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Bees (Hymenoptera: Anthophila) of the Sofia Basin, Bulgaria

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Abstract. Urban environments can serve as sources of biodiversity but also as zones of heightened ecological pressure. The Sofia Basin (Bulgaria), which includes the largest city in Bulgaria, represents a suitable region for such an investigation. The present study examines pollinators from the clade Anthophila in the Sofia Basin, based on both literature data and newly collected material. For this purpose, seven scientific publications containing information on wild bees from the studied area were reviewed and analysed. The compiled and newly obtained data were summarised and presented according to the current taxonomic framework, resulting in a list of 161 species belonging to six families, three of which are newly recorded for the region. The conservation status of the wild bee fauna in the Sofia Basin was also assessed, revealing that six species are included in the IUCN Red List of Threatened Species – one Endangered and five Vulnerable. Although preliminary, the results provide a valuable baseline for future monitoring and conservation efforts aimed at preserving pollinator diversity across both urban and natural habitats.

Key words: conservation, faunistic data, IUCN, new records, pollinators.

Introduction

Bees (Hymenoptera, Anthophila) represent one of the most important groups of pollinators, playing an essential role in the reproduction of flowering plants and the maintenance of biodiversity (Ollerton *et al.* 2011). Their contribution to the pollination process determines their critical importance for the stability of terrestrial ecosystems (Potts *et al.* 2016). Approximately four out of every five species of wild and cultivated plants depend on pollinators (European Commission n.d.). The loss of pollinators would lead to a substantial reduction in fruit and seed production or even to a complete failure of seed formation (Layek *et al.* 2023).

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Over the past few decades, numerous studies have documented declines of wild bee populations (Zattara & Aizen 2021; Turley *et al.* 2022; Ghisbain *et al.* 2023). In Europe, the number of threatened wild bee species has more than doubled over the past ten years, increased from 77 in 2014 to 172 by 2025, representing approximately 10% of wild bee species in the region at risk of extinction (Nieto *et al.* 2014; IUCN 2025a). The main driver of this decline is land use intensification, including habitat loss and fragmentation, intensive agricultural practices and the widespread use of pesticides (Gebremariam 2024). Additional factors contributing to the decline in pollinator abundance include climate change, environmental pollution, spread of pathogens and invasive alien species (Gebremariam 2024; European Commission n.d.).

Urban environments, often perceived as hostile to biodiversity, can play an important role in the conservation of pollinators, especially bees (Theodorou *et al.* 2020). Urban green areas such as parks, community gardens, and the green strips between residential buildings serve as important refuges for pollinators by providing nesting sites (Fortel *et al.* 2016) and foraging resources for numerous bee species (Graffigna *et al.* 2024). In Sofia, the capital and largest city of Bulgaria, green areas make up around 47% of the city's territory (Sofia Municipality 2021). However, ongoing overdevelopment poses a serious threat to the preservation of these green areas.

Despite the ecological importance of bees and their recognised vulnerability, faunistic studies of Bulgarian bees remain limited. Many regions, including the Sofia Basin, are still poorly documented. An updated faunistic overview is therefore needed to support conservation and ecological management in this area. The present study aims to conduct a survey to compile a preliminary list of pollinators within the clade Anthophila in the Sofia Basin region, providing a foundation for future research and monitoring of pollinator populations in the area.

Material and Methods

The examined material consists of specimens collected by students during field practices and stored in the Zoological Collection of Sofia University (BFUS), together with additional specimens collected by the authors and kept in their private collections. One of the main sites used for student practices is the experimental field of Sofia University "St. Kliment Ohridski" in Dragalevtsi (42.6548°N, 23.3254°E). The insects were identified based on morphological characteristics using Arnoldi *et al.* (1978), Terzo (1998), Amiet *et al.* (2004, 2007), Terzo *et al.* (2007), Michez *et al.* (2019), Rasmont *et al.* (2021) and Müller (2025). In addition, the interactive identification key for bumblebees available at http://www.interactive-keys.eu/bumblekey/default.aspx was also used.

A preliminary list of wild bees (Anthophila) recorded from the Sofia Basin was prepared based on the zoological material collected by the authors, the specimens examined from the Zoological Collection of Sofia University, Bulgaria (BFUS), and data from the literature. For this purpose, the publications of Meunier (1897), Nedialkov (1914), Drenowsky (1936), Pittioni (1938), Atanassov (1939), Banaszak & Dochkova (2014) and

Dimitrov (2024) were used. The compilation of the list followed the most recent taxonomic updates published in the latest European checklist of wild bees, and the arrangement of taxa also adheres to this classification (Ghisbain *et al.* 2023).

Photographs of the specimens were taken using both a Canon 70D DSLR body equipped with a Canon MP-E 65mm f/2.8 1–5× macro lens, and a mirrorless Canon EOS R50 camera with a Laowa 90mm F2.8 CA-Dreamer 2X macro lens. The images were then focus-stacked using Helicon Focus 8.1.0 software.

