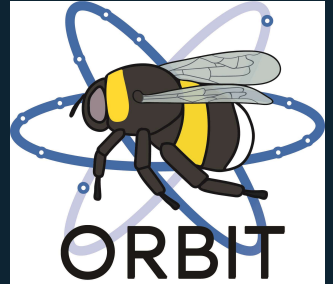




Pollinator Academy

Genus: *Dioxys*



Female



Male

Genus: *Dioxys* Lepeletier & Serville 1825

Clade: Anthophila

Family: Megachilidae

SubFamily: Megachilinae

Tribe: Dioxyni

Number of species of this genus found in Europe: 6

Morphology & diagnosis

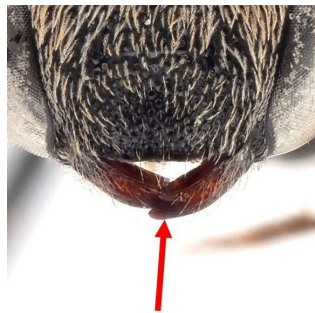
They are medium to large sized brood parasitic bees (6-16mm). They are morphologically similar to all the genera of the tribe Dioxyni. The mandible is bidentate, and they lack a transversal carina on the base of the labrum. The forewings bear two submarginal cells. The median projection on the metanotum is blunt, flattened. The scutellum presents two lateral spines. The basal area of the propodeum presents a light rugosity and is carinated. Females, as brood parasitic bees, don't have ventral scopa. The abdomen on the females of this genus is less pointed than in the other genera.

Summary of distinctive traits

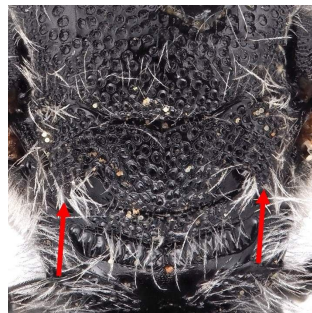
- 2 submarginal cells (a)
- Bidentate mandible (b)
- Scutellum with two postero-lateral spines (c)
- Labrum without a basal transverse carina
- T6 wide in females (d)



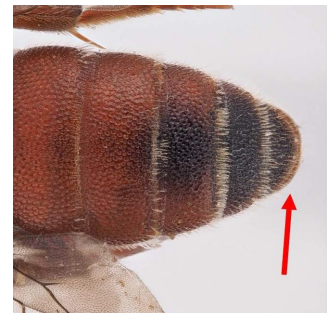
(a) *Dioxys pumilus* Female



(b) *Dioxys pumilus* Female



(c) *Dioxys cinctus* Male



(d) *Dioxys pumilus* Female

General comments on identification to species level

Male determination is done using the genitalia, thus this should be extracted. Female determination is done on the base of the labrum, mesoscutellum, sterna and terga. They have to be made visible, along with opening the mandibles and separating the antennae from the head.

Morphologically similar genera, and how to distinguish them

- ***Dioxys - Aglaoapis & Metadioxys***

Dioxys species have no transverse carina on the labrum. Male genitalia are more than twice as long as width of the gonobase.

Aglaoapis & Metadioxys species have a transverse carina on the labrum above the closed mandibles. Male genitalia are less than twice as long as width of the gonobase.

- ***Dioxys - Paradioxys***

Dioxys species have no carina between the lateral teeth of the scutellum. The tip of the female abdomen is not needle-like.

Paradioxys species have a clear carina between the lateral teeth of the scutellum. The tip of the female abdomen is needle-like due to an elongate and pointed sternite 6.

- ***Dioxys - Ensliniana***

Dioxys species have a scutellum with two spines.

Ensliniana species have a rounded scutellum.

- ***Dioxys - Stelis***

Dioxys species have the second recurrent vein reaching within the second submarginal cell.

Stelis species have the second recurrent vein reaching at or beyond (apically) to the second submarginal cell.

