Pollinator Academy

Genus: *Anthophora*

Female

Male

Genus: *Anthophora* Latreille, 1803

Clade: Anthophila

Family: Apidae

SubFamily: Apinae

Tribe: Anthophorini

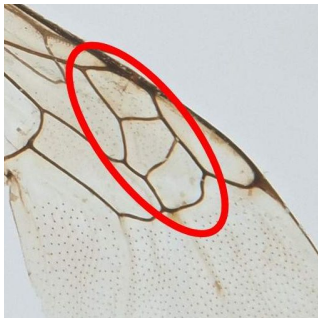
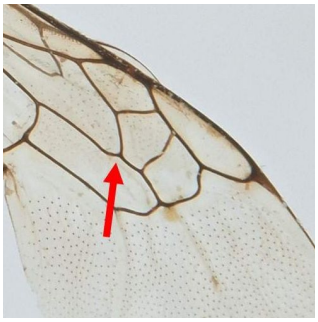
Number of species of this genus found in Europe: 77

Morphology & diagnosis

They are robust bees with long to very long-tongues. The clypeus is protuberant and the antennae are relatively short in comparison with other groups. The wings always have three submarginal cells, all of them of equivalent size, and the marginal cell is short. The first recurrent vein reaches the middle of the second submarginal cell, and the nervulus is interfurcal. Males generally have at least some white or yellow facial markings, and some females also show similar markings, though females of most European species show dark faces. They often show a dense pilosity on the abdomen, which can be homogeneously distributed or forming bands. They have a dense scopa on the hind tibia and basitarsus. *Anthophora* can be recognized by the presence of arolium between the claws. Many *Anthophora* males display characteristic pilosity on the mid-leg, this pilosity comprising feathery or dense fan-like hairs.. Regarding their behaviour, they are fast flyers. They don't always stop on the flowers to forage, and can forage on flight.

Summary of distinctive traits

- Stout species, with typically protuberant clypeus and short antennae
- Short marginal cell (a)
- The 3 submarginal cells of equivalent size (b)
- 1st recurrent vein reaching the middle of the second submarginal cell (c)
- Arolia present between the tarsal claws


(a) *Anthophora quadrimaculata* Male

(b) *Anthophora quadrimaculata* Male

(c) *Anthophora quadrimaculata* Male

(d) *Anthophora bimaculata* Male

General comments on identification to species level

For males, the form of the hind legs, the pilosity on the middle leg as well as the yellow markings on the face and the genitalia are the most used diagnostic characters. For females, the criteria are mostly related to hair colour and placement, rendering female identification highly challenging due to the lack of structural characters. While preparing specimens, it is very important to extract the male genitalia and make sure that the specimen body pilosity is clean and well preserved.

Morphologically similar genera, and how to distinguish them

- ***Anthophora - Amegilla***

Anthophora species tend to be larger and have arolia between the tarsal claws. *Amegilla* species tend to be smaller with well delimited hairs bands on the metasoma, and lack arolia between the tarsal claws.

- ***Anthophora - Habropoda***

Anthophora species have a distinctly short marginal cell, as well as the 1st recurrent vein which reaches the middle of submarginal cell 2 and an interfurcal nervulus. *Habropoda* species have a more elongated tip to the marginal cell (the apex of the anterior margin of submarginal cell 3 reaches only the middle of the marginal cell), the 1st recurrent vein reaches the apex of submarginal cell 2, and the nervulus is post-furcal.

- ***Anthophora - Bombus***

Anthophora species have non-aligned ocelli, often bear yellow markings on the face and have no vein partially-crossing the 1st submarginal cell. *Bombus* species have aligned ocelli, never bear yellow markings on the face, and have a vein partially-crossing the 1st submarginal cell.

Geographical distribution and global diversity

Anthophora are found in all the continents except Antarctica. The highest diversity is seen in the regions with Mediterranean or steppe vegetation types. The genus *Anthophora* includes about 400 species worldwide.

Presence in Europe

They are present in all Europe except Iceland.

Biology

Seasonal life cycle

Most species are univoltine, but in the south of their distribution some species are bivoltine (Friese 1923). Males emerge earlier than females, with sometimes some weeks between the emergence of both sexes in species like *A. plumipes* (Westrich 1989, Stone et al. 1995,). *Anthophora* can be found in forest edges, quarries, steep-sided riverbanks, ruderal areas, and open parks. These habitats provide large flower choices for these predominantly polylectic bees.

Reproduction

Males have two mating strategies; if there are few males competing, they adopt a territorial strategy, if there are many males competing, they switch to a patrol strategy.

