

## ***Pherbellia goberti* (Pandellé, 1903) new to Belgium (Diptera : Sciomyzidae)**

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### **Abstract**

During a Malaise trap campaign in 2012 in the Dunbergbroek (Holsbeek, prov. Vlaams Brabant), 527 specimens belonging to 21 species of Sciomyzidae were found. One species, *Pherbellia goberti* (Pandellé, 1903), is found new to the Belgian fauna. This is an extremely rare species known from 11 specimens worldwide only. Its life cycle and biology are unknown to this day and here, valuable information and an overview of current knowledge is provided.

**Keywords** Diptera, Sciomyzidae, *Pherbellia goberti*, first record Belgium

### **Samenvatting**

Met behulp van een Malaiseval werden in 2012 in het Dunbergbroek (Holsbeek, prov. Vlaams Brabant) 527 specimens van 21 soorten Sciomyzidae verzameld. Een van deze, *Pherbellia goberti* (Pandellé, 1903), wordt als nieuwe soort voor België gemeld. Dit is een uiterst zeldzame soort die slechts van 11 specimens wereldwijd gekend is. De levenscycli en biologie van *P. goberti* is voorlopig onbekend. Hier wordt waardevolle informatie aangeboden, samen met een overzicht van de huidige kennis.

### **Résumé**

Au cours d'une campagne de collecte au piège Malaise en 2012 dans le Dunbergbroek (Holsbeek, prov. Vlaams Brabant), 527 spécimens appartenant à 21 espèces de Sciomyzidae ont été capturés. Une de ces espèces, *Pherbellia goberti* (Pandellé, 1903) est mentionnée comme nouvelle pour la faune de Belgique. C'est une espèce très rare, connue seulement de 11 spécimens. Le cycle de vie et la biologie de cette espèce ne sont pas connus à ce jour, et ces nouvelles données peuvent apporter de précieuses informations.

### **Introduction**

Snail-killing flies (NL: Slakkendodende vliegen) are amongst the ecologically well-known families of dipterans in the world. The fact that their larvae prey on gastropods makes them interesting study organisms in applied ecology as biocontrol agents, as well as in fundamental ecology on the evolution of larval feeding behavior. For nearly half of all known species, extensive research has revealed their life cycles, immature stages and host preference (MURPHY *et al.*, 2012). All species of Sciomyzidae, with only few exceptions, are known to have malacophagous larvae feeding on several families of land and aquatic snails. Recently, the phylogeny of Sciomyzidae has been established for a large group species by molecular research (CHAPMAN, 2008; TÓTHOVÁ *et al.*, 2012) resolving taxonomic relatedness between genera.

Despite the growing scientific interest for these valuable insects, faunistic research on this family in Belgium has been virtually lacking for almost 40 years now. Jan Verbeke was possibly the only person

to collect Sciomyzidae in large numbers. This resulted in a set of publications between 1948 and 1967 on biology and taxonomy of Sciomyzidae. Recently the interest in snail killing flies has revived in Belgium (e.g. VAN DE MEUTTER & MORTELMANS, 2012; MORTELMANS, 2013) which will hopefully further improve our knowledge of this fascinating group.

In order to increase species records, a Malaise trap campaign was conducted in 2012 in the Dunbergbroek (Holsbeek, prov. Vlaams Brabant) which generated a large and varied catch of snail killing flies. Here, we only discuss the arrival of *P. goberti* to Belgium, as other results from this trap will be published in an integrated document, wrote from an more ecological point of view (MORTELMANS & VAN DE MEUTTER, in prep.).

### Habitat of the Dunbergbroek

The Dunbergbroek nature reserve is situated in a 2 km wide valley of the river Winge northeast of the village of Holsbeek (prov. Vlaams Brabant). Maps by Ferraris (1770-1777) and Van der Maelen (+-1840) show the area as meadows within a brook valley (Nl: beemd), with scattered small patches of wood (ANONIEM, 2009). Since 1945, the area became increasingly forested, mainly with poplars *Populus x canadensis*. Parts of the Dunbergbroek are still old forest, with a rich spring flora. The Winge valley is primarily fed by rainwater and in summer, many of the ditches dry out. Locally seepage water rich in minerals surfaces in the meadows, giving rise to a unique and rich flora. Management of the area primarily aims at developing and restoring natural forest (e.g. alluvial forest and fen forest). Some 15% of the area is assigned to restore the typical flower-rich meadows.

