

Note on some *Ptomaphagus* Hellwig, 1795 collected in the Jean Massart botanical garden (Brussels-Capital Region, Belgium) with a new record for the Belgian fauna (Coleoptera, Leiodidae, Cholevinae, Ptomaphagini).

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Abstract. We present the first record in Belgium of the leiodid beetle *Ptomaphagus thebeatles* Schilthuisen et al., 2020 (Leiodidae), resulting from an entomological inventory in the Jean Massart botanical garden located in Auderghem (Brussels-Capital Region). This recently described species was expected to occur in our country. The data related to this collection are presented and discussed.

Résumé. Nous présentons la collecte inédite en Belgique du coléoptère léiodide *Ptomaphagus thebeatles* Schilthuisen et al., 2020 (Leiodidae) réalisée lors d'un inventaire entomologique dans le jardin botanique Jean Massart situé à Auderghem (Région de Bruxelles-Capitale). On s'attendait à ce que cette espèce récemment décrite soit présente dans notre pays. Les données relatives à cette collecte sont présentées et discutées.

Keyword. Coleoptera, Leiodidae, Cholevinae, faunistics, Belgium, new record.

Introduction

Since 2013, an entomological survey has been ongoing at the Jean Massart Botanical Garden in Brussels. This survey, conducted by the Royal Belgian Institute of Natural Sciences, has demonstrated the presence of exceptional biodiversity in this peri-urban environment (see references in Drumont et al., 2020). The insect species richness may be related to the plant diversity present within the site as well as with its management, but it is also the fruit of the great effort in sampling and identification of the specimens.

A wide variety of traps (pitfall traps, interception traps with or without bait, Malaise traps, bottle traps on trees, light traps, etc.) have been deployed in different places on the site and over several years, as well as numerous opportunistic collections, by sweeping the herbaceous layer or beating shrubs and low tree branches. Beetles represent a large proportion of the insects present on the site with close to 1200 species (Drumont & Kuhn, 2019). Among them, a few specimens of the leiodid genus *Ptomaphagus* were collected and carefully studied and investigated.

Ptomaphagus Hellwig, 1795 is a genus of Cholevinae that in Europe consists of approximately 20 externally very similar species, all belonging to the subgenus *Ptomaphagus s. str.* (Jeannel, 1936; Perreau, 2000; Schilthuisen, in prep.). Their precise ecology remains unclear: like most Leiodidae, they probably feed on fungal spores, they are often found in subterranean conditions or in flood debris, but are also good and strong flyers, turning up in flight interception traps. Six species occur in northwestern Europe, three of which belong to the *P. sericatus* complex, a group of extremely similar taxa that can only be reliably distinguished by details of the apex of the male aedeagus.

P. medius (Rey, 1889) (Fig. 1) is a common, widespread and well-known species from western Europe, though also introduced into Canada (Schilthuisen et al., 2020). *P. sericatus* (Chaudoir, 1845) was previously (Schilthuisen, 1989, 2010) considered to be a species present throughout Europe, but it is now clear that the true *P. sericatus* is absent in northwestern Europe, its nearest limits being southern France and southern and eastern Germany. Much material from northwestern Europe previously assigned to *P. sericatus* belongs, however, to the newly-described *P. thebeatles* Schilthuisen et al., 2020 (Fig. 2) that appears to have its main distribution in southern Europe, but in the past few decades has also appeared in the Netherlands (collections from this country only hold specimens from the 1980s or later, all older material belongs exclusively to *P. medius*). The two species are easily distinguished by

the apex of the aedeagus, which is long, tapered, and gently curved ventrad in *P. medius*, but blunt-ended and sinuous in *P. thebeatles* (Fig. 3). No reliable differences in the female spermatheca (often a good distinguishing character in Ptomaphagini) have been observed yet, and external differences are very slight (*P. thebeatles* has slightly more robust antennae than *P. medius*). The pair of species, therefore, can only be confidently identified by studying the male genitalia.

Until now, no material of *P. thebeatles* was known from Belgium, but the records reported in this paper show that it is also present in this country, as was to be expected.



Figs 1-2. Dorsal view of *Ptomaphagus* Hellwig specimens from the Jean Massart botanical garden (Auderghem, Brussels-Capital Region, Belgium). Fig. 1: male of *P. medius* (Rey, 1889) ; fig. 2: male of *P. thebeatles* Schilthuizen et al., 2020. (Photos credit: M. Schilthuizen).

