

Stenomicridae, a new fly family for the Netherlands (Diptera: Opomyzoidea)

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KEY WORDS

Identification key, *Podocera delicata*, *Podocera soniae*, *Stenomicra cogani*

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Stenomicridae is a family of small flies with only three species known from Europe: *Podocera delicata*, *Podocera soniae* and *Stenomicra cogani*. Here, we report the presence of this family in the Netherlands for the first time, with all three European species being found in the country. Larvae of the flies are phytophagous. Two species are dependent on sedges and wood club-rush and were found together at two locations on their known host plants. The third species was found in a Malaise trap.

Introduction

The section of acalyptrate Diptera harbours many families in Europe, some of them with very few or only one species. These small families often remain unnoticed, due to the difficulty in finding specimens and/or identifying the family. Recently, however, two small families were added to the Dutch list, namely Chiropteromyzidae (Carles-Tolrá 2009) (now a subfamily of Heleomyzidae, Roháček 2018) and Strongylophthalmyiidae (De Bree 2018). It also seemed likely that the family Stenomicridae would occur in the Netherlands.

The larvae of two species are known to be phytophagous on sedge *Carex* and wood club-rush *Scripus sylvaticus* (Roháček 2009). Any attempt to find these species should be made in boggy woodland with large stands of sedges. The Sint Jansberg at Plas-molen (province of Limburg) has just such a habitat. A collecting trip succeeded in finding this family. An additional species was caught with Malaise trap in the province of Gelderland. After the initial find of the family in 2017, it turned out that *Stenomicra cogani* had been collected in the Netherlands many years ago. Paul Beuk kindly made the data of the specimens in the collection of the Natuurhistorisch Museum Maastricht (NHMM) available to us.

Identification and phylogeny

Stenomicridae are small (1-2 mm) and slender acalyptrate flies with a yellow or grey body. Due to their small size and secretive life habits they are not easily found. In ethanol of a Malaise trap, samples of these yellow bodied small flies could easily be mistaken for gall midges (Cecidomyiidae). For identification to family level, see Oosterbroek (2006). Diagnostic features of Stenomicridae are as follows: antennae geniculate, arista long pectinate, two pairs of fronto-orbital bristles with the anterior pair inclinate, ocellar and interfrontal bristles absent, gena with a series of ventroclinate setae terminated by one porrect pseudovibrissa, costa with subcostal break present and subcostal vein incomplete, crossvein BM-Cu absent, cell cup open, no preapical setae on tibiae. Despite their small size and difficult to discern features stenomicrid flies are easily recognized by their

remarkable appearance as seen in the accompanying habitus photos of live specimens (figures 1-3).

The family status of Stenomicridae is still unclear. Currently, the species in Stenomicridae are included as a subfamily of the Perisclididae in the World catalog of the family Perisclididae (Mathis & Rung 2011). However, the authors note: 'Although Stenomicrinae are recognized as a subfamily, evidence confirming the monophyly of this subfamily is vague or generally wanting. Thus, the genera here included in Stenomicrinae may eventually be placed elsewhere in the suprafamily Asteioinea (superfamily Opomyzoidea) and they may not be as closely related to each other as the classification adopted here would infer'. Nevertheless, the family Stenomicridae was established already by Papp (1984) and the family status of this group was supported by both Papp (2006) and Roháček (2011b). Thus, here we treat these highly remarkable flies as a separate family. Within the family there are also disagreements regarding the generic classification. While Mathis & Rung (2011) treat *Podocera* as a synonym of *Stenomicra*, Papp (2006), followed by Roháček (2009, 2011b), elevated *Podocera* to genus level. Remarkably, Mathis & Rung (2011) make no mention of Roháček (2009).

Key to European species

Although a key is available for the western Palearctic (Merz & Roháček 2005), here, we present a key to the European species. This key is based on descriptions given by Bächli (1997) and Merz & Roháček (2005). For drawings of genitalia, see Merz & Roháček (2005) (*Podocera*) and Roháček (2011b) (*Stenomicra*).

- 1a. Body entirely pale yellow, costal sector between veins R2+3 and R4+5 three times as long as that between veins R4+5 and M. Anterior fronto-orbital bristle shorter than posterior one, wing completely hyaline, crossvein DM-Cu absent (for habitus, see figure 1) *Stenomicra cogani* Irwin, 1982
- 1b. Body at least partly grey, costal sector between R2+3 and R4+5 as long as or shorter than that between R4+5 and M, both fronto-orbital bristles subequal in size, crossvein DM-Cu present (*Podocera*) 2



1. *Stenomicra cogani*, male. Photographed on a leaf of *Scirpus sylvaticus* in the Czech Republic (North Bohemia). Photo: Jindřich Roháček

1. *Stenomicra cogani*, man. Gefotografeerd op een blad van *Scirpus sylvaticus* in Tsjechië (Noord Bohemen).



2. *Podocera delicata*, male. Photographed on a stem of *Carex* in the Czech Republic (North Bohemia). Photo: Jindřich Roháček

2. *Podocera delicata*, man. Gefotografeerd op een stengel van *Carex* in Tsjechië (Noord Bohemen).

- 2a. Abdominal terga partly pale, legs yellow, wing without alula, basally with broad milky white band, vein CuA2 present as fold, dorsocentral bristles in a single evenly spaced row, only the prescutellar setae strong, surstylus with two apical teeth (for habitus, see figure 2)
..... *Podocera delicata* (Collin, 1944)
- 2b. Abdominal terga completely brown, hind tibia with dark ring, wing with alula, basal milky band poorly visible, crossveins milky white, vein CuA2 absent, two posterior dorsocentral setae strong and separated by a distinct gap, surstylus with simple apex (for habitus, see figure 3)
..... *Podocera soniae* (Merz & Roháček, 2005)

Species

Stenomicra cogani Irwin, 1982 (figure 1)

Material 7 ♂ 2 ♀, province of Noord-Holland, Naardermeer, AC 136-478, 17-24.vi.1992, Malaise trap, Leg RIN, col. NHMM [in ethanol]