

A revision of the status of *Melanogaster aerosa* Loew, 1843 in Belgium, with notes on its phenology and habitat (Diptera: Syrphidae)

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Abstract

Until recently, a single old record of *Melanogaster aerosa* was known from Belgium and it was feared regionally extinct. A revision of collection material revealed a number of additional old records from three wide-ranging localities in Belgium. In 2014, *M. aerosa* has been collected near Genk, which proves that the species is still present in Belgium. The habitat and phenology of *M. aerosa* in Western-Europe is discussed. It is striking that *M. aerosa* is to be found in two different, often spatially separated habitats: base-poor moorland and base-rich floodplains. Based on data from the Netherlands, it is shown that in each of these habitats, *M. aerosa* is observed predominantly at a different time: during summer in moorland, and in spring in floodplains.

Keywords: habitat differentiation, phenology, aquatic habitat.

Samenvatting

Het Zomers doflifje *Melanogaster aerosa* was tot voor kort van België enkele gekend van één oude waarneming, en daardoor werd ze beschouwd als regionaal uitgestorven. Nazicht van collecties leverde een aantal extra oude waarnemingen op van drie ver uiteen gelegen plaatsen verspreid in België. In 2014 werd het Zomers doflifje opnieuw gevangen in België, nabij Genk, waaruit blijkt dat de soort nog in België voorkomt. Het Zomers doflifje wordt aangetroffen in twee verschillende, meestal ruimtelijk gescheiden, habitatten: zure, ionenarme venen, en uiterwaarden op klei. Op basis van Nederlandse gegevens wordt aangetoond dat *M. aerosa* op een verschillende tijdstip tijdens het jaar gezien wordt: tijdens de zomer in zure venen, en tijdens de lente in uiterwaarden op klei.

Résumé

Jusque il y a peu, une seule donnée ancienne pour *Melanogaster aerosa* était connue de Belgique, espèce que l'on craignait régionalement éteinte. Cependant, la révision des collections a révélé d'autres données anciennes dans trois localités très éloignées les unes des autres. De plus, en 2014, *M. aerosa* a été récoltée près de Genk, ce qui prouve que l'espèce est encore présente en Belgique. Son habitat et sa phénologie en Europe occidentale sont discutés. Il est surprenant de constater que cette espèce occupe deux habitats différents: des tourbières et des zones riches inondables. Mais d'après des observations faites aux Pays-Bas, *M. aerosa* serait observée principalement dans les landes en été et dans les plaines inondables au printemps.

Introduction

Melanogaster aerosa is a small, black-brown (females) or black (males) syrphid that occurs in the Palaearctic region. In older literature it is found under the name *Chrysogaster (Melanogaster) macquarti* (Loew, 1843), but a revision of the original material showed this was a synonym of *M. parumplicata* (MAIBACH *et al.*, 1994). According to VERLINDEN (1991), *M. aerosa* is an extremely rare species in Belgium. In 1979 he revised the collection of the RBINS in Brussels and of the 25< specimens labelled “*Chrysogaster macquarti*” he could confirm only one as *M. aerosa*: Postel, 13.VIII.1922, 1♂ (leg. G. Severin). He attributed the large number of misidentifications to the confusing description of this species in older literature. Descriptions and keys in current literature (e.g. BARTSCH *et al.*, 2009; MAIBACH *et al.*, 1994; VAN VEEN 2004) have improved considerably, yet, identification remains difficult, and reference material may be necessary to successfully complete the identification (BARTSCH *et al.*, 2009).

VAN DE MEUTTER (2011) indicates that *M. aerosa* is regionally extinct in Belgium, based on VERLINDEN (1991). However, there have been several recent claims of this species in Belgium. At the same time, historical records had not been revised in the light of the description of *M. parumplicata*, a closely related species to *M. aerosa*. In this article I present the results of an exhaustive revision of the RBINS collection and some private collections and report a new observations of this species in Belgium. Finally, I discuss incongruences in habitat preferences and phenology between the UK and the Netherlands.