Results

Family APIDAE Latreille, 1802

***Bombus lucorum* (Linnaeus, 1761**) (Fig. 1a and 1b)

Material examined – Bulgaria: **Sofia Basin:** Dragoman marsh, 42.9391°N, 22.9772°E, 705 m, 18 Mar 2017, leg. I. Gjonov, 1♀ (BFUS); Sofia: 23-25 Jun 2015, leg. Anonymous 2♀♀ (BFUS); 23-25 Jun 2015, leg. Angelova, 1♂ (BFUS); 23-25 Jun 2015, leg. A. Becheva, 1♂ (BFUS); 23-25 Jun 2015, leg. N. Atanasova, 1♂ (BFUS); 13 Jun 2017, leg. Anonymous 1♀ (BFUS).

Previous records for the Sofia Basin – Pancharevo (Banaszak & Dochkova 2014).

***Bombus terrestris* (Linnaeus, 1758)**

Material examined – Bulgaria: **Sofia Basin:** Sofia: 15 Jun 2015, leg. V. Petrova, 1♀ (BFUS); 26 Jun 2017, leg. B. Stoykova, 1♀ (BFUS), Elin Pelin, 42.7019°N, 23.5829°E, 570 m, 03 Aug 2022, leg. M. Mohammed, 1♂, on *Lavandula angustifolia* Mill.

Previous records for the Sofia Basin – the vicinity of Sofia (Meunier 1897); Sofia (Atanassov 1939); Pancharevo (Banaszak & Dochkova 2014); Vrazhdebna training base of the University of Forestry – Sofia (Dimitrov 2024).

***Bombus hortorum* (Linnaeus, 1761)**

Material examined – Bulgaria: **Sofia Basin:** Sofia, 10 Jul 2016, leg N. Stoyanov, 1♂ (BFUS); 19 Jun 2018, leg. V. Georgiev, 1♂ (BFUS), Sofia, 42.6687°N, 23.3048°E, 581 m, 20 Jul 2021, leg. M. Mohammed, 2♂♂.

Previous records for the Sofia Basin – the vicinity of Sofia (Meunier 1897); Sofia (Nedialkov 1914); Pancharevo (Banaszak & Dochkova 2014).

***Bombus lapidarius* (Linnaeus, 1758)** (Fig. 1c)

Material examined – Bulgaria: **Sofia Basin:** Sofia: 13 Jun 2016, leg. Anonymous 1♀ (BFUS); 12 Jun 2018, leg. Anonymous 1♀ (BFUS).

Previous records for the Sofia Basin – the vicinity of Sofia (Meunier 1897); Sofia (Nedialkov 1914; Atanassov 1939); Knyazhevo (Nedialkov 1914); Pancharevo (Nedialkov 1914; Banaszak & Dochkova 2014).

***Bombus hypnorum* (Linnaeus, 1758)** (Fig. 1d)

Material examined – Bulgaria: **Sofia Basin:** Sofia: 10 Jul 2016, leg. N. Stoyanov, 1♂ (BFUS); 13 Jun 2017, leg. Anonymous, 1♀ (BFUS).

Previous records for the Sofia Basin – Pancharevo (Banaszak & Dochkova 2014).

***Bombus pratorum* (Linnaeus, 1761)** (Fig. 1e)

Material examined – Bulgaria: **Sofia Basin:** Sofia: 23-25 Jun 2015, leg. Anonymous 1♂ (BFUS); 13 Jun 2017, leg. Anonymous 3♂♂ (BFUS).

Previous records for the Sofia Basin – Sofia (Nedialkov 1914; Pittioni 1938; Atanassov 1939); Knyazhevo (Nedialkov 1914; Atanassov 1939); Pancharevo (Banaszak & Dochkova 2014).

***Bombus niveatus* Kriechbaumer, 1870** (Fig. 1f)

Material examined – Bulgaria: **Sofia Basin:** Sofia, 13 Apr 2019, leg. P. Petrov, 1♀ (BFUS); leg. D. Gradinarov, 1♂ (BFUS).

Previous records for the Sofia Basin – Sofia (Nedialkov 1914), as *Bombus vorticosus* Gerst. var. *niveatus* Kriechb., (Pittioni 1938), as *Bombus vorticosus* Gerst., (Atanassov 1939), as *Bombus vorticosus* Gerst.; Pancharevo (Atanassov 1939), as *Bombus vorticosus* Gerst.

***Bombus humilis* Illiger, 1806** (Fig. 1g)

Material examined – Bulgaria: **Sofia Basin:** Sofia, 23-25 Jun 2015, leg. Anonymous 1♀ (BFUS); Buhovo, 26 Apr 2017, leg. M. Pramatarova, 1♀ (BFUS).

Previous records for the Sofia Basin – Sofia (Nedialkov 1914), as *Bombus variabilis* Schmied., (Pittioni 1938), as *Bombus helferanus* Seidl., (Atanassov 1939), as *Bombus helferanus* Seidl.; Knyazhevo (Nedialkov 1914), as *Bombus variabilis* Schmied.; Pancharevo (Nedialkov 1914), as *Bombus variabilis* Schmied., (Pittioni 1938), as *Bombus helferanus* Seidl.