The Malaisetrapp (50.932617°, 4.775434°) was situated at the eastern edge of an open area within forest. The forest next to the trap was a *Populus x canadensis* stand with a large number of dead trees. The open area is a wet meadow, dominated by sedges (*Carex* sp.) near the trap. Some typical flowers are *Caltha palustris*, *Silene flos-cuculi*, *Dactylorhiza majalis*, *Rhinanthus angustifolius*. The meadow may be flooded for some weeks during winter and groundwater stays near the surface almost year round.

### *Pherbellia goberti* new to Belgium

MATERIAL EXAMINATED. *Pherbellia goberti* (Pandellé, 1903); 1♂; malaise trap 30.VI.2012 – 15.VII.2012; leg. F. Van de Meutter & Roel Uyttenbroeck, det. & col. J. Mortelmans; Dunbergbroek, Holsbeek (prov. Vlaams Brabant).

In 1820 Fallén described the first nine species of what we now know as *Pherbellia* under the genus *Sciomyza*. Ten years later, in 1830, Robineau-Desvoidy recognized the distinct character of these nine species and assigned them to a new genus *Pherbellia*. Since that time, new species of *Pherbellia* have been identified and published regularly (MERZ & ROZKOŠNÝ, 1995). Now, *Pherbellia* is by far the largest Sciomyzidae genus in the Palearctic region: 42 species of *Pherbellia* are known (KNUTSON & VALA, 2011) which is nearly 25% of all Palearctic Sciomyzidae.

The genus is characterized by a bristle above the first coxa (a feature shared by all Sciomyzini) generally broad genae, the anal vein reaching to the wing margin, a mainly dusted body and a frontal stripe which is in most cases conspicuous. The genus is morphologically very similar and probably closely related to *Pteromicra* (TÓTHOVÁ *et al.*, 2012). Most species of *Pherbellia* have hyaline wings and may be overlooked due to their small size and inconspicuous appearance. Several authors have suggested dividing this speciose genus into subgenera or species groups, but until now no such classification is published (KNUTSON & VALA, 2011). Genetic research shows *Pherbellia* to be a paraphyletic genus within the Sciomyzini (TÓTHOVÁ *et al.*, 2012) which only supports the idea of creating subgenera or species groups. *Pherbellia* is known from all biogeographic regions but no species are known to have a global distribution. The highest number of species can be found in the Palearctic realm with 42 species, followed by the Nearctic with 29 species (KNUTSON & VALA, 2011). In other regions, only few species are found.

Typically, larvae of *Pherbellia* are true predators which feed on various families of aquatic pulmonate snails, although terrestrial snails are attacked too in lower numbers. Only few species of *Pherbellia* appear to be host-specific. Larvae feed on various prey and actively search for new hosts.

Until the third larval stage, larvae reside within one host which is killed ultimately. Thereafter, larvae prey actively on other snails. Pupation occurs within the host (BRATT *et al.*, 1969). Species of *Pherbellia* are multivoltine and overwinter as puparia (BERG *et al.*, 1982), although some do overwinter as an imago (e.g. the common *P. schoenherri*).

PANDELLÉ (1902) described *Pherbellia goberti* in his work on French Diptera as *Sciomyza goberti*. The holotype was collected in Landes (France). It was deposited, without mention of the collection date, in Muséum National d'Histoire Naturelle in Paris. The description, however, is very brief, provides little detail, and lacks figures. KNUTSON (1981) published a detailed redescription of the Pandellé specimen in order to bring attention to this species and gain knowledge on species recognition. After KNUTSON (1981), only one record for *P. goberti* is known: STUKE (2005) mentions two males and two females from Grippel, northern Germany. Simultaneously with KNUTSON (1981) and probably unaware of his redescription, ROZKOŠNÝ (1982) described *Pherbellia stylifera*. These two species would only differ in length of arisal hairs. These hairs should be much longer than the arista is broad at its base in *P. goberti*, and shorter than the arista is broad at its base in *P. stylifera*. *P. stylifera* is known by a male holotype from Finland and a female paratype from Sweden. ROSKOŽNY (1984) suggested it to be a boreal species. Only in 1993 additional specimens were found: LAMMERTSMA (1996) published the discovery of three males for the Netherlands. Simultaneously, VAN AARTSEN (1996) found another female in the Netherlands. KASSEBEER (2000) mentions a male from Hamburg, northern Germany. At last, COLE (2003) found a female in Great Britain, Cambridgeshire.

