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First records of *Brachyopa grunewaldensis* Kassebeer, 2004 in Belgium (Diptera: Syrphidae)

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Abstract

In 2017, the first two sightings of *Brachyopa grunewaldensis* KASSEBEER 2004 for Belgium have been done. Both specimens were collected from flowers along forest margins of large woodlands in the south of Belgium. This paper provides further details on these records, on the European distribution of the species and on how it can be recognized. Finally, the ecology of the species is inferred from current knowledge.

Keywords: sap run, saproxylic, *Quercus*, rot hole, forest quality

Samenvatting

In 2017 werden de eerste twee exemplaren van *Brachyopa grunewaldensis* KASSEBEER 2004 voor België gezien. Beide waarnemingen gebeurden op bloemen langs bosranden van grote bosgebieden in het zuiden van het land. Dit artikel bespreekt verdere details over deze waarnemingen en over de Europese verspreiding van deze soort en geeft aan hoe ze kan herkend worden. Ten slotte proberen we de ecologie van de soort te reconstrueren op basis van de huidige kennis.

Résumé

En 2017, deux spécimens de *Brachyopa grunewaldensis* Kassebeer, 2004 ont été observés pour la première fois en Belgique. Ces deux syrphes ont été récoltés sur des fleurs le long de la lisière de vastes zones forestières dans le sud du pays. Cet article détaille plus amplement ces observations et tente d'apporter des informations sur l'écologie de l'espèce en s'appuyant sur les connaissances actuelles, en outre la répartition européenne et les critères de reconnaissance de l'espèce sont fournis.

Introduction

Brachyopa are not like other Belgian syrphid flies. Not only do they look very different from other syrphids in resembling dung flies (Scathophagidae), they are also a specialist group that lives in sap runs and decaying sapwood. Most *Brachyopa* are rather secretive and to be found in dense woodlands, but some may be found more in the open for example at tree-bordered avenues, dancing about conspicuous sap runs (e.g. *B. insensilis*). Only some species regularly visit flowers, mostly bushes and umbels. Therefore finding *Brachyopa* may require some expertise and dedication, which is why they are not often met with by the non-specialist entomologist.

Brachyopa is a primarily Holarctic genus with 14 species known in Europe until the year 2000 (SPEIGHT, 2015). Since then, however, a further 8 species have been discovered or described raising the total to 22 species by 2018 (KASSEBEER, 2000; DOCZKAL & DZIOCK, 2004; HAARTO & KERPPOLA, 2009; VAN STEENIS & VAN STEENIS, 2014; PÉREZ-BAÑÓN *et al.*, 2016). Most of the new species have been found at the southeastern outskirts of Europe, yet, more surprisingly two new species to science have been found in German forests: *B. grunewaldensis* and *B. silviae* (KASSEBEER, 2000; DOCZKAL & DZIOCK, 2004). Both species are members of what DOCZKAL & DZIOCK (2004) called the *bicolor*-

group; *Brachyopa* with a grey thorax and orange abdomen and the hairs on the arista shorter than the maximum width of the arista.

In 2017, *Brachyopa grunewaldensis* has been found in Belgium at two locations. In this paper we provide details on these findings, give a summary of how *Brachyopa grunewaldensis* is to be discerned from similar looking *Brachyopa* and discuss its ecology and distribution in Europe.

Observations

FIRST OBSERVATION. 30.IV.2017, 1♀, Lavacherie, Rue de Saint-Ode, on *Prunus spinosa* along the river Ourthe, Latitude: 50.070333, Longitude: 5.506407, leg. det. & coll. Frank Van de Meutter.

After a very productive day looking for syrphids in the large forests at the North-East of Saint-Hubert, I made a last stop at Lavacherie. In the last hour of sunshine, a row a flowering *Prunus spinosa* at the edge of a broad-leaved forest attracted my attention. The bushes were fully sun-exposed and despite the late hour and dropping temperatures, the activity of syrphids on the flowers continued. Among good numbers of *Dasysyrphus* and *Meliscaeva*, and the more exceptional *Chrysogaster rondanii* MAIBACH & GOELDLIN DE TIEFENAU, 1995 and *Cheilosia psilophthalma* BECKER, 1894, several species of *Brachyopa* were found: *B. vittata* ZETTERSTEDT, 1843, *B. panzeri* GOFFE, 1945, *B. testacea* (FALLÉN, 1817) and *B. pilosa* COLLIN, 1939. Finally, I found a small *Brachyopa* similar to *B. pilosa* in having a grey thorax and orange abdomen but with an extensively grey dusted anterior halve of the scutellum and without a sensory pit in the postpedicellus. The specimen was collected and studied at home, when it became evident that this was a *B. grunewaldensis*, a species not before observed in Belgium.

SECOND OBSERVATION. 1.VI.2017, 1♂, Rulles, on *Anthriscus sylvestris* along a forest track, Latitude: 49.73248234, Longitude: 5.52590143, leg. & det. Jef Hendrix.

That day, I was looking for syrphids and other flies in the forests nearby Marbehan. *Anthriscus sylvestris* was flowering in very large numbers along the roadsides, resulting in a large number of syrphidae. A small *Brachyopa* from the *bicolor*-group was found foraging on these flowers. The lack of a sensory pit in combination with the fact that is was found in a forest on a flower, made it an interesting specimen. It was collected and studied at home and turned out to be the second *B. grunewaldensis* for Belgium.

