianum*.

The collections were done during the April to October of the year 2017. The specimens were collected during early morning to early evening having on sunny days by using common entomological Ariel net.

The collection areas were selected from district Kharmang of Gilgit Baltistan including; Mehdiabad, Mayourdo, Tolti, Kendrik, Gohari and Tarkati.

The specimens were killed in a killing jar and then placed in other box to reach at laboratory.

The specimens were pinned and set according to the scientific way. The specimens were identified with the help of Williams (1991). The specimens have been deposited in the Entomology laboratory, Faculty of Agriculture, The University of Poonch Rawalakot, Azad Jammu and Kashmir.

Results and discussion

The current study yielded six species under one genera of family apidae, all of them are new record to the study area.

Family Apidae

Subfamily Apinae

Tribe *Bombini*

Genus *Bombus* Latreille, 1802

Bombus (Sibiricobombus) asiaticus (Morawitz, 1875)

Material examined

Material Examined (112 ex.): Tarkati, 8332.99 ft, 8.vi.2017, 5♀, 22.vi. 2017, 6♀, 17.vii. 2017, 2♀, Tolti, 7806.79 ft, 11.vi.2017, 9♀, 26.vi.2017, 1♀, 15.vii.2017, 11♀, Gohari, 7691.07 ft, 18.vi.2017, 10♀, 23.vi.2017, 12♀, 13.vii.2017, 15♀, Mehdiabad, 7719.68 feet, 10.vi.2017, 8♀, 27.vi.2017, 18♀, 19.vii.2017, 15♀.

Host

Mentha longifolia, *Senecio jacobaea*, *Trifolium repens*, *Calluna vulgaris*

Distribution

Pakistan, Kashmir.

World Distribution

Russia, Turkey, Iran, Afghanistan, Tajikistan, Kazakhstan, Mongolia, Himachal Pradesh, Nepal, Sikkim, Myanmar, Tibet, northern and central China.

Remarks

Sabir *et al.* (2011) found from wild flowers and recorded this species as new country record from Pakistan. And now first time recorded from district Kharmang, Skardu, Pakistan

Bombus (Psithyrus) branickii (Radoszkowski, 1893)

Material Examined

Material Examined (28 ex.): Mayourdo, 8099.74 ft, 5.vi.2017, 7♀, 20. vi.2017, 13♀, 16.vii.2017, 8♀.

Host

Rubus armeniacus, *Cistaceae sp*, *Mentha longifolia*, *Senecio jacobaea*, *Trifolium repens*

Distribution

Pakistan, Kashmir.

World Distribution

Afghanistan, Kazakhstan, Kyrgystan, Tajikistan, Himachal Pradesh, Nepal, Sikkim, Tibet, north-western and south-western China, Mongolia, Russia.

Remarks

This species is recorded as new species country record from Pakistan

Bombus (Bombus) tunicatus (Smith, 1852)

Material Examined

Material Examined (181 ex.): Tarkati, 8332.99 ft,

8.vi.2017, 11♀, 22. vi.2017, 16♀, 17.vii.2017, 8♀, Tolti, 7806.79 ft, 11.vi.2017, 15♀, 26.vi.2017, 12♂, 15.vii.2017, 17♀, Gohari, 7691.07 ft, 18.vi.2017, 9♀, 23. vi. 2017, 15♀, 13.vii.2017, 12♀, Mehdiabad, 7719.68 ft, 10.vi.2017, 7♀, 27.vi.2017, 11♀, 19.vii.2017, 14♀, Mayourdo, 8099.74 ft, 5.vi.2017, 10♀, 20.vi.2017, 11♀, 16.vii.2017, 13♀.

Host

Cistaceae sp, *Mentha longifolia*, *Senecio jacobaea*, *Trifolium repens*

Distribution

Pakistan, Kashmir.

World Distribution

Afghanistan, Himachal Pradesh, Uttaranchal, Nepal, Sikkim.

Remarks

Sabir *et al.*, (2011) found from agriculture land and recorded this species as new country record from Pakistan. And now first time recorded from district Kharmang, Skardu, Pakistan

Bombus (Bombus) lucorum (Linnaeus, 1761)

Material Examined

Material Examined (206 ex.): Mehdiabad, 7719.68 ft, 10.vi.2017, 18♀, 27.vi.2017, 16♀, 19.vii.2017, 15♀, Mayourdo, 8099.74 ft, 5.vi.2017, 11♀, 20. vi.2017, 19♀, 16.vii.2017, 16♀, Tolti, 7806.79 ft, 11.vi.2017, 11♀, 26.vi.2017, 18♂, 15.vii.2017, 9♀, Gohari, 7691.07 ft, 18.vi.2017, 10♀, 23.vi.2017, 16♀, 13.vii.2017, 13♀, Tarkati, 8332.99 ft, 8.vi.2017, 16♀, 22. vi.2017, 12♀, 17.vii.2017, 18♀.

Host

Mentha longifolia, *Senecio jacobaea*, *Trifolium repens*.

Distribution

Pakistan, Kashmir.

World Distribution

Europe, Russia, Turkey, Iran, Afghanistan, Tajikistan,

Kazakhstan, Mongolia, Himachal Pradesh, Nepal, Sikkim, Myanmar, Tibet, northern and central China, Korea, Japan, Alaska, Canada.

Remarks

Sabir *et al.* (2011) found from wild flowers and recorded this species as new country record from Pakistan.

And now first time recorded from district Kharmang, Skardu, Pakistan

Bombus (Melanobombus) rufofasciatus (Smith, 1852)

Material Examined

Material Examined (50 ex.): Kendrik, 10972.69 ft, 10.vi.2017, 9♀, 29. vi.2017, 19♀, 8.vii.2017, 22♀.

Host

Senecio jacobaea, *Trifolium repens*

Distribution

Pakistan, Kashmir

World Distribution

India, Nepal, Bhutan, Myanmar, Sikkim, Tibet, south-western China.

Remarks

Sabir *et al.* (2011) found from wild flowers and recorded this species as new country record from Pakistan.

And now first time recorded from district Kharmang, Skardu, Pakistan

Bombus (Subterraneobombus) melanurus (Lepeletier, 1835)

Material Examined

Material Examined (49 ex.): Kendrik, 10972.69 ft, 10.vi.2017, 12♀, 29. vi.2017, 16♀, 8.vii.2017, 21♀.

Host

Senecio jacobaea, *Trifolium repens*, *Silybum*

marianum

Distribution

Pakistan, Kashmir

World Distribution

India, Nepal, Turkey, Armenia, Lebanon, Syria, Iran, Russia, Sikkim, Kazakhstan, Mongolia, Tibet, north western and northern China.

Remarks

Sabir *et al.*, (2011) found from wild flowers and recorded this species as new country record from Pakistan.

And now first time recorded from district Kharmang, Skardu, Pakistan.

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