Material and methods

During November 2014-February 2015, the author has revised all material of *Chrysogaster* and *Melanogaster* present in the collection of the RBINS. Specimens could be verified against *M. aerosa*, *M. hirtella*, *M. nuda* and *M. parumplicata* present in the collection of the author. Records under the name *C. macquarti*, *M. macquarti* and *M. aerosa* present in the Belgian Syrphidae database BELSYRPHDAT were paid extra attention to. Whenever records referred to specimens in private collections, the owners were asked to describe on what features the identification was based or to loan their specimens for revision. Records for which no further details were received are not withheld in this study. I used BARTSCH *et al.* (2009), FALK (2015), MAIBACH *et al.* (1994) and VAN VEEN (2004) to identify *Melanogaster* sp.

A comparative analysis of habitat and phenology of *M. aerosa* in the UK and the Netherlands was conducted based on BALL *et al.* (2011) and REEMER *et al.* (2009). Phenological data were obtained from phenology histograms, by measuring bar lengths (that are scaled to counts) in the presented histograms. A detailed study on the relation between habitat and phenology for the Netherlands was performed on data of the Dutch Syrphidae database of EIS Kenniscentrum Insecten (Leiden).

Results

Overview of the available records

Oost-Vlaanderen: Heusden (bij Destelbergen), ES55D, 11.VI.1944, 1♀, leg. Bequaert M., det. Van de Meutter F., coll. RBINS; **Antwerpen:** Postel, FS58C, 13.VIII.1922 (1♂), 22.VIII.1922 (1♀), 23.VIII.1922 (3♂, 2♀), 24.VIII.1922 (1♂), 26.VIII.1922 (1♂, 5♀), all leg. Severin G., det. Van de Meutter F., coll. RBINS; **Limburg:** Genk, Schemmersberg, FS75C, 13.IX.2014, 1♀, leg. Van de Meutter F., det. Van de Meutter F., coll. Van de Meutter F.; **Luxemburg:** Tailles, Les Tailles, FR96B, 17.IX.1926, 1♂, 2♀, leg. Severin G., det. Van de Meutter F., coll. RBINS.

Revising the large collection at the RBINS revealed 15 specimens of *M. aerosa*. The individual that was identified as *M. macquarti* by L. Verlinden and that subsequently has been referred to as *M. aerosa* (e.g. VAN DE WEYER 2002, VAN DE MEUTTER 2011) indeed belongs to that species. It is puzzling that this specimen was accompanied by a series of specimens collected at the same site in a sequence of days, which were assigned to *M. hirtella* by Luc Verlinden. In total, six males and eight females of *M. aerosa* were collected by G. Severin at Postel between 13-26.VIII.1922. The same entomologist also collected one male and two female *M. aerosa* on 17.IX.1926 at Les Tailles. Among

