

NEW DISTRIBUTION RECORDS OF CUCKOO BUMBLEBEES IN BULGARIA

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Abstract: Subgenus *Psithyrus* (genus *Bombus*) includes cuckoo bee species that are specialized as obligate social parasites in colonies of the true bumblebee species. They have lost the ability to collect pollen and to rear their brood. As such, these bees do not establish their own nests, but instead, invade the host colonies, kill or subdue the foundress and use the resident worker forces. In contrast to the remainders of the genus *Bombus*, *Psithyrus* species have no worker caste.

Seven cuckoo bee species occur in Bulgaria, although collected data are old and from only few locations. In the current study we present new distribution records of *Psithyrus* species in Bulgaria.

INTRODUCTION

Subgenus *Psithyrus* Lepeletier (Hymenoptera, Apidae) contains workerless social parasites in nests of the other bumblebee species, *Bombus* Latreille. The females from this subgenus lack the pollen baskets on the hind legs. Being inquilines they dominate or kill the host queen and may become the queens of the colony (Goulson, 2010).

Until now 27 species of cuckoo bumblebees are known in the world, of which 10 in Europe (Rasmont et al., 2015; Williams, 2016). The data provided on *Psithyrus* species in Bulgaria are rather old and still incomplete. The first summaries about bumblebees from the Balkan Peninsula are Pittioni's papers (1938, 1939), who lists the presence of 9 cuckoo bee species (formerly placed

in a separate genus) and two other species, *B. flavidus* Eversmann, 1852 and *B. norvegicus* (Sparre-Schneider, 1918) which are still unknown from the Balkans. Most of what we know about bumblebees in Bulgaria comes from the studies of Neno Atanasov. He has been recorded seven cuckoo bee species from different sites in a series of papers.

Nowadays, after taxonomic changes the following seven species of subgenus *Psithyrus* are supported by faunistic data from Bulgaria: *Bombus bohemicus* (Seidl, 1838), *B. vestalis* (Geoffroy, 1785), *B. barbutellus* (Kirby, 1802), *B. rupestris* (Fabricius, 1793), *B. campestris* (Panzer, 1801), *B. quadricolor* (Lepeletier, 1832) and *B. sylvestris* (Lepeletier, 1832) (Drenowsky, 1936; Nedialkov, 1914; Atanasov 1939, 1962, 1972, 1974, 1975).

The present study provides new distribution records on cuckoo bumblebees in Bulgaria.

MATERIALS AND METHODS

The current study is based on materials of the Sofia University Zoological collection (BFUS). The specimens are collected by the authors and students during summer field practices conducted at sites in mountains: Lozen, Rhodopes and Balkan. The specimens are sampled by aerial entomological nets. Morphology of the genital apparatus was used to determine the males. Data are presented in a faunistic list where previous and new sampling sites as well as host range according to Rasmont et al. (2015) are given.

RESULTS AND DISCUSSION

***Bombus (Psithyrus) bohemicus* (Seidl, 1837)**

Previous records: Drenowsky (1936): Rila Mt.; Atanasov (1939): Rila Mt., Rhodope Mts, Slavyanka Mt.; Atanasov (1972): Western Balkans Mts; Atanasov (1974): Central Balkans Mts; Atanasov (1975): Rhodopes.

Material examined: Lozen Mt., 13.06.2016, 1 ♀, leg. G. Nacheva; 09.07.2016, 1 ♂, leg. V. Tsochev.

It is a social parasitic species specializing primarily on *B. lucorum* (Linnaeus, 1761) and probably also *B. magnus* Vogt, 1911, *B. cryptarum* (Fabricius, 1775) and *B. terrestris* (Linnaeus, 1758).

***Bombus (Psithyrus) vestalis* (Geoffroy, 1785)**

Previous records: Nedialkov (1914): Osogovo Mt., Kjustendil, Vitosha Mt., Rhodope Mts, Balkan Mts; Drenowsky (1936); Atanasov (1939): Pirin Mt., Iskar Gorge, Osogovo Mt., Kyustendil, Vitosha Mt., Rhodope Mts, Balkan Mts; Atanasov (1962): Belasitsa Mt.; Atanasov (1972): Western Balkan Mts; Atanasov (1974): Eastern Balkan Mts; Atanasov (1975): Rhodopes.

Material examined: Lozen Mt., 1 ♂, 13.07.2015, leg. S. Lazarov.

Bombus vestalis is known to parasitize the nests of *B. terrestris*.

Bombus (Psithyrus) barbutellus (Kirby, 1802)

Previous records: Nedialkov (1914): Sofia, Svishtov, Plovdiv; Drenowsky (1936): Rila Mt.; Atanassov (1939): Euxinograd, Rhodope Mts, Thracian plane, Zemen, Svishtov, Plovdiv, Slavyanka Mt., Sredna Gora Mt., Rila Mt.; Atanassov (1962): Belasitsa Mt.; Atanassov (1972): Western Balkan Mts; Atanassov (1974): Central Balkan Mts; Atanassov (1975): Rhodopes.

Material examined: Lozen Mt., 13.07.2015, 1 ♂, leg. P. Dimitrov.

It is a social parasite species invading the nests of *B. hortorum* (Linnaeus, 1761), *B. argillaceus* (Scopoli, 1763) and *B. ruderatus* (Fabricius, 1775).

