



Pollinator Academy

Genus: *Biastes*



Female



Male

Genus: *Biastes* Panzer, 1806

Clade: Anthophila

Family: Apidae

SubFamily: Nomadinae

Tribe: Biastini

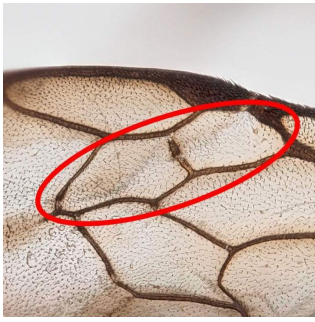
Number of species of this genus found in Europe: 3

Morphology & diagnosis

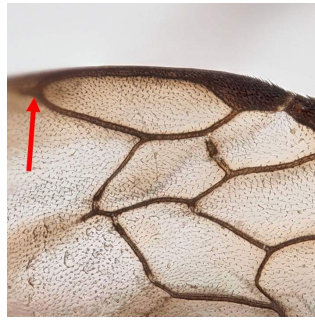
As members of the family Apidae, *Biastes* have a long-tongue morphology. They are small brood parasite species (5-9mm). They show a compact body completely black, or black over most of the body and red on the metasoma and hind legs. Cuticle punctuations are always strongly shiny and rugous. As most brood parasite bees, have a tough cuticle. They are almost hairless bees, the pilosity is sparse and always show a close-cropped aspect. It can even be completely absent or, as in *Biastes emarginatus* (Schenck, 1853), reduced to a few areas of dense, white and velvety hairs on diverse parts of the body such as the lateral areas of the mesosoma or the margins of metasomal segments. Males carry areas of short hair on the medial sterna. Posterior edge of sternite 6 in females is concave with two lobes bearing strong, short bristles. Their wings are extremely dark and they have two submarginal cells. The anterior wing has two cubital cells, with the first being smaller than the second. The antennal scape is extremely short, less than twice as much longer than broad. In some species males have antennae with 12 instead of 13 members. Moreover, in *Biastes* the propodeal enclosure is clearly visible, the mandible of the females is bidentate and the labrum of the males is broader than long. The clypeus is prominent. *Biastes* sting is strongly reduced, almost vestigial, and the tip is bifurcated (not in *B. truncatus*).

Summary of distinctive traits

- 2 submarginal cells of equivalent size (a)
- Pointed marginal cell (b)
- Protruding clypeus (c)
- Bidentate mandible (d)



(a) *Biastes emarginatus*
Female



(b) *Biastes emarginatus*
Female



(c) *Biastes emarginatus*
Female



(d) *Biastes emarginatus*
Female

General comments on *Biastes* species identification

The identification of both males and females must be carried out under the microscope. The elements to examine are the last sterna, the structure of the (micro-)pilosity, the punctuations of the mesosoma, and the three-dimensional structure of the genitalia for the males. Species identification criteria include the presence of spots of white hairs on the mesopleuron (*B. emarginatus*), the metasoma (*B. truncatus*) or neither (*B. brevicornis*).

Morphologically similar genera, and how to distinguish them

- ***Biastes* - *Ammobates* & *Pasites***

Biastes species have a short and wide scapus, less than twice as long as wide. Females have a clear propodeal triangle and a bidentate mandible. Males have a labrum wider than long. *Ammobates* and *Pasites* species have a normal scapus, longer. Females have a propodeal triangle faint and a unidentate mandible. Males have a labrum longer than wide.

