



Pollinator Academy

Genus: *Coelioxys*



Female



Male

Genus: *Coelioxys* Latreille, 1809

Clade: Anthophila

Family: Megachilidae

SubFamily: Megachilinae

Tribe: Megachilini

Number of species of this genus found in Europe: 29

Morphology & diagnosis

Coelioxys are medium to large sized bees (7-16mm). They are brood parasitic species. They have a long tongue, and the clypeus is not protruding in relation to the eyes. They don't present any yellow spot on the cuticle, which is entirely black. The forewings present two submarginal cells. Females do not present ventral scopa, as they are brood parasites. They don't have a pygidial plate. They don't have arolium between the tarsal claws. The metasoma shows a conical shape, pointed at the tip. In the female, the anal segment is often very elongated and pointed. Their axillae are modified into spines. The pilosity is forming white bands on terga, in some cases also present across the entire body, normally more developed in males. Together with honeybees, they are the only genera of bees that present pilosity in the compound eyes. Males show 4 to 8 teeth on tergite 7. Females stand out in the field by their slow, tracking, flight.

Summary of distinctive traits

- Females with a very pointed tip of the metasoma (a)
- 2 submarginal cells (b)
- No ventral scopa in females (brood parasitic bees) (c)
- Patches of short and appressed hairs on the metasoma (d)
- Males with 4 to 8 teeth at the tip of the metasoma (e)
- Axillae tooth-like (f)
- Arolium absent (g)
- Hairs on the compound eyes (trait shared only with *Apis mellifera*) (h)



(a) *Coelioxys argenteus*
Female



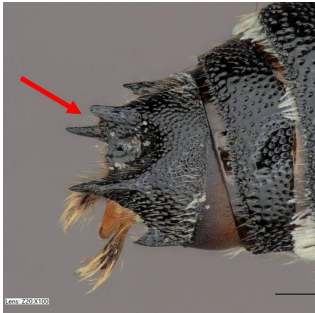
(b) *Coelioxys argenteus*
Female



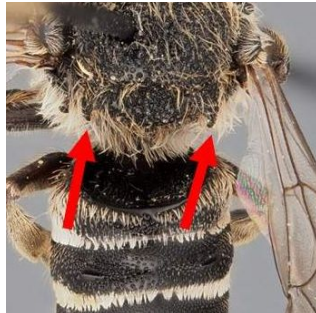
(c) *Coelioxys argenteus*
Female



(d) *Coelioxys argenteus*
Female



(e) *Coelioxys aurolimbatus* Male



(f) *Coelioxys aurolimbatus* Male



(g) *Coelioxys echinatus* Female



(h) *Coelioxys echinatus* Male

General comments on identification to species level

Species can be distinguished based on the patterns of hairs patches and apical shape of tergites 6 (females) and 7 (males). Genitalia does not have a high importance in this genus.

Morphologically similar genera, and how to distinguish them

- ***Coelioxys - Paradioxys***

Coelioxys species have 2 tooth-like axillae and a rounded scutellum.

Paradioxys species have rounded axillae, and 2 spine-like postero-lateral projections of the scutellum.

- ***Coelioxys - Aglaoapis, Dioxys & Metadioxys***

Coelioxys species have 2 tooth-like axillae and a rounded scutellum. The tip of the metasoma is pointed in females.

Aglaoapis, Dioxys & Metadioxys species have rounded axillae, and 2 spine-like postero-lateral projections of the scutellum. The tip of the metasoma is not pointed in females.