***Bombus pascuorum* (Scopoli, 1763)** (Fig. 1h)

Material examined – Bulgaria: **Sofia Basin:** Sofia: 23-25 Jun 2015, leg. R. Birkovski, 1♀ (BFUS); 23-25 Jun 2015, leg. H. Vasilev, 1♀ (BFUS); 23-25 Jun 2015, leg. Anonymous 1♀ (BFUS); 19 Jun 2018, leg. A. Gancheva, 1♀ (BFUS); Knyazhevo, 12 Jun 2018, leg. G. Dimitrova, 1♀ (BFUS).

Previous records for the Sofia Basin – Sofia (Nedialkov 1914), as *Bombus agrorum* Fab., (Atanassov 1939), as *Bombus agrorum* F.; Pancharevo (Banaszak & Dochkova 2014).

***Bombus sylvarum* (Linnaeus, 1761)**

Material examined – Bulgaria: **Sofia Basin:** Sofia, 15 Jun 2015, leg. Anonymous 2♀♀ (BFUS).

Previous records for the Sofia Basin – the vicinity of Sofia (Meunier 1897); Sofia (Nedialkov 1914); Pancharevo (Nedialkov 1914); Vrazhdebna training base of the University of Forestry – Sofia (Dimitrov 2024).

***Ceratina cucurbitina* (Rossi, 1792)** (Fig. 2a)

Material examined – Bulgaria: **Sofia Basin:** Sofia, 42.7473°N, 23.2728°E, 532 m, 21 Jun 2021, leg. M. Mohammed, 1♂.

Previous records for the Sofia Basin – Sofia (Nedialkov 1914); Pancharevo (Nedialkov 1914).

***Ceratina cyanea* (Kirby, 1802)** (Fig. 2b and 2c)

Material examined – Bulgaria: **Sofia Basin:** Elin Pelin, 42.7019°N, 23.5829°E, 570 m, 03 Aug 2022, leg. M. Mohammed, 1♀.

Previous records for the Sofia Basin – Sofia (Nedialkov 1914); Pancharevo (Nedialkov 1914).

***Xylocopa violacea* Linnaeus, 1758** (Fig. 2d)

Material examined – Bulgaria: **Sofia Basin:** Sofia, 42.7476°N, 23.2680°E, 530 m, 04 Oct 2020, leg. M. Mohammed, 1♂.

Previous records for the Sofia Basin – First record for Sofia Basin

Family HALICTIDAE Thomson, 1869

***Halictus resurgens* Nurse, 1903** (Fig. 2e)

Material examined – Bulgaria: **Sofia Basin:** Sofia, 42.7476°N, 23.2680°E, 530 m, 04 Oct 2020, leg. M. Mohammed, 2♀♀ and 3♂♂.

Previous records for the Sofia Basin – First record for Sofia Basin.

***Systropha planidens* Giraud, 1861** (Fig. 2f)

Material examined – Bulgaria: **Sofia Basin:** Katina village, 42.8394°N, 23.3371°E, 620 m, 02 Jul 2022, leg. M. Mohammed, 1♂, on *Centaurea scabiosa* L.

Previous records for the Sofia Basin – Pancharevo (Nedialkov 1914), (Banaszak & Dochkova 2014).

Family MEGACHILIDAE Latreille, 1802

***Anthidium manicatum* (Linnaeus, 1758)** (Fig. 2g)

Material examined – Bulgaria: **Sofia Basin:** Elin Pelin, 42.7019°N, 23.5829°E, 570 m, 03 Aug 2022, leg. M. Mohammed, 1♂, on *Lavandula angustifolia* Mill.

Previous records for the Sofia Basin – the vicinity of Sofia (Meunier 1897); Sofia (Nedialkov 1914); Knyazhevo (Nedialkov 1914); Pancharevo (Nedialkov 1914).

***Anthidium oblongatum* (Illiger, 1806)** (Fig. 2h)

Material examined – Bulgaria: **Sofia Basin:** Elin Pelin, 42.7019°N, 23.5829°E, 570 m, 03 Aug 2022, leg. M. Mohammed, 2♂♂, on *Lavandula angustifolia* Mill.

Previous records for the Sofia Basin – First record for Sofia Basin.

***Osmia bicornis* (Linnaeus, 1758)**

Material examined – Bulgaria: **Sofia Basin:** Sofia, 42.6977°N, 23.3224°E, 554 m, 04 Mar 2021, leg. M. Mohammed, 6♂♂.

Previous records for the Sofia Basin – Sofia (Nedialkov 1914); Knyazhevo (Nedialkov 1914); Dragalevtsi (Nedialkov 1914).