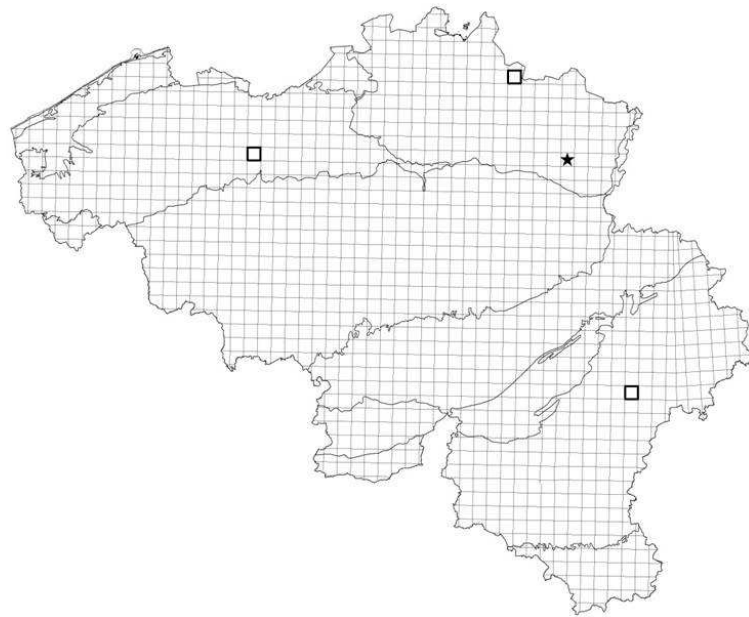


Fig. 1. The distribution of *M. aerosa* in Belgium at the level of 5x5km UTM squares. The lines within the limits of Belgium delineate ecoregions. Records dating before 1950 are shown by a square, records between 1950-1980 are indicated with a circle, records from 1980 till present are indicated with a star.

100< specimens collected in the valley of the Scheldt and Leie river near Gent around 1950 by J. Verbeke and M. Bequaert, one female *M. aerosa* was discovered (11.VI.1944, leg. M. Bequaert).

Recent claims of *M. aerosa* that could be revised, were mainly *M. hirtella* or *M. nuda*. A male *Melanogaster* collected on 18.V.2002 at Ansart (leg. J. Menten, coll. J. Menten) assigned to *M. aerosa* turned out to be a *M. parumplicata* and predates the first published records of *M. parumplicata* in Belgium (BAUGNÉE, 2011). The record published by VAN DE WEYER (2002) at Hechtel has been retracted later (Guy Van de Weyer, pers. comm.). One records is confirmed as *M. aerosa*: a female at Genk, Schemmersberg on 13.IX.2014. The distribution of *M. aerosa* in Belgium is given in figure 1.

Numerous specimens in the RBINS collection were labelled “*C. macquarti*”. They mostly concerned males, and very few females. Misidentified males *M. hirtella* often had extensive blackish thorax hairs, which probably was the cause of the misidentification. In some areas, male *M. hirtella* with black hairs on the thorax may be prevailing (e.g. at some acid fens in the Campine area (VAN DE WEYER 2002), or in the Hautes Fagnes), which should be kept in mind when identifying *Melanogaster*. It is advisable to use features of the genitalia in combination with the shape of the facial knob to discriminate male *M. aerosa* from other *Melanogaster* sp. Female *M. aerosa* are recognized by the short, decumbent, bristle-like, golden-coloured hairs on the thorax. In *M. hirtella* and *M. parumplicata*, these hairs are longer, more greyish and more straight, on average. We often encountered female *M. hirtella* where hairs on the thorax were largely worn off, or bend by handling, which may lead to confusion. Good illustrations of *M. aerosa*, *M. hirtella* and *M. nuda* can be found on the website of Steven Falk (FALK, 2015). In figure 2, I illustrate a typical *M. aerosa* female in comparison with a typical *M. hirtella*.

Habitat

The principal habitat of *M. aerosa* appears to differ between Great-Britain and the Netherlands: in Great-Britain the species is mainly found in acid moorland, and a minority at alluvial ditches or coastal grazing marsh (BALL *et al.*, 2011; FALK 2015). In the Netherlands, it is found mainly in open, wet areas such as floodplains, mostly on clay soil, and to a much lesser extent on acid moorland. In both countries, *M. aerosa* has declined over the past decades, yet in the Netherlands, the decline appears related to the habitat; *M. aerosa* has declined in moorland habitats, yet to a lesser extent in floodplain areas (REEMER *et al.*, 2009).