- ***Coelioxys - Megachile***

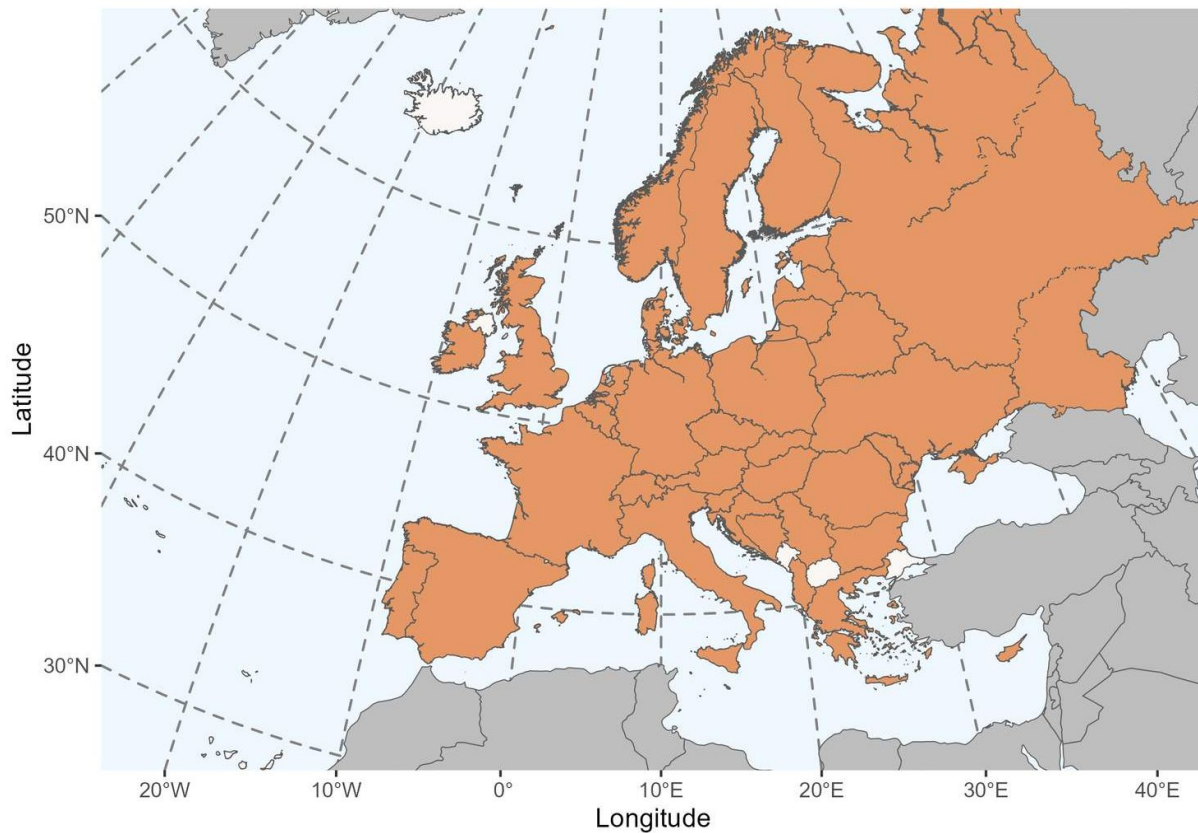
Coelioxys species have 2 tooth-like axillae. Females don't have a scopa. Males have four long preapical teeth on tergite 7, sometimes divided or crenulate.

Megachile species have 2 rounded axillae. Females do have a scopa. Males have only crenulate, emarginate or two small teeth on tergite 7.

Geographical distribution and global diversity

This genus has an almost cosmopolitan distribution. It is present in all continents, and almost all countries in the world. It is also quite diversified at the global scale, with

more than 480 species described so far. Rocha Filho & Packer (2017) recognised 20 subgenera at the global scale.



Presence in Europe

Albania, Austria, Belarus, Belgium, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain (excluding Canary Islands), Sweden, Switzerland, Ukraine, United Kingdom.

Biology

Seasonal life cycle

Coelioxys are brood parasitic bees, and they are strictly linked to the seasonality of their host species. They fly essentially in spring and summer. One generation per year. They overwinter as a prepupa.

Reproduction

As in most cases in solitary bees, the copula occurs close to where the individuals emerge, commonly on vegetation or on the ground, and it lasts a few seconds.

Nesting

The females never build their own nest: they exclusively depend on ground-nesting bees and their nests for reproduction. Then, the females are constantly patrolling the area searching nests of their host species. Once the hosts leave their nest to forage, they infiltrate into the host nests where they lay an egg on the reserves of food that the host has prepared for its own descendants. Their parasitic behaviour is quite variable. In certain species females lay the eggs in cells where the host female still did not lay her eggs, sometimes is the opposite. They can parasitize open nests, which is a derived trait of the Megachilidae (Litman et al. 2013).