A preliminary inventory of wild bees from the Sofia Basin:

Family ANDRENIDAE Latreille, 1802

Tribe Andrenini Latreille, 1802

Genus *Andrena* Fabricius, 1775

Subgenus *Aenandrena* Warncke, 1968
Andrena aeneiventris Morawitz, 1872

Subgenus *Andrena* Fabricius, 1775
Andrena varians (Kirby, 1802)

Subgenus *Charitandrena* Hedicke, 1933
Andrena hattorfiana (Fabricius, 1775)

Subgenus *Chlorandrena* Pérez, 1890
Andrena humilis Imhoff, 1832
Andrena taraxaci Giraud, 1861

Subgenus *Euandrena* Hedicke, 1933
Andrena bicolor Fabricius, 1775

Subgenus *Hamandrena* Dubitzky, 2010
Andrena nasuta Giraud, 1863

Subgenus *Holandrena* Pérez, 1890
Andrena variabilis Smith, 1853

Subgenus *Hoplandrena* Pérez, 1890
Andrena scotica Perkins, 1916

Subgenus *Lepidandrena* Hedicke, 1933
Andrena mocsaryi Schmiedeknecht, 1884

Subgenus *Margandrena* Warncke, 1968
Andrena marginata Fabricius, 1776

Subgenus *Melandrena* Pérez, 1890
Andrena flavipes Panzer, 1799
Andrena thoracica (Fabricius, 1775)

Subgenus *Micrandrena* Ashmead, 1899
Andrena distinguenda Schenck, 1871
Andrena minutula (Kirby, 1802)

Subgenus *Notandrena* Pérez, 1890
Andrena nitidiuscula Schenck, 1853

Subgenus *Opandrena* Robertson, 1902
Andrena schencki Morawitz, 1866

Subgenus *Simandrena* Pérez, 1890
Andrena dorsata (Kirby, 1802)

Subgenus *Taeniandrena* Hedicke, 1933
Andrena afzeliella (Kirby, 1802)

Subgenus *Trachandrena* Robertson, 1902
Andrena haemorrhoa (Fabricius, 1781)

Tribe Panurgini Leach, 1815

Genus *Panurgus* Panzer, 1806
Subgenus *Panurgus* Panzer, 1806
Panurgus banksianus (Kirby, 1802)
Panurgus calcaratus (Scopoli, 1763)

Family APIDAE Latreille, 1802

Tribe Anthophorini Dahlbom, 1835

Genus *Amegilla* Friese, 1897
Subgenus *Amegilla* Friese, 1897
Amegilla quadrifasciata (de Villers, 1789)

Subgenus *Zebramegilla* Brooks, 1988
Amegilla albigena (Lepeletier, 1841)
Amegilla salviae (Morawitz, 1876)
Amegilla savignyi (Lepeletier, 1841)

Genus *Anthophora* Latreille, 1803
Subgenus *Anthophora* Latreille, 1803
Anthophora crinipes Smith, 1854

Subgenus *Heliophila* Klug, 1807
Anthophora bimaculata (Panzer, 1798)

Subgenus *Melea* Sandhouse, 1943
Anthophora plagiata (Illiger, 1806)

Subgenus *Petalosternon* Brooks, 1988
Anthophora crassipes Lepeletier, 1841

Subgenus *Pyganthophora* Brooks, 1988
Anthophora aestivalis (Panzer, 1801)
Anthophora retusa (Linnaeus, 1758)

Genus *Habropoda* Smith, 1854
Habropoda zonatula Smith, 1854

Tribe Biastini Linsley & Michener, 1939

Genus *Biastes* Panzer, 1806
Biastes brevicornis (Panzer, 1798)

Tribe Bombini Latreille, 1802

Genus *Bombus* Latreille, 1802
Subgenus *Bombus* Latreille, 1802
Bombus lucorum (Linnaeus, 1761)
Bombus terrestris (Linnaeus, 1758)

Subgenus *Megabombus* Dalla Torre, 1880
Bombus argillaceus Scopoli, 1763
Bombus hortorum (Linnaeus, 1761)

Subgenus *Melanobombus* Dalla Torre, 1880
Bombus lapidarius (Linnaeus, 1758)

Subgenus *Psithyrus* Lepeletier, 1833
Bombus barbutellus (Kirby, 1802)
Bombus campestris (Panzer, 1801)
Bombus rupestris (Fabricius, 1793)
Bombus vestalis (Geoffroy, 1785)

Subgenus *Pyrobombus* Dalla Torre, 1880
Bombus hypnorum (Linnaeus, 1758)
Bombus pratorum (Linnaeus, 1761)

Subgenus *Sibiricobombus* Vogt, 1911
Bombus niveatus Kriechbaumer, 1870

Subgenus *Subterraneobombus* Vogt, 1911
Bombus subterraneus (Linnaeus, 1758)

Subgenus *Thoracobombus* Dalla Torre, 1880
Bombus humilis Illiger, 1806
Bombus muscorum (Linnaeus, 1758)
Bombus pascuorum (Scopoli, 1763)
Bombus pomorum (Panzer, 1805)
Bombus ruderarius (Müller, 1776)
Bombus sylvarum (Linnaeus, 1761)
Bombus zonatus Smith, 1854

Tribe Ceratinini Latreille, 1802

Genus *Ceratina* Latreille, 1802
Subgenus *Ceratina* Latreille, 1802
Ceratina cucurbitina (Rossi, 1792)

Subgenus *Euceratina* Hirashima, Moure & Daly, 1971
Ceratina chalcites Germar, 1839
Ceratina cyanea (Kirby, 1802