In territorial strategy, males fly around a number of flowers and alights onto twigs and leaves nearby, sometimes biting them, probably to deposit pheromones. It then sweeps over with the tarsi of the middle legs its back and over twigs and leaves. Males try to mate with every female that comes close. Jacobi (1997) suspects that females follow the pheromone scent to mate and therefore uses the term "rendezvous copulations".

During the patrolling strategy, several males fly around permanent posts. As soon as they see a female they follow her. Sometimes a female can have three or four males chasing her at the same time. Males will try to mate once the female lands.After mating, the inseminated female flies slowly to look for a suitable nest site. This can be near the nest it emerged from.

Nesting

Most species nest in the ground, some in rotten wood or in existing cavities in wood or plant stems. Vertical surfaces are preferred for ground nests but flat surfaces can be used as well. Bare soil must be present in both cases. All species of *Anthophora* are solitary, but females of some species form nest aggregations.

Parasites

For most *Anthophora* species, mourning bees (*Melecta*) are the brood parasites. However, some *Anthophora* species are attacked by other bee genera such as *Thyreus*

(e.g. *Anthophora quadrimaculata, Anthophora femorata*) and *Ammobates punctatus* (*Anthophora bimaculata*), as well as by the larvae of oil beetles.

Floral preferences

Most species are polylectic, but as they are long-tongue bees they show a strong preference for flowers with deep corollas and deep-set nectaries, such as Lamiaceae. Females fly fast while foraging, producing a buzzing noise. Some species such as *Anthophora furcata* uses buzzing for foraging, similar to Bombus (Müller et al. 1997). The females vibrates through contractions of the flight muscles, and pushes against the flower anthers with the hairy clypeus. This causes to pollen to fall on it's head, which it will then sweep onto the scopa. Since many other species have hairy bodies, they are though to use this foraging behavior as well. Further study is required, but some members of the subgenus Paramegilla Friese, 1897 are likely to be oligolectic on botanical families including Asteraceae, Boraginaceae, and Lamiaceae.

Type species: *Apis pilipes* Fabricius, 1775 = *Apis plumipes* Pallas, 1772, designated by Commission Opinion 151, 1944.

Synonyms: *Megilla* Fabricius, 1804; *Saropoda* Latreille, 1809; *Micranthophora* Cockerell, 1906; *Solamegilla* Marikovskaya, 1980.

Etymology: from Greek roots Antho- = flower, and phor- = carry, flower carrier bee

Common names:

FR: Anthophores

ENG: flower bees (UK), digger bees (US)

GER: die Pelzbienen

List of species found in Europe:

1. *Anthophora (Anthophora) vernalis* Morawitz, 1877
2. *Anthophora (Anthophora) canescens* Brullé, 1832
3. *Anthophora (Anthophora) crinipes* Smith, 1854
4. *Anthophora (Anthophora) fulvitarsis* Brullé, 1832
5. *Anthophora (Anthophora) plumipes* (Pallas, 1772)
6. *Anthophora (Anthophora) punctilabris* Pérez, 1879
7. *Anthophora (Anthophora) senescens* Lepeletier, 1841
8. *Anthophora (Caranthophora) dufourii* Lepeletier, 1841
9. *Anthophora (Caranthophora) pubescens* (Fabricius, 1781)
10. *Anthophora (Clisodon) furcata* (Panzer, 1798)
11. *Anthophora (Dasymegilla) quadrimaculata* (Panzer, 1798)
12. *Anthophora (Dasymegilla) raddei* Morawitz, 1875
13. *Anthophora (Heliophila) bimaculata* (Panzer, 1798)
14. *Anthophora (Heliophila) fulvodimidiata* Dours, 1869
15. *Anthophora (Heliophila) lanzarotensis* (Tkalců, 1993)
16. *Anthophora (Heliophila) lieftincki* (Tkalců, 1993)
17. *Anthophora (Heliophila) pulverosa* Smith, 1854
18. *Anthophora (icertae sedis) laevigata* Spinola, 1808
19. *Anthophora (icertae sedis) porphyrea* Westrich, 1993
20. *Anthophora (icertae sedis) purpuraria* Westrich, 1993
21. *Anthophora (icertae sedis) uniciliata* Sichel, 1860
22. *Anthophora (Lophanthophora) affinis* Brullé, 1832
23. *Anthophora (Lophanthophora) agama* Radoszkowski, 1869
24. *Anthophora (Lophanthophora) atricilla* Eversmann, 1846
25. *Anthophora (Lophanthophora) cinerascens* Lepeletier, 1841
26. *Anthophora (Lophanthophora) crysocnemis* Morawitz, 1877
27. *Anthophora (Lophanthophora) dispar* Lepeletier, 1841