- ***Biastes - Ammobatooides & Schmiedeknechtia***

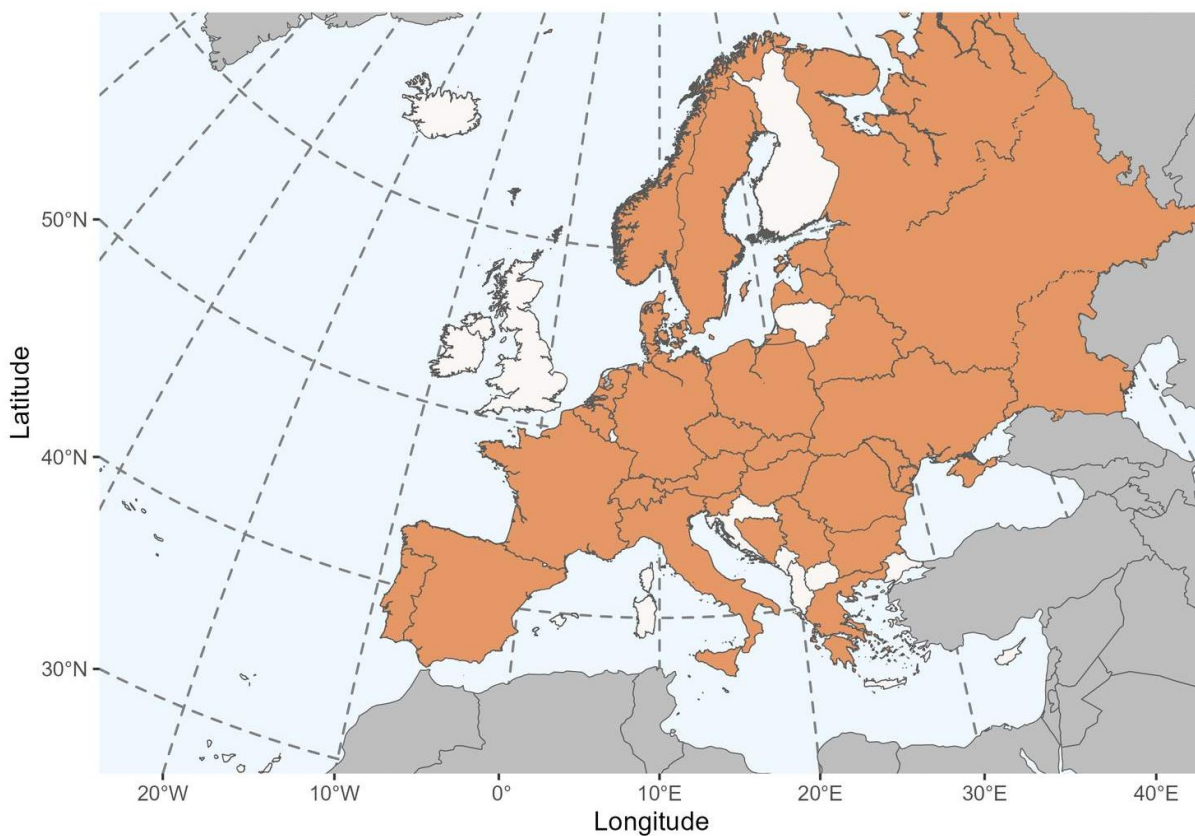
Biastes species have a truncated marginal cell, basal part submarginal cell 1 is about as long as that of submarginal cell 2. Males have non-converging eyes. *Ammobatooides* & *Schmiedeknechtia* species have an oval or pointed marginal cell, basal part of submarginal cell 1 is around twice as long as that of submarginal cell 2. Males have strongly converging eyes.

- ***Biastes - Clavipanurgus, Flavipanurgus, Panurginus, Panurgus & Simpanurgus***

Biastes species have a somewhat protruding clypeus and a long-tongue morphology (segments 1 and 2 of maxillary palpi are strongly elongated). *Clavipanurgus*, *Flavipanurgus*, *Panurginus*, *Panurgus* & *Simpanurgus* species have a flat clypeus and a short-tongue morphology of mouthparts (short maxillary palpi).

Geographical distribution and global diversity

They occur from Europe to China, Japan and eastern Russia. There are only 5 described species of the genus (Warncke 1982). This genus has only 3 species over the whole Europe, which are all locally very rare. Some species of the genus *Biastes* can be found north up to Finland, and eastwards as far as the Urals and the Caucasus (Warncke 1982).



Presence in Europe

Austria, Belarus, Belgium, Bosnia & Herzegovina, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France (except Corsica), Germany, Greece (except Crete), Hungary, Italy (excluding Sardinia), Latvia, Moldova, Netherlands, Norway, Poland, Portugal (mainland), Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain (mainland), Sweden, Switzerland, Ukraine.

Biology

Seasonal life cycle

The species of *Biastes* are brood parasite bees, and they are strictly linked to the seasonality of their host species. They fly essentially in spring and summer. They are univoltine.

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. Details of the development are still unknown.