Tribe Eucerini Latreille, 1802

Genus *Eucera* Scopoli, 1770
Subgenus *Cubitalia* Friese, 1911
Eucera caspica Morawitz, 1873
Eucera curvitarsis Mocsáry, 1879
Eucera hispana Lepeletier, 1841
Eucera interrupta Bär, 1850
Eucera longicornis (Linnaeus, 1758)
Eucera nigrifacies Lepeletier, 1841
Eucera pollinosa Smith, 1854
Eucera proxima Morawitz, 1875
Eucera seminuda Brullé, 1832

Genus *Tetralonia* Spinola, 1839
Tetralonia dentata (Germar, 1839)
Tetralonia malvae (Rossi, 1790)
Tetralonia nana Morawitz, 1874
Tetralonia ruficornis (Fabricius, 1804)
Tetralonia salicariae (Lepeletier, 1841)
Tetralonia scabiosae Mocsáry, 1881

Tribe Nomadini Latreille, 1802

Genus *Nomada* Scopoli, 1770

Nomada alboguttata Herrich-Schäffer, 1839
Nomada fucata Panzer, 1798
Nomada fulvicornis Fabricius, 1793
Nomada furva Panzer, 1798
Nomada ruficornis (Linnaeus, 1758)
Nomada sexfasciata Panzer, 1799
Nomada succincta Panzer, 1798
Nomada zonata Panzer, 1798

Tribe Xylocopini Latreille, 1802

Genus *Xylocopa* Latreille, 1802

Subgenus *Xylocopa* Latreille, 1802
Xylocopa valga Gerstaecker 1872
Xylocopa violacea Linnaeus, 1758

Family COLLETIDAE Lepeletier, 1841

Tribe Colletini Latreille, 1802

Genus *Colletes* Latreille, 1802

Colletes cunicularius (Linnaeus, 1761)
Colletes fodiens (Fourcroy, 1785)

Tribe Hylaeini Viereck, 1916

Genus *Hylaeus* Fabricius, 1793

Subgenus *Dentigera* Popov, 1939
Hylaeus brevicornis Nylander, 1852

Subgenus *Hylaeus* Fabricius, 1793
Hylaeus annulatus (Linnaeus, 1758)
Hylaeus nigritus (Fabricius, 1798)

Subgenus *Paraprosopis* Popov, 1939
Hylaeus sinuatus (Schenck, 1853)

Subgenus *Patagiata* Blüthgen, 1949
Hylaeus difformis (Eversmann, 1852)

Subgenus *Prosopis* Fabricius, 1804
Hylaeus variegatus (Fabricius, 1798)

Family HALICTIDAE Thomson, 1869

Subfamily Halictinae Thomson, 1869

Genus *Halictus* Latreille, 1804
Subgenus *Halictus* Latreille, 1804
Halictus quadricinctus (Fabricius, 1776)
Halictus resurgens Nurse, 1903
Halictus scabiosae (Rossi, 1790)
Halictus sexcinctus (Fabricius, 1775)

Subgenus *Protohalictus* Pesenko, 1985
Halictus rubicundus (Christ, 1791)

Subgenus *Tytthalictus* Pesenko, 1984
Halictus maculatus Smith, 1848

Genus *Lasioglossum* Curtis, 1833
Subgenus *Biennilaeus* Pesenko, 2007
Lasioglossum marginatum (Brullé, 1832)

Subgenus *Dialictus* Robertson, 1902
Lasioglossum leucopus (Kirby, 1802)
Lasioglossum morio (Fabricius, 1793)

Subgenus *Hemihalictus* Cockerell, 1897
Lasioglossum griseolum (Morawitz, 1872)
Lasioglossum lucidulum (Schenck, 1861)
Lasioglossum parvulum (Schenck, 1853)
Lasioglossum punctatissimum (Schenck, 1853)
Lasioglossum puncticolle (Morawitz, 1872)
Lasioglossum quadrisignatum (Schenck, 1853)
Lasioglossum villosulum (Kirby, 1802)

Subgenus *Lasioglossum* Curtis, 1833
Lasioglossum quadrinotatum (Kirby, 1802)
Lasioglossum sexnotatulum (Nylander, 1852)

Subgenus *Leuchalictus* Warnke, 1975
Lasioglossum leucozonium (Schrank, 1781)
Lasioglossum zonulus (Smith, 1848)

Subgenus *Pyghalictus* Warncke, 1975
Lasioglossum glabriusculum (Morawitz, 1872)
Lasioglossum politum (Schenck, 1853)

Subgenus *Sphecodogastra* Ashmead, 1899
Lasioglossum albipes (Fabricius, 1781)
Lasioglossum calceatum (Scopoli, 1763)
Lasioglossum interruptum (Panzer, 1798)
Lasioglossum laeve (Kirby, 1802)
Lasioglossum laticeps (Schenck, 1868)
Lasioglossum malachurum (Kirby, 1802)
Lasioglossum pauxillum (Schenck, 1853)

Genus *Seladonia* Robertson, 1918
Subgenus *Pachyceble* Moure, 1940
Seladonia tumulorum (Linnaeus, 1758)

Subgenus *Seladonia* Robertson, 1918
Seladonia gemmea (Dours, 1872)

Genus *Sphecodes* Latreille, 1804
Sphecodes gibbus (Linnaeus, 1758)