Fig. 3. Apices of the aedeagi of *P. medius* from Oegstgeest, the Netherlands: dorsal (a) and lateral (b) and *P. thebeatles* from Amsterdam, the Netherlands: dorsal (d) and lateral (e) views. (Modified after Schilthuizen et al., 2020.). (Photo credit: M. Schilthuizen).

Material and methods

The Jean Massart Botanical Garden is located in the municipality of Auderghem (Brussels-Capital region), on the edge of the Soignes forest. It contains a very large botanical diversity (> 1,500 plant species) spread over an area of approximately 5 hectares. The garden is divided into different plots comprising diverse botanical collections (e.g. medicinal plants, evolutionary garden, arboretum) as well as differentiated management areas (e.g. lean hay meadow, collection orchards) (Drumont et al., 2020).

The analyzed *Ptomaphagus* specimens were collected from different locations in the garden and via several trapping methods:

- Malaise traps (Fig. 4) (and in combination with collection planters, Fig. 5): In May 2015, two Malaise traps were installed on the fringe and on either side of the part of the site devoted to the evolutionary garden. Trap readings with replacement of the collection flasks containing the alcohol in which the insects are stored were carried out for an annual cycle every week until the beginning of November, every two weeks from this period (until March 2016 when the weekly readings resumed). The device of the two Malaise traps was renewed in 2016 in the same places, and in April, a third trap was added in a wooded area of the garden located about a hundred meters of the two others ones. In 2017, 3 additional Malaise traps were added to better cover the different areas of the site (arboretum, humid zone, and dry meadow).

In addition to the Malaise traps, in May 2016, three pairs of planters were affixed against the central vertical canvas of the Malaise traps to capture beetles which often drop when coming into contact with the tissue. The collector liquid is made up of water, alcohol vinegar and a little dishwashing detergent. The surveys of the planters were carried out every week for two months.

The device was renewed in June 2017 at the bottom of 3 Malaise traps (including two different from those chosen in 2016;

- pitfall traps in the ground (Fig. 6): 7 plots made up of two "pitfall" activity traps placed in the ground were distributed in the garden to cover as many different biotopes as possible. Installation took place in March 2015 and samples were taken every two weeks until September of the same year. The traps consisted of glass jars topped with a leaf guard and half-filled with red wine vinegar with a little dishwashing detergent;
- bottle traps on tree (Fig. 7): A pair of bottle traps (with a 50 ml collection bottle) were attached at breast height on either side of the trunk on 6 trees spread throughout the garden. These trees belonged to different tree species both in deciduous (*Quercus robur*, *Crataegus monogyna*, *Fagus sylvatica*, and *Fraxinus excelsior*) and in conifer (*Pseudotsuga mentziesii*). The liquid in the collection bottles was red wine vinegar with a few drops of dishwashing detergent. The traps were installed in May 2015 and recorded every two weeks throughout the year and the device renewed in 2016.



Figs 4-7. Views of traps set up in the Jean Massart botanical garden (Auderghem, Brussels-Capital Region, Belgium). Fig. 4. Malaise trap (in this case the number 1 where most of the *Ptomaphagus*

specimens listed in this note have been collected); fig. 5. Malaise trap in combination with collection planters; fig. 6. pitfall trap in the ground; fig. 7. bottle trap on tree. (Photos credit: A. Drumont).

The abbreviations used in the rest of the text are:

HRC: private collection of Hugo Raemdonck, Ganshoren, Belgium.

RBINS: Royal Belgian Institute of Natural Sciences, Brussels, Belgium.

TXEX: Taxon Expeditions collection, Leiden, the Netherlands.

The material collected is mounted on paper cards, labelled, and housed in RBINS, otherwise when stated.