28. *Anthophora (Lophanthophora) hispanica* (Fabricius, 1787)
29. *Anthophora (Lophanthophora) mucida* Gribodo, 1873
30. *Anthophora (Lophanthophora) robusta* (Klug, 1845)
31. *Anthophora (Lophanthophora) rutilans* Dours, 1869
32. *Anthophora (Melea) plagiata* (Illiger, 1806)
33. *Anthophora (Mystacanthophora) borealis* Morawitz, 1864
34. *Anthophora (Paramegilla) astragali* Morawitz, 1878
35. *Anthophora (Paramegilla) balassogloi* (Radoszkowski, 1877)
36. *Anthophora (Paramegilla) balneorum* Lepeletier, 1841
37. *Anthophora (Paramegilla) deserticola* Morawitz, 1873
38. *Anthophora (Paramegilla) dubia* Eversmann, 1852
39. *Anthophora (Paramegilla) femorata* (Olivier, 1789)
40. *Anthophora (Paramegilla) ferruginea* Lepeletier, 1841
41. *Anthophora (Paramegilla) fulvipes* Eversmann, 1846
42. *Anthophora (Paramegilla) gallica* Dalla Torre & Friese, 1895
43. *Anthophora (Paramegilla) gracilipes* Morawitz, 1873
44. *Anthophora (Paramegilla) harmalae* Morawitz, 1878
45. *Anthophora (Paramegilla) ireos* (Pallas, 1773)
46. *Anthophora (Paramegilla) larvata* Giraud, 1863
47. *Anthophora (Paramegilla) nigrovittata* Dours, 1869
48. *Anthophora (Paramegilla) podagra* Lepeletier, 1841
49. *Anthophora (Paramegilla) ponomarevae* Brooks, 1988
50. *Anthophora (Paramegilla) quadricolor* (Erichson, 1840)
51. *Anthophora (Paramegilla) segnis* Eversmann, 1852
52. *Anthophora (Paramegilla) socia* (Klug, 1845)
53. *Anthophora (Petalosternon) calcarata* Lepeletier, 1841
54. *Anthophora (Petalosternon) crassipes* Lepeletier, 1841

55. *Anthophora (Petalosternon) orotavae* (Saunders, 1904)
56. *Anthophora (Pyganthophora) aestivalis* (Panzer, 1801)
57. *Anthophora (Pyganthophora) albosignata* (Friese, 1896)
58. *Anthophora (Pyganthophora) alluaudi* Pérez, 1902
59. *Anthophora (Pyganthophora) altaica* Radoszkowski, 1882
60. *Anthophora (Pyganthophora) atriceps* Pérez, 1879
61. *Anthophora (Pyganthophora) atroalba* Lepeletier, 1841
62. *Anthophora (Pyganthophora) balearica* (Friese, 1896)
63. *Anthophora (Pyganthophora) cincrea* (Friese, 1896)
64. *Anthophora (Pyganthophora) dalmatica* Pérez, 1902
65. *Anthophora (Pyganthophora) leucophaea* Pérez, 1879
66. *Anthophora (Pyganthophora) monacha* (Erichson, 1849)
67. *Anthophora (Pyganthophora) nigriceps* Morawitz, 1886
68. *Anthophora (Pyganthophora) orientalis* Morawitz, 1877
69. *Anthophora (Pyganthophora) pedata* Eversmann, 1852
70. *Anthophora (Pyganthophora) pruinosa* Smith, 1854
71. *Anthophora (Pyganthophora) retusa* (Linnaeus, 1758)
72. *Anthophora (Pyganthophora) rogenhoferi* Morawitz, 1872
73. *Anthophora (Pyganthophora) romandii* Dours, 1869
74. *Anthophora (Pyganthophora) senilis* Eversmann, 1846
75. *Anthophora (Pyganthophora) sichelii* Radoszkowski, 1869
76. *Anthophora (Pyganthophora) testaceipes* Morawitz, 1888
77. *Anthophora (Pyganthophora) ventilabris* Lepeletier, 1841

Subgenera found in Europe:

1. *Anthophora* s.str Latreille, 1803;

2. *Caranthophora* Brooks, 1988;
3. *Clisodon* Patton, 1879;
4. *Dasymegilla* Brooks, 1988;
5. *Heliophila*, Klug 1807;
6. *Lophanthophora* Brooks, 1988;
7. *Melea* Sandhouse, 1943;
8. *Mystacanthophora* Brooks, 1988;
9. *Paramegilla* Friese 1897;
10. *Petalosternon* Brooks, 1988;
11. *Pyganthophora* Brooks, 1988

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Attributions

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