Host species

They are principally brood parasites of the genera *Megachile* but they also parasitize nests of other Megachilidae such as *Osmia*, *Hoplitis* and *Trachusa*, along with other less related genera (*Anthophora*).

Floral preferences

As brood parasitic bees, the females do not actively collect pollen to feed their larvae. Flowers are only important as a nectar source. The bees of this genus are long-tongued, so they only visit flowers with deep nectar such as Asteraceae Cardueae, Labiatae or Fabaceae. However, as their host bee is in some cases specialized on certain plant species, the concerned species are therefore also automatically

specialized on this plant, as their larvae only consumes the food resources accumulated by its hosts.



Type species: *Apis conica* Linnaeus, 1758 = *Apis quadridentata* Linnaeus, 1758, by designation of Curtis, 1831.

Synonyms: *Coelioxita* Pasteels, 1977; *Coelioxula* Pasteels, 1982; *Liothgraphis* Sandhouse, 1943.

Etymology: the origin of this name comes from the Greek root 'coel', meaning 'cavity', and 'ox', meaning 'pointed', as a reference to the terminal segment of female metasoma

Common names: FR: les coelioxys; GER: der Kegelbienen; NL: de kegelbijen (NL)

List of species found in Europe:

1. *Coelioxys (Allocoelioxys) acanthopyga* Alfken, 1940
2. *Coelioxys (Allocoelioxys) acanthurus* Illiger, 1806)
3. *Coelioxys (Allocoelioxys) afer* Lepeletier, 1841
4. *Coelioxys (Allocoelioxys) argenteus* Lepeletier, 1841
5. *Coelioxys (Allocoelioxys) artemis* Schwarz, 2001
6. *Coelioxys (Allocoelioxys) brevis* Eversmann, 1852
7. *Coelioxys (Allocoelioxys) caudatus* Spinola, 1838
8. *Coelioxys (Allocoelioxys) coturnix* Pérez, 1884
9. *Coelioxys (Allocoelioxys) echinatus* Förster, 1853
10. *Coelioxys (Allocoelioxys) elegantulus* Alfken, 1934

11. *Coelioxys (Allocoelioxys) elongatulus* Alfken, 1938
12. *Coelioxys (Allocoelioxys) elsei* Schwarz, 2001
13. *Coelioxys (Allocoelioxys) emarginatus* Förster, 1853
14. *Coelioxys (Allocoelioxys) haemorrhoea* Förster, 1853
15. *Coelioxys (Allocoelioxys) mielbergi* Morawitz, 1880
16. *Coelioxys (Allocoelioxys) obtusus* Pérez, 1884
17. *Coelioxys (Allocoelioxys) polycentris* Förster, 1853
18. *Coelioxys (Coelioxys) quadridentatus* (Linnaeus, 1758)
19. *Coelioxys (Liothyrapis) decipiens* Spinola, 1838
20. *Coelioxys (Melissoctonia) conoideus* (Illiger, 1806)
21. *Coelioxys (Paracoelioxys) alatus* Förster, 1853
22. *Coelioxys (Paracoelioxys) elongatus* Lepeletier, 1841
23. *Coelioxys (Paracoelioxys) inermis* (Kirby, 1802)
24. *Coelioxys (Paracoelioxys) mandibularis* Nylander, 1848
25. *Coelioxys (Paracoelioxys) osmiae* Alfken, 1928
26. *Coelioxys (Rozeniana) aurolimbatus* Förster, 1853
27. *Coelioxys (Rozeniana) rufescens* Lepeletier & Serville, 1825
28. *Coelioxys (incertae sedis) lanceolatus* Nylander, 1852
29. *Coelioxys (incertae sedis) obtusispinus* Thomson, 1872

Subgenera found in Europe:

- *Allocoelioxys* Tkalcu, 1974
- *Coelioxys* s.str. Latreille, 1809
- *Liothyrapis* Cockerell, 1911

- *Melissoctonia* Rocha-Filho, 2016
 - *Paracoelioxys* Gribodo, 1884
 - *Rozeniana* Rocha-Filho, 2016
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