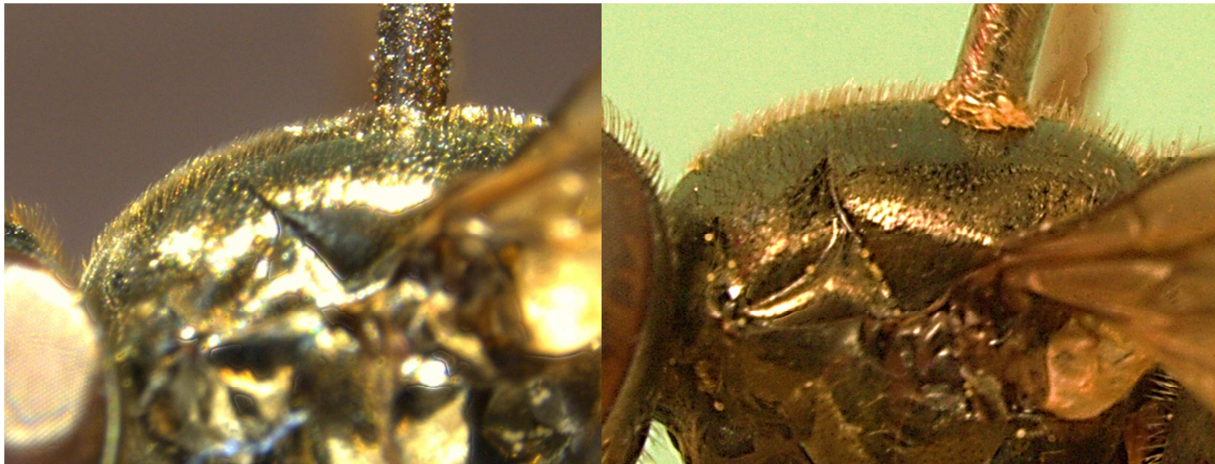


Fig. 2. Thoracic dorsum of *M. aerosa* (left) and *M. hirtella* (right) illustrating difference in thoracic hairs.

Phenology

The phenology of *M. aerosa* in Great-Britain can be described as a long, slowly growing continuous flight period from May to September with a peak in August (BALL *et al.*, 2011). According to FALK (2015), at many sites the species does not appear before August. This is different from the Netherlands, where *M. aerosa* has two clearly separated generations; the first runs from May to the end of June, the second from the end of July to September (REEMER *et al.*, 2009). Also, the overall pattern is reversed: higher numbers in spring than in summer. In figure 3, we separated the Dutch data into two groups; “spring” observations (observations before 15 July) and “summer” observations (observations after 15 July). As a standard, we did the same for data of *M. hirtella* in each country. The graphs confirm that *M. aerosa* is mainly a “summer” species in the UK, and more a “spring” species in the Netherlands. *Melanogaster hirtella* clearly is a spring species in both countries, but there are also summer observations in the UK (9%).

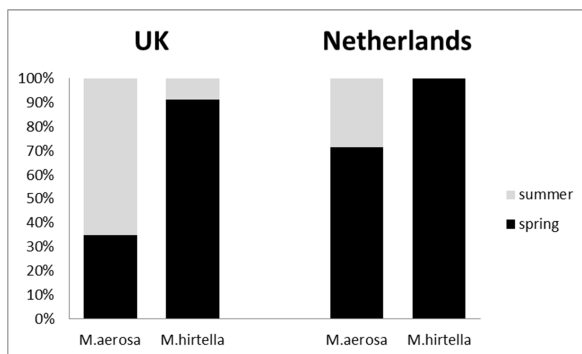


Fig. 3. The proportion of “spring” (<15 July) versus “summer” (>15 July) observations of *M. aerosa* and *M. hirtella* in Great-Britain and the Netherlands.

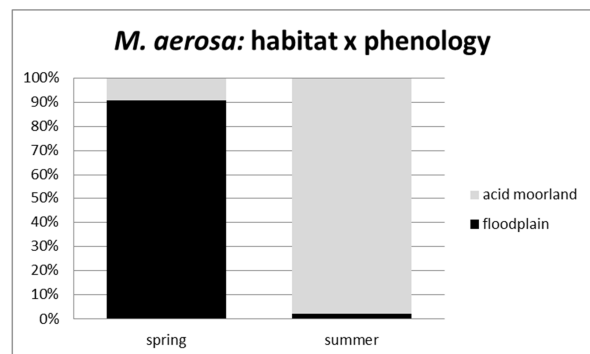


Fig. 4. The proportion found in acid moorland versus floodplains for the “spring” and “summer” generation of *M. aerosa* in the Netherlands.