Recently, the taxonomic status of *P. goberti* has changed. STUKE (2005) published a comment made by Rudolf Rozkošný and considered *P. stylifera* as a junior synonym of *Pherbellia goberti*. This view is now widely shared amongst sciomyzid workers (KNUTSON & VALA, 2011).

Specimens of *P. goberti* appears as a small *Sciomyza* species at first sight. They have yellow-brown thorax and pleura. Also the wings and halteres are yellowish with the cross veins only slightly tinged. Further essential characters are the glabrous anepisternum, the short mid-frontal stripe, the middle and hind femora and tibia without brownish rings and the third antennal segment which is red to brownish. The head is unusually broad and has two well-developed ocellar bristles. Genae are small, less than half the height of an eye. Females of some *Pherbellia* are hard to separate from each other when having a glabrous anepisternum and short mid-frontal stripe: *P. rozkosnyi*, *P. sordida*, *P. scutellaris* and especially *P. pallidiventris*. Care has to be taken while identifying females, especially wet specimens of which important dusting and colouring characteristics may be obscured. For the identification of females, essential literature is ROZKOŠNÝ (1991). Males on the other hand are easily recognized by studying genitalia, pictured in KNUTSON (1981), VALA (1989) and ROZKOŠNÝ (1991).

Combining all published records of *P. stylifera* and *P. goberti*, it appears that this is a very rare, but rather widespread species, occurring in most countries in north-west Europe: Finland (1 location, ROZKOŠNÝ, 1982), Sweden (1 location, ROZKOŠNY, 1982), Germany (2 locations, KASSEBEER, 2000; STUKE, 2005), France (1 location, PANDELLÉ, 1902), Britain (1 location, COLE, 2003), the Netherlands (2 locations, VAN AARTSEN, 1996; LAMMERTSMA, 1996) and now, Belgium. These records are presented in figure 2. ROZKOŠNÝ (1991) for reasons unknown suggests that *P. stylifera* is most likely an element of the Nearctic fauna, although no records are known from that region for now. Only little data on habitat preferences are known. COLE (2003) swept his specimen from an open marsh area, next to a pond, rich in emergent and marginal flora. LAMMERTSMA (1996) caught two specimens from moist reed stands and one from quaking bog.

A phenology graph (Fig. 1) is presented based on all records published from Sweden (ROZKOŠNÝ, 1982), Britain (COLE, 2003) the Netherlands (LAMMERTSMA, 1996; VAN AARTSEN, 1996) and Germany (KASSEBEER, 2000; STUKE, 2005). For other records, no date is known. Adults were found from the beginning of May to the end of August, with a peak possibly in June. The life stages of immature *P. goberti* are not yet known. The general life history of *P. goberti* will likely be similar to that of other *Pherbellia* species, as described by BERG *et al.* (1982), which is summarized above.