Subfamily Rophitinae Schenck, 1866

Genus *Rophites* Spinola, 1808
Rophites quinquespinosus Spinola, 1808

Genus *Systropha* Illiger, 1805
Systropha curvicornis (Scopoli, 1770)
Systropha planidens Giraud, 1861

Family MEGACHILIDAE Latreille, 1802

Tribe Anthidiini Ashmead, 1899

Genus *Anthidiellum* Cockerell, 1904
Anthidiellum strigatum (Panzer, 1805)

Genus *Anthidium* Fabricius, 1804
Subgenus *Anthidium* Fabricius, 1804
Anthidium manicatum (Linnaeus, 1758)
Anthidium punctatum Latreille, 1809

Subgenus *Proanthidium* Friese, 1898
Anthidium oblongatum (Illiger, 1806)

Genus *Pseudoanthidium* Friese, 1898
Subgenus *Royanthidium* Pasteels, 1969
Pseudoanthidium reticulatum (Mocsáry, 1884)

Genus *Stelis* Panzer, 1806
Subgenus *Stelis* Panzer, 1806
Stelis breviuscula (Nylander, 1848)
Stelis phaeoptera (Kirby, 1802)

Tribe Megachilini Latreille, 1802

Genus *Coelioxys* Latreille, 1809
Subgenus *Melissoctonia* Rocha-Filho, 2016
Coelioxys conoideus (Illiger, 1806)

Subgenus *Paracoelioxys* Gribodo, 1884
Coelioxys elongatus Lepeletier, 1841

Subgenus *Rozeniana* Rocha-Filho, 2016
Coelioxys aurolimbatus Förster, 1853
Coelioxys rufescens Lepeletier & Serville, 1825

Genus *Megachile* Latreille, 1802
Subgenus *Chalicodoma* Lepeletier, 1841
Megachile baetica (Gerstaecker, 1869)

Subgenus *Eutricharaea* Thomson, 1872
Megachile argentata (Fabricius, 1793)
Megachile rotundata (Fabricius, 1787)

Subgenus *Megachile* Latreille, 1802
Megachile centuncularis (Linnaeus, 1758)
Megachile genalis Morawitz, 1880
Megachile versicolor Smith, 1844

Subgenus *Pseudomegachile* Friese, 1898
Megachile ericetorum (Lepeletier, 1841)

Subgenus *Xanthosarus* Robertson, 1903
Megachile lagopoda (Linnaeus, 1761)

Tribe Osmiini Newman, 1834

Genus *Chelostoma* Latreille, 1809

Subgenus *Chelostoma* Latreille, 1809

Chelostoma florisomne (Linnaeus, 1758)

Subgenus *Foveosmia* Warncke, 1991

Chelostoma campanularum (Kirby, 1802)

Subgenus *Gyrodromella* Michener, 1997

Chelostoma rapunculi (Lepeletier, 1841)

Genus *Heriades* Spinola, 1808

Subgenus *Heriades* Spinola, 1808

Heriades crenulata Nylander, 1856

Genus *Hoplitis* Klug, 1807

Subgenus *Anthocopa* Lepeletier & Serville, 1825

Hoplitis papaveris (Latreille, 1799)

Genus *Osmia* Panzer, 1806

Subgenus *Allosmia* Tkalců, 1974

Osmia rufohirta Latreille, 1811

Subgenus *Helicosmia* Thomson, 1872

Osmia caerulescens (Linnaeus, 1758)

Osmia melanogaster Spinola, 1808

Osmia niveata (Fabricius, 1804)

Subgenus *Hoplosmia* Thomson, 1872

Osmia bidentata Morawitz, 1876

Subgenus *Metallinella* Tkalců, 1966

Osmia brevicornis (Fabricius, 1798)

Subgenus *Osmia* Panzer, 1806

Osmia bicornis (Linnaeus, 1758)

Osmia cornuta (Latreille, 1805)