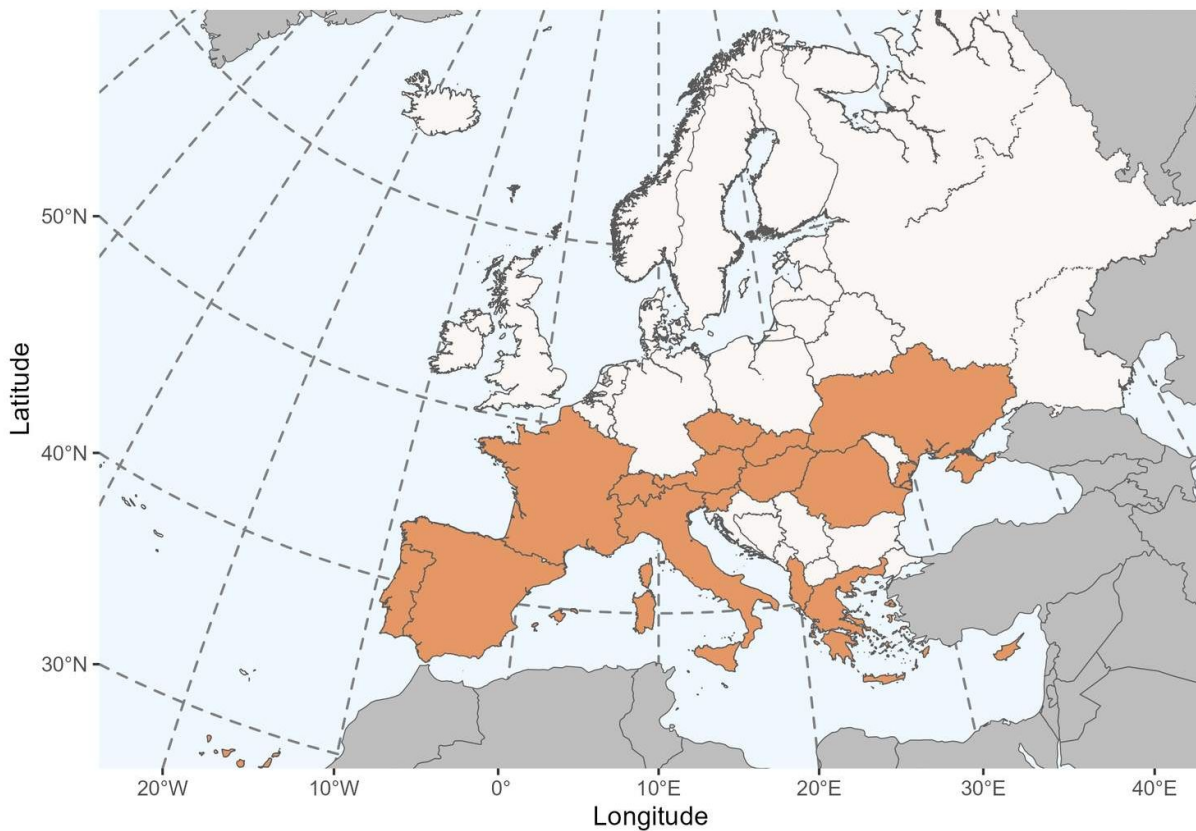
- ***Dioxys - Coelioxys***

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

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

Geographical distribution and global diversity

The genus *Dioxys* has an Holarctic distribution, is present in Europe, Asia and North America as South as Mexico. In the Palaeartic it is distributed from Morocco to the west up to Japan in the East.



Presence in Europe

Albania, Austria, Czech Republic, Cyprus, France, Greece, Hungary, Italy, Liechtenstein, Portugal, Romania, Slovakia, Slovenia, Spain, Switzerland, Ukraine.

Biology

Seasonal life cycle

They are spring species in Southern Europe, flying up to mid summer, while they fly in summer in Central and North Europe.

Reproduction

As in most cases in solitary bees, the copula occurs close to where the individuals emerge, commonly on vegetation or on the ground (Bergmark et al., 1984), and it lasts a few seconds.

Nesting

The females of *Dioxys* 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. The members of the tribe Dioxyni show the distinctive trait of having an atrophied sting, quite rare being brood parasitic bees that have to fight with the owners of the nests they parasitize. The small larva kills the host larva or egg with its long and sharp jaws and then eats the food that was collected for the host.

Host species

The host species are known only of some of European species, they are species of the genera *Heriades*, *Megachile*, *Osmia* and *Hoplitis*.

Floral preferences

As brood parasitic bees, the females do not actively collect pollen to feed their larvae. Males and females are then seen visiting a diversity of flowers from which they collect the nectar and a small quantity of pollen for their own consumption. However, as their host bee is in some cases

specialized on certain plant species, then they are therefore also automatically specialized on this plant, as their larvae only consumes the food resources accumulated by its hosts.

i **Type species:** *Trachusa cincta* Jurine, 1807, monobasic.

Synonyms: *Hoplopassites* Ashmead, 1898; *Chrysopheon* Titus, 1901.

Etymology: the name of this genus comes from two Greek words meaning 'double pointed', as a reference for the two spines on the post-scutellum.

Common names:

FR: les dioxydes

GER: der Zweizahnbienen

NL: de tweetandige bijen

List of species found in Europe:

1. *Dioxys (Dioxys) ardens* Gerstaecker, 1869
2. *Dioxys (Dioxys) atlanticus* Saunders, 1904
3. *Dioxys (Dioxys) cinctus* (Jurine, 1807)
4. *Dioxys (Dioxys) lanzarotensis* Tkalcu, 2001
5. *Dioxys (Dioxys) moestus* Costa, 1883
6. *Dioxys (Dioxys) pumilus* Gerstaecker, 1869

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Attributions

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