Habitat x Phenology

Based on a detailed dataset from the Netherlands, we have assigned observations to either the “floodplain” habitat, which also included some records from polder grassland, or to “acid moorland”. Assignment was based on the presence of the above habitats at the locality of each record. Records from localities where both floodplains and acid moorland occur could not be assigned and were omitted. The results are presented in figure 4. *Melanogaster aerosa* in summer are almost all from acid moorland (98%) and those from spring are generally from floodplains (91%). The Belgian data also fit into this pattern: the single spring record is from a floodplain, all acid moorland records are from (late) summer.

Discussion

Until recently, the status of *M. aerosa* in Belgium was “regionally extinct” (VAN DE MEUTTER, 2011). Only one confirmed record existed which dated back more than 90 years. The extensive review of material of *Melanogaster* revealed a number of additional historical records in Belgium. A recent observation in 2014 indicates that the species is still present in Belgium. *M. aerosa* is very similar to other *Melanogaster* species and may be easily overlooked. The focus of Belgian observers keen for this species has been on the Campine area (e.g. VAN DE WEYER, 2002), but it is revealed that it may also occur in river floodplains on clay, where it may go unnoticed between a profusion of *M. hirtella*. *Melanogaster aerosa* occurs in two different types of habitat: base-rich floodplains on clay, and acid, base-poor moorland (REEMER *et al.*, 2009; SPEIGHT, 2011). New records revealed in this study indicate that this was also the case in Belgium. Apart from the records from the Campine area and the Ardennes on base-poor substrate, also a record from a floodplain along the river Scheldt has been unearthed. The species has declined in Western-Europe, yet in the Netherlands it appears that this decline has occurred mainly on acid moorland, and much less at base-rich floodplains. It is tempting to link this selective decline to acidification which had a dramatic impact on fauna of acid moorland in the second half of the 20th century (e.g. dragonflies, KETELAAR 2001).

The recent record of *M. aerosa* in Belgium is from the Campine area, on base-poor sand. The locality “Schemmersberg” near Genk is a dry heathland with a small pond created in 2012. The species was found in the rather unique company of true xerothermic species as *Paragus bicolor* and *Chamaesyphus lusitancius*. This female *M. aerosa* probably originated from the larger surroundings where a large number of heathland fens and ponds are present which have either inflow of base-rich seepage or inflow of water derived from small rivers, which buffers the water in and around these fens. In the Netherlands, the vast majority of recent records come from floodplains, where *M. aerosa* occurs in low numbers among a profusion of *M. hirtella*. This paper indicates that in Belgium *M. aerosa* historically also was present in the floodplains of the river Scheldt. If *M. aerosa* is still present in Belgian floodplains, it would probably require systematic searching to uncover it.

In VERLINDEN (1991), the flight period of *M. aerosa* is erroneously given as “half July”, whereas the single record known at that time was from half of August. Current records show that *M. aerosa* may have two generations in Belgium, one in spring and one in summer, as is the case in the Netherlands (REEMER *et al.*, 2009). In Great-Britain, no distinction can be made between a spring and summer generation. This may be due to the large latitudinal and climatic range in this country. Assigning records to “floodplain” or “acid moorland” habitat in the Netherlands revealed that summer and spring generations are largely allopatric: they occur in different populations in different habitats. This pattern could be an artefact, because heathlands are more visited by entomologists in summer and vice versa for floodplains. We have not performed a detailed analysis on sampling behaviour of Dutch entomologists to confirm or reject this hypothesis. However, if the pattern is true, such a large ecological differentiation in both habitat and flight period is very curious, and further research into this taxon is warranted.

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