Osmia tricornis Latreille, 1811

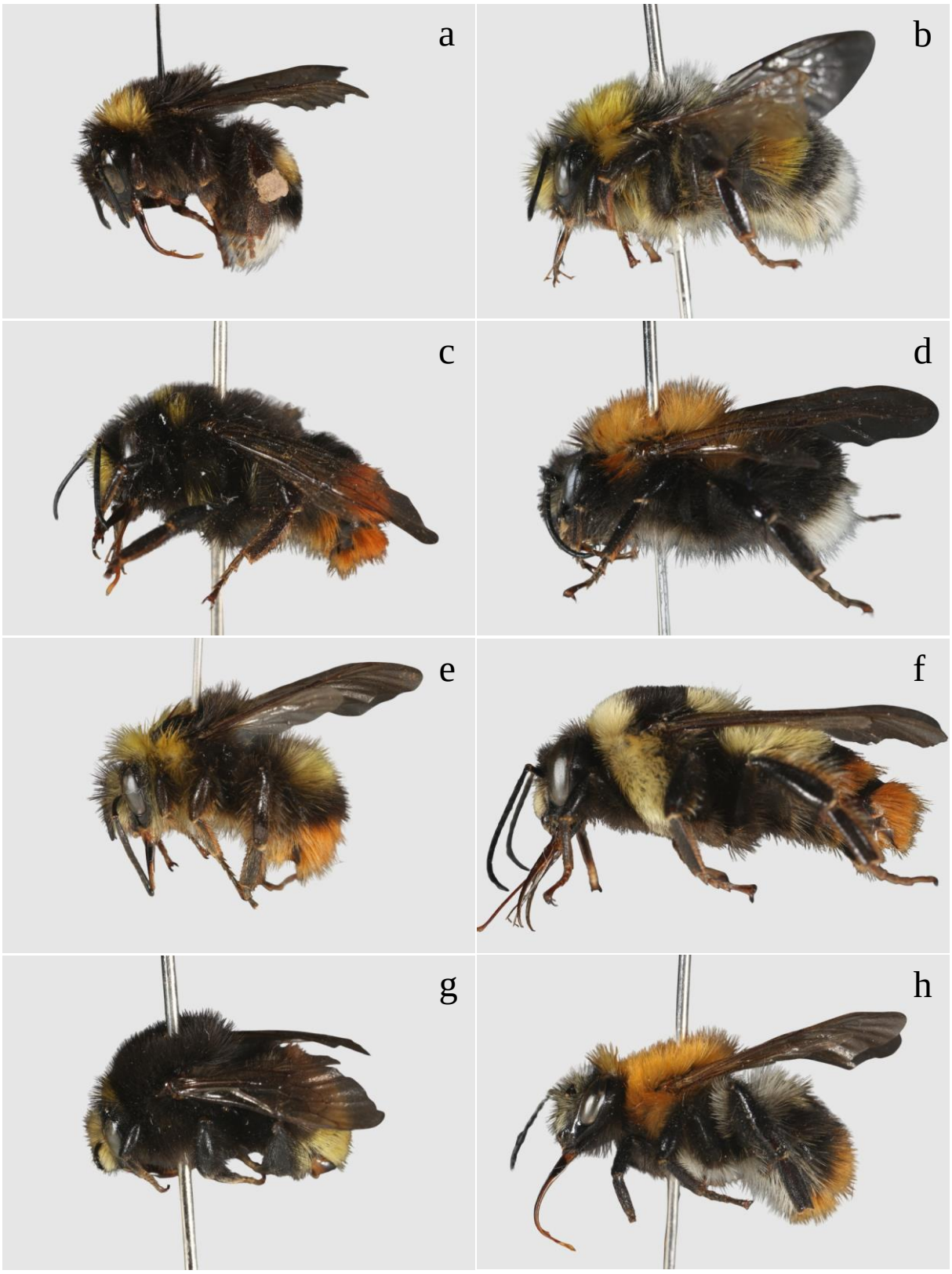

Figure 1. a – *Bombus lucorum*, female; b – same as 1a, male; c – *B. lapidarius*, male; d – *B. hypnorum*, female; e – *B. pratorum*, male; f – *B. niveatus*, male; g – *B. humilis*, male; h – *B. pascuorum*, male.