Recognition

In the excellent paper by (DOCZKAL & DZIOCK, 2004), *B. grunewaldensis* is extensively compared with all Western-European species of what they call the *bicolor*-guild. Using the keys of VERLINDEN (1991) and VAN VEEN (2004), *B. grunewaldensis* keys out as *B. insensilis*, because of the lack of a sensory pit in the postpedicellus. This is also the case with *B. bimaculosa* and *B. silviae,* both present in Germany within a few 100km of Belgium, but these species have rather distinct black, shiny, undusted spots on the thorax whereas in *B. grunewaldensis* and *B. insensilis* the thorax is uniformly dusted. Distinguishing the latter two species is best achieved by looking at the mediotergite (the underside of the scutellum): in *B. insensilis* it is completely dusted, in *B. grunewaldensis* there is a large rectangular undusted central area. Also, in *B. grunewaldensis* the proepimeron is haired, whereas it has no hairs in *B. insensilis*. Females may be more easily recognized in the field by the small undusted spots along the ocelli (vertex completely dusted in *B. insensilis*). All these features are shown on photographs in BOT & VAN DE MEUTTER (2019).

Discussion

In an informal newsletter distributed among Belgian syrphid fanatics during spring 2017, the first author made an overview of the European distribution of *B. grunewaldensis* and *B. silviae*, based on a compilation of available published records (KASSEBEER, 2000; DOCZKAL & DZIOCK, 2004; RICARTE *et al.*, 2010, 2013; PÉREZ-BAÑÓN *et al.*, 2016; SPEIGHT *et al.*, 2018). Some further records without location information exist from the Balkan area. It was concluded that the south of Belgium fits within

Fig. 1. Map of Europe indicating literature records of *Brachyopa grunewaldensis* (●) and the new Belgian records (●).

the western part of the European distribution of *B. grunewaldensis* which covers the northeast of Germany to central Spain (Fig. 1). Given that large deciduous forests can be found in the south of Belgium, it was considered likely that the species was present here. Finding it however would require information on the ecology of the species. *B. grunewaldensis* is a species of mature broad-leaved forest by all accounts, but forest type is less clear. From currently available information, two forest types seem to crystallize as the preferred habitat: woodlands where indigenous *Quercus* sp. (different species) is the dominant tree, and alluvial hardwood forest (e.g. with *Fraxinus* sp., *Platanus* sp.) (SPEIGHT, 2015). The first forest type is by far the commoner of the two in the south of Belgium and therefore it comes as no surprise that both observations occurred at the edge of (large) *Quercus* dominated woodland.

Apart from knowledge on its general (forest) habitat, knowledge of the breeding habitat and the behavior of *B. grunewaldensis* may be helpful to actually find it. DOCZKAL & DZIOCK (2004) categorize it as one of the very rare syrphids in Europe, although they also suggest that it may simply be difficult to find given it was mainly collected with Malaise traps at that time, suggestive of a secretive way of living. The first information on the breeding habitat came from a study with emergence traps in Spain, which produced many *B. grunewaldensis* from *Fraxinus* and *Quercus* trunk cavities (RICARTE *et al.*, 2013). It is unclear whether the preference for cavities (most *Brachyopa* prefer sap runs) is a species-specific habit, or if it is the simple consequence of the warm and dry Mediterranean climate where exposed sap runs may be too ephemeral to complete its life-cycle. Anyways it could be worthwhile inspecting suchlike habitats in Belgium.

If a species is but rarely found on flowers, and is difficult to find elsewhere (as with many syrphids), it is difficult to tell whether this is due to rarity or to behavior, yet there are indications that some *Brachyopa* visit flowers more frequently than others. Among the alleged infrequent flower visitors is *B. insensilis*; the recent surge of observations in Belgium of this species being entirely due to observations of males patrolling at the breeding habitat, but virtually no observations from flowers. *Brachyopa insensilis* is found at often fairly isolated and wind-exposed trees with conspicuous outflowing sap runs. *Aesculus* trees in parks, gardens and cities that suffer from *Phytophtora sp.* bleeding cancer, but also *Populus* sp. with sap runs are supreme places to find *B. insensilis.* After this

became widely known, *B. insensilis* is now fairly commonly seen in Flanders, but observations in large natural woods remain very rare, although other species are frequent at sap runs in such circumstances (e.g. *B. bicolor*, *B. pilosa*, …). It is a tantalizing question whether this could also happen with the very closely related *B. grunewaldensis*. The first two observations of *B. grunewaldensis* in Belgium were on flowering *Prunus spinosa* and *Anthriscus sylvestris*. Elsewhere it has been reported from flowers of *Acer*, *Crataegus*, *Pyrus spinosa* and *Sorbus torminalis* (SPEIGHT, 2015). It is therefore obvious that *B. grunewaldensis* can be looked for on flowering trees and bushes, possibly even more than the very similar *B. insensilis*, but it is unclear if other (even more productive) search techniques could be used. Females apparently have been found drinking from wet mud at stream edges and forest tracks (SPEIGHT, 2015). For this to be productive locations to look for syrphids, the weather needs to be warm and especially dry (low humidity, windy, preferably during longer spells of dry weather) and the drinking area has to be within a generally dry (forest) environment (Frank Van de Meutter, pers. obs., I.2019). Whether looking for males at specific microhabitats in trees may be a good approach is unclear: males have been found flying about the trunk of *Quercus* and at a sap run on *Castanea* (KASSEBEER, 2000; SPEIGHT, 2015). This is poor evidence that is to be found frequently at such places, or to expect that it may be as easily detected at sap runs as *B. insensilis*. With the rapidly growing number of observations in Europe, we hope to learn more of this enigmatic species and how to find it. As a species of large and rather pristine forests in Europe, this species belongs to a set of valuable indicator species of forest quality (SPEIGHT, 2015).

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