Nesting

The females of *Biastes* 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 young larvae have a cephalic capsule very developed, with the mandibles long and pointed to kill the larva of the host. The larva does not spin a cocoon. Sometimes two eggs of the brood parasite bee are found in the brood cell of a host, but whether they are from the same female is unknown. Females of *B. emarginatus* flew away immediately as soon as a host female appeared at the nest. However, if the brood parasite bee was already in the nest, the host bee grabbed the parasite with her mandibles and dragged it out of the nest to the front of the nest entrance (Rozen et al. 2009).

Host Species

The *Biastes* are nest parasites specifically associated with wild ground-nesting bees of the family *Halictidae* and subfamily *Rophitinae*, particularly to the genera *Dufourea*, *Rophites* and *Systropha* (Warncke 1982). Notably, they are associated to *Dufourea dentiventris* (Nylander 1848) and *D. inermis* (Nylander 1848) in Belgium and neighbouring countries, and to *Rophites algirus* (Pérez 1895) and *R. quinquespinosus* (Spinola 1808) in Germany (Westrich et al. 1992).

Floral preferences

As cuckoo-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, certain known hosts are specialist on *Stachys* sp. (Lamiaceae; the case of *Rophites*) or on bindweed (genus *Convolvulus*, Convolvulaceae; as in all *Systropha*). Thus, *Biastes* are therefore also automatically specialized on these plants, as their larvae only consumes the food resources accumulated by their hosts.

Nocturnal behaviour

The nocturnal rest of *Biastes emarginatus* are reported by Westrich et al. (1992). Both males and females at the end of the day and before the onset of bad weather bite plant stems with their mandibles at a height of 20-30 cm above the ground. The stems of grasses of the genus *Festuca* (*Poaceae*) are preferred. The animals rest with tightened limbs and extended antennae in a vertical to horizontal posture. Sleeping parties contain 4-14 individuals of both sexes at 3-5 m² in two places near nests of the host *Rophites algeris* (Pérez, 1895).



Type species: *Tiphia brevicornis* Panzer, 1798, monobasic.

Synonyms: *Rhineta* Illiger, 1807; *Melittoxena* Morawitz, 1873;
Biastoides Schenk, 1874;

Etymology: the etymology of this genus comes from the Greek *biastes*, meaning « strong and powerful, energetic, violent, using force » in reference to their body compact and robust, even they are small species.

Common names:

FR: les biastes

GER: der Kraftbienen (= « vigorous bees»)

NL: de pantserbijen (= « armoured bees»)

List of species found in Europe:

1. *Biastes (Biastes) brevicornis* (Panzer 1798)
2. *Biastes (Biastes) emarginatus* (Schenck 1853)
3. *Biastes (Biastes) truncatus* (Nylander 1848)

References

Amiet F., Herrmann M., Müller A. & Neumeyer R., 2007. Apidae 5. *Ammobates*, *Ammobatoides*, *Anthophora*, *Biastes*, *Ceratina*, *Dasypoda*, *Epeoloides*, *Epeolus*, *Eucera*, *Macropis*, *Melecta*, *Melitta*, *Nomada*, *Pasites*, *Tetralonia*, *Thyreus*, *Xylocopa*. Fauna Helvetica 20. Centre suisse de cartographie de la faune (CSCF), Neuchâtel, 356 pp.

Bergmark et al. 1984.

Rozen Jr, J. G., Straka, J, Rezkova, K. 2009. Oocytes, larvae, and cleptoparasitic behavior of *Biastes emarginatus* (Hymenoptera: Apidae: Nomadinae: Biastini). American Museum Novitates 3667, 15pp.

Warncke K., 1982. Zur Systematik der Bienen - Die Unterfamilie Nomadinae (Hymenoptera, Apidae). *Entomofauna* 3: 97-128.

Westrich P., Westrich L. & Müller A., 1992. Beobachtungen zur Nachtruhe der Kraftbiene *Biastes emarginatus* (Schenck) (Hymenoptera, Apoidea, Anthophoridae). *Linzer Biologische Beiträge* 24(1): 3-12.

Attributions

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Authors

Photographs: Paolo Rosa (ORBIT consortium)

Text: ORBIT consortium

Reviewers: Petr Bogusch (ORBIT consortium)

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