Results and Discussion

Among the 19 specimens of *Ptomaphagus* collected at present in the Jean Massart botanical garden, only 10 males have been recognized that can be unambiguously identified. Material studied is as follows:

***P. medius* (Rey, 1889)** ((Fig. 1) (5 exs): 1 ♂, Belgium, Brussels-Capital Region, Auderghem, Jean Massart botanical garden, 7-21.V.2015, ground pitfall n°7, leg. A. Drumont & H. Raemdonck, I.G.: 33.004 / LEIODIDAE *Ptomaphagus subvillosus* Gze. Det. W. Troukens (RBINS) ; 1 ♂, same location, 17-26.VI.2015, Malaise trap n°1, leg. A. Drumont & H. Raemdonck, I.G.: 33.004 (RBINS) ; 1 ♂, same location, 11-19.V.2016, Malaise trap n°3, leg. A. Drumont & H. Raemdonck, I.G.: 33.177 TXEX) ; 1 ♂, same location, 7-14.VI.2016, planter trap at the bottom of Malaise trap n°1, leg. L. Dahan, I.G.: 33.177 (RBINS) ; 1 ♂, same location, 1-6.VII.2016, Malaise trap n°1, leg. A. Drumont & H. Raemdonck, I.G.: 33.177 / PTOMAPHAGUS SP. MEDIUS SERICATUS (HRC).

***P. thebeatles* Schilthuizen et al., 2020** (Fig. 2) (5 exs): 1 ♂, Belgium, Brussels-Capital Region, Auderghem, Jean Massart botanical garden, 21.V-4.VI.2015, ground pitfall n°5, leg. A. Drumont & H. Raemdonck, I.G.: 33.004 (RBINS) ; 1 ♂, same location, 8-15.VII.2015, Malaise trap n°1, leg. A. Drumont & H. Raemdonck, I.G.: 33.004 / LEIODIDAE *Ptomaphagus subvillosus* (Goeze, 177) Det. Willy Troukens 2016 (RBINS) ; 1 ♂, same location, 28.VII-11.VIII.2016, bottle trap on tree n°2 (*Fagus sylvatica*), leg. A. Drumont & H. Raemdonck, I.G.: 33.177 / LEIODIDAE *Ptomaphagus subvillosus* Det. W. Troukens (RBINS) ; 1 ♂, same location, 1-8.IX.2016, Malaise trap n°1, leg. A. Drumont & H. Raemdonck, I.G.: 33.177 / LEIODIDAE *Ptomaphagus medius* Rey Det. W. Troukens (HRC) ; 1 ♂, same location, 8-15.VI.2017, planter trap at the bottom of Malaise trap n°5, leg. A. Drumont, L. Dahan & H. Raemdonck, I.G.: 33.645 (TXEX).

Two species of *Ptomaphagus*, *P. medius* (Rey, 1889) and *P. thebeatles* Schilthuizen et al., 2020, are occurring in the site, both identified in same proportion by 5 male exemplars. In the Netherlands, the two species often occur together, at similar abundances, and they are particularly common in disturbed and urban localities.

Although sampling has been particularly intensive on this location, only a few *Ptomaphagus* specimens were been caught between 2013 and 2017. This may be caused by the low representation of Cholevinae in this site or by inappropriate methods of collecting for this group of beetles. Baited meat traps placed in the ground would probably have been more effective to collect them, but the presence of several foxes complicated the installation of such traps in the field.

From the 10 *Ptomaphagus* males collected in the botanical garden, a majority (7 exs) were collected by using Malaise traps or with planter put at the bottom of these traps, two of them by pitfall traps in the ground and only one in a bottle trap fixed on a tree. These observations suggest that *Ptomaphagus* fly low above the ground on the site.

Ptomaphagus thebeatles was recently described by Schilthuizen et al., 2020 on the basis of material from France, Hungary, Romania, Russia, Slovakia, Spain, and The Netherlands. As its distribution seems to be wide across southern and western Europe, it was expected to be found in Belgium, too. This hypothesis has been verified during an entomological inventory in the Jean Massart botanical garden located in Auderghem (Brussels-Capital Region). The species is undoubtedly present in more locations in Belgium. Further inventories in different sites combined with investigations of old

material identified under *P. medius* or *P. sericatus* (Chaudoir, 1845) would contribute to define its distribution in our country.

Acknowledgments

This publication results in part from the project to inventory the arthropod fauna of the Jean Massart botanical garden, a project supported by Bruxelles-Environnement. Therefore, we would particularly like to thank Barbara Dewulf, Frédéric Fontaine and Guy Rotsaert (Green Spaces Division, Biodiversity Department) as well as Olivier Beck (Project Director) for their encouragement and the granting of collection permits. We are especially indebted to the staff of the Jean Massart garden: Thierry Bruffaerts (site manager, Bruxelles-Environnement), Youri Rouge and Hernando Silva Montenegro (Université Libre de Bruxelles - ULB), as well as to the entire technical team of gardeners for their always warm welcome and the constant interest in our inventory.

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