Bombus (Psithyrus) rupestris (Fabricius, 1793)

Previous records: Nedialkov (1914): Rila Mt., Vitosha Mt.; Atanassov (1939): Rila Mt., Vitosha Mt., Sofia, Slavyanka Mt.; Atanassov (1972): Western Balkan Mts; Atanassov (1974): Central and Eastern Balkan Mts; Atanassov (1975): Rhodopes.

Material examined: Lozen Mt., 13.06.2016, 1 ♀, leg. G. Nacheva.

It is a specialized social parasite mainly on *B. lapidarius* (Linnaeus, 1758) and *B. sichelii* Radoszkowski, 1859.

Bombus (Psithyrus) campestris (Panzer, 1801)

Previous records: Nedialkov (1914): Sredna Gora Mt., Rila Mt.; Atanassov (1939): Konyavska Mt., Choklyovo Marsh, Sredna Gora Mt., Rila Monastery; Atanassov (1975): Rhodopes.

Material examined: Western Balkan Mts: Komshtitsa vill., 05.07.2015, 1 ♀, leg. I. Gjonov; Rhodopes Mts: Slaveyno vill., 18-25.07.2016, 1 ♀, leg. D. Gergov.

It is a social parasite mostly of *B. pascuorum* (Scopoli, 1763), *B. humilis* Illiger, 1806, *B. ruderarius* (Müller, 1776), *B. sylvarum* (Linnaeus, 1758), *B. muscorum* (Skorikov, 1922) and *B. subterraneus*.

The data mentioned above presents new distribution records on the poorly studied cuckoo bumblebees in Bulgaria. All five species have not been listed previously from the new regions and thus these are the first records of *Bombus bohemicus*, *B. vestalis*, *B. barbutellus* and *B. rupestris* for Lozen Mountain as well as *B. campestris* for Balkan Mountains. More actual data, however, are needed in study of species composition, geographic variation and ecology of bumblebees in Bulgaria.

REFERENCES

1. Atanassov N. 1939. Beitrag zum Studium der Hummelfauna Bulgariens (Bombus - Hymenoptera). *Mitteilungen der Bulgarischen Entomologischen Gessellschaft in Sofia*, 10: 91-109.
2. Atanassov N. 1962. Untersuchungen über die systematik und die Ökologie der Hymenopterenarten aus dem Gebiet von Petrič (Südwestbulgarien). *Izvestiya na Zoologicheskaya institut s muzei*, 12: 109-172.

3. Atanassov N. 1972. Hymenopteraarten im Westlichen „Balkan“ - Gebirge. I. *Bulletin de l'Institut de zoologie et musée*, 35: 179-228.
4. Atanassov N. 1974. Hummeln und Schmarotzerhummeln (*Bombus* Latr., *Psithyrus* Lep., Hym.) von dem Mittleren und dem Östlichen Balkangebirge. *Bulletin de l'Institut de zoologie et musée*, 41: 107-121.
5. Atanassov N. 1975. Artenzusammensetzung und Verbreitung der *Bombus* Latr. Und *Psithyrus* Lep. (Hymenoptera) in den Rhodopen. In: Peshev, G. et al. (Eds). La faune des Rhodopes. Materiaux. Academie des Sciences de Bulgarie, Sofia: 145-160.
6. Drenowsky Al. K. 1936. Beitrag zur Insektenfauna Bulgariens und Mazedoniens II (Lepidoptera, Hymenoptera, Diptera und Othoptera). *Mitteilungen der Bulgarischen Entomologischen Gesellschaft in Sofia*, 9: 237- 256.
7. Goulson D. 2010. Bumblebees: behaviour, ecology, and conservation. Second Edition, Oxford, University Press, New York, 317 pp.
8. Nedialkov N. 1914. Septième contribution à la faune entomologique de la Bulgarie. La revue de l'Académie Bulgare des Sciences, 9: 181- 210.
9. Pittioni B. 1938. Die Hummeln und Schmarotzerhummeln der Balkan-Halbinsel. Mit besonderer Berücksichtigung der Fauna Bulgariens. *Mitteilungen aus den Königlichen Naturwissenschaftlichen Instituten*, 11: 12-69.
10. Pittioni B. 1939. Die Hummeln und Schmarotzerhummeln der Balkan-Halbinsel mit besonderer Berücksichtigung der Fauna Bulgariens. II: Spezieller Teil. *Mitteilungen aus den Königlichen Naturwissenschaftlichen Instituten in Sofia*, 12: 49-122.
11. Rasmont P., Franzén M., Lecocq T., Harpke A., Roberts S.P.M., Biesmeijer J.C., Castro L., Cederberg B., Dvorák L., Fitzpatrick U., Gonseth Y., Haubruge E., Mahé G., Manino A., Michez D., Neumayer J., Ødegaard F., Paukkunen J., Pawlikowski T., Potts S.G., Reemer M., J. Settele, J. Straka, Schweiger O. 2015. Climatic Risk and Distribution Atlas of European Bumblebees. *Biorisk* 10 (Special Issue), 246 pp.
12. Williams P. H. 2016. Bumble Bees of the World, London: The Natural History Museum. <http://www.nhm.ac.uk/research-curation/projects/bombus/index.html>