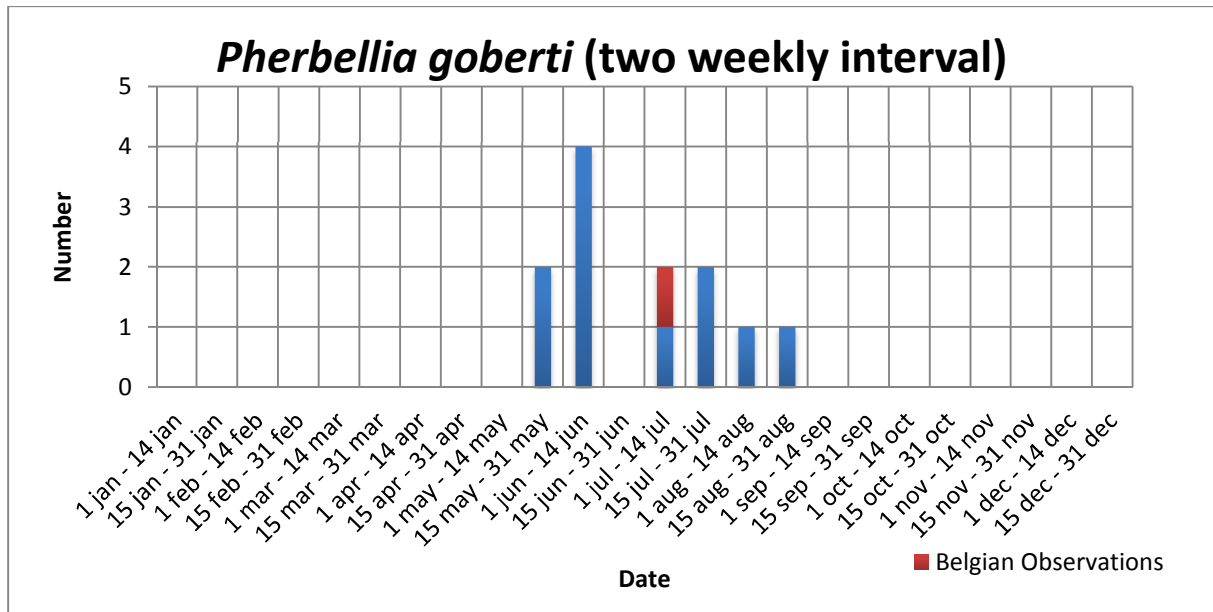


Fig. 1. Phenology of *Pherbellia goberti* based on data from ROZKOŠNÝ, 1982; COLE, 2003; LAMMERTSMA, 1996; VAN AARTSEN, 1996; KASSEBEER, 2000 and STUKE, 2005.

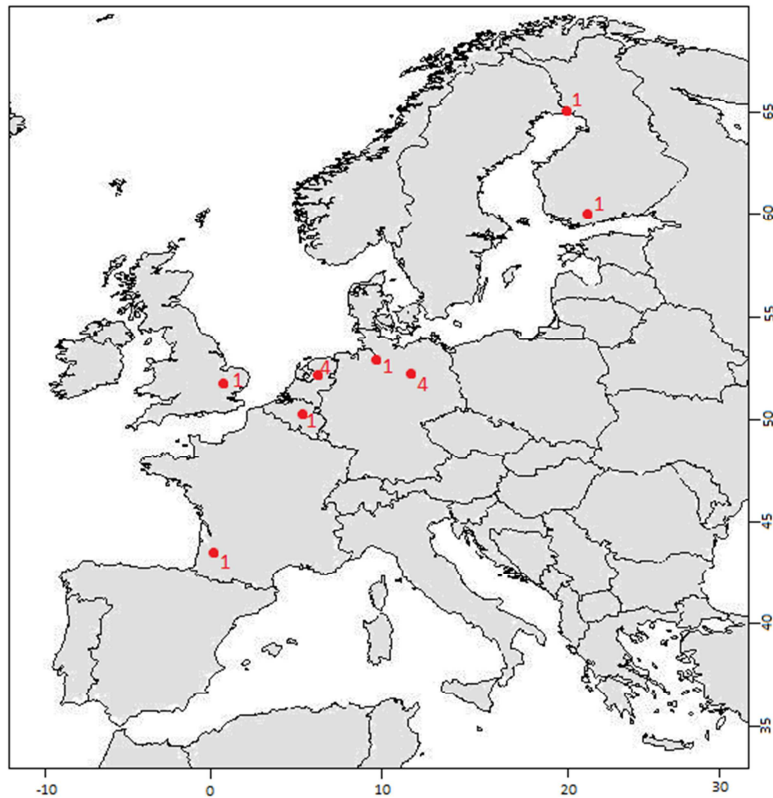


Fig. 2. Distribution map of *Pherbellia goberti* with the number of individuals found at each site, based on data from ROZKOŠNÝ, 1982; COLE, 2003; LAMMERTSMA, 1996; VAN AARTSEN, 1996; KASSEBEER, 2000 and STUKE, 2005.

In Belgium, 14 species of *Pherbellia* are known, four species are particularly common and widespread: *P. schoenherri* (Fallén, 1826), *Pherbellia albocostata* (Fallén, 1820), *Pherbellia griseola* (Fallén, 1820) and *Pherbellia dorsata* (Zetterstedt, 1846) (MORTELMANS, 2013). This number is now increased to 15 species.

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