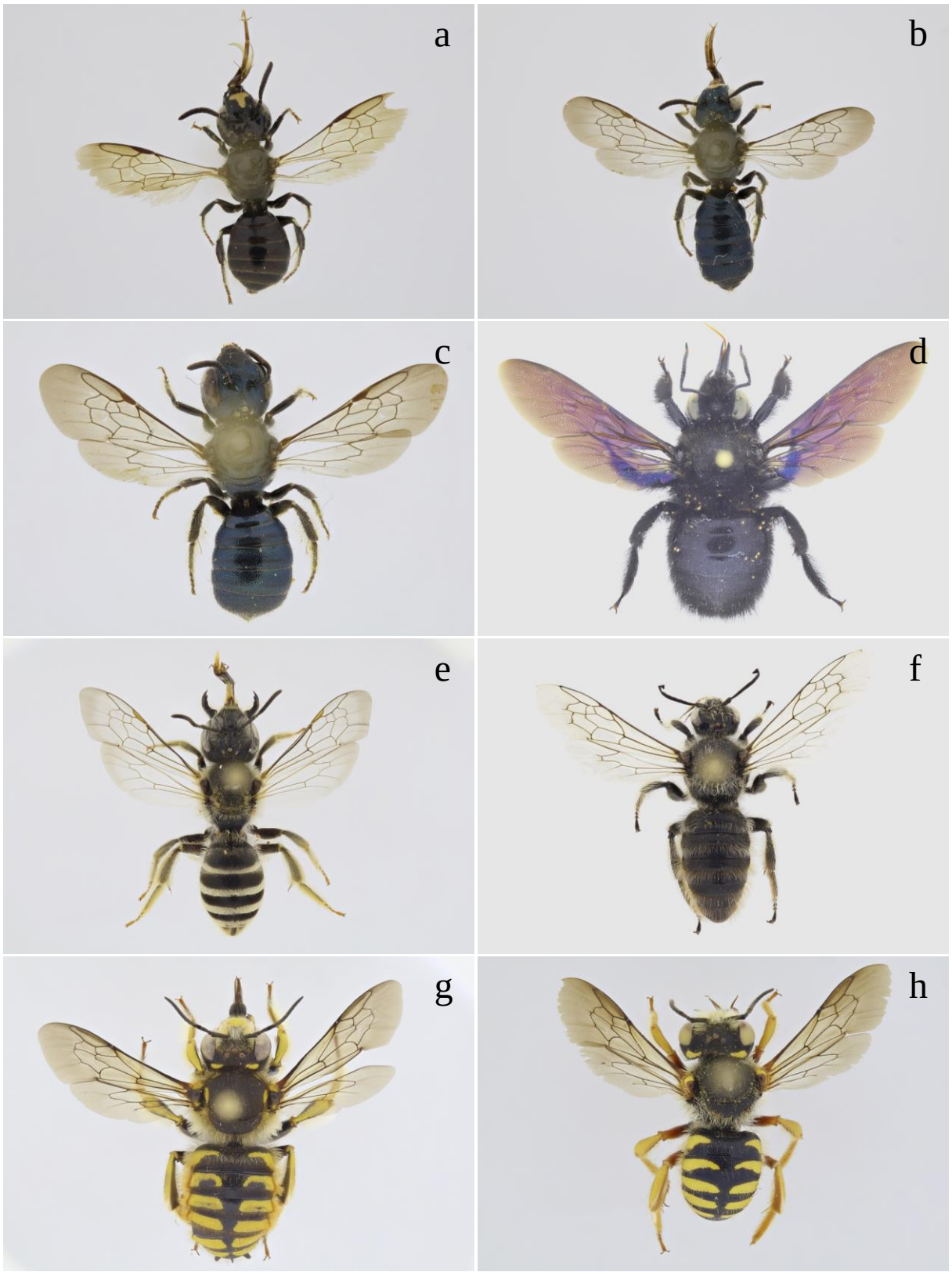

Figure 2. a – *Ceratina cucurbitina*, male; b – *C. cyanea*, male; c – *C. cyanea*, female; d – *Xylocopa violacea*, male; e – *Halictus resurgens*, female; f – *Systropha planidens*, male; g – *Anthidium manicatum*, male; h – *A. oblongatum*, male.

Family MELITTIDAE Schenck, 1860

Tribe Dasypodaini Sagemehl, 1882

Genus *Dasypoda* Latreille, 1802

Subgenus *Dasypoda* Latreille, 1802

Dasypoda hirtipes (Fabricius, 1793)

Tribe Macropidini Robertson, 1904

Genus *Macropis* Panzer, 1809

Macropis fulvipes (Fabricius, 1804)

Tribe Melittini Schenck, 1860

Genus *Melitta* Kirby, 1802

Melitta dimidiata Morawitz, 1876

Discussion

This study provides new data on the occurrence and geographic distribution of species from the clade Anthophila in the Sofia Basin, Bulgaria, and presents a preliminary list of the wild bees recorded from the Sofia region.

A total of 161 wild bee species, belonging to 33 genera and six families, are known from the Sofia Basin, distributed as follows: Andrenidae (22 species), Apidae (60 species), Colletidae (8 species), Halictidae (35 species), Megachilidae (33 species) and Melittidae (3 species). They represent approximately 7.5% of all wild bee species known from Europe.

To date, no systematic surveys have been conducted in the Sofia Basin, indicating that the actual species richness is likely higher than currently known. In support of this, three species are reported here for the first time from the studied area: *Xylocopa violacea* (Apidae), *Halictus resurgens* (Halictidae) and *Anthidium oblongatum* (Megachilidae). It should also be noted that these newly recorded species for the Sofia Basin were found in the outskirts of Sofia, where rapid urban expansion poses a significant threat to the biodiversity concentrated in parks and suburban green areas. In this context, sites such as the experimental field of Sofia University “St. Kliment Ohridski” represents important refuges that contribute to the conservation of urban pollinator communities and should be prioritised for long-term protection.

According to the IUCN Red List of Threatened Species (IUCN 2025b), six of the species recorded from the Sofia Basin are classified as Endangered (one), and Vulnerable (five) (Table 1).

Table 1. Wild bee species (Anthophila) from the Sofia Basin included in the IUCN Red List of Threatened Species (EN – Endangered, VU - Vulnerable).

Family	Species	Categories
Halictidae	*Lasioglossum quadrisignatum* (Schenck, 1853)	EN
Halictidae	*Lasioglossum laeve* (Kirby, 1802)	VU
Halictidae	*Rophites quinquespinosus* Spinola, 1808	VU
Apidae	*Bombus muscorum* (Linnaeus, 1758)	VU
Apidae	*Bombus pomorum* (Panzer, 1805)	VU
Apidae	*Bombus zonatus* Smith, 1854	VU

For the three *Bombus* species listed in the IUCN Red List of Threatened Species, the most recent records from Bulgaria date back nearly 50 years. Although *B. muscorum* has been reported from numerous localities, all available records are outdated, with the most recent one from 1987 (Dochkova *et al.* 1987). For the other two species, *B. pomorum* and *B. zonatus*, the most recent records from Bulgaria date to around 1975. The lack of recent observations applies to all other species included in the list as well. None of these species were detected during the present field surveys, which suggests that updated research and conservation assessments are needed to clarify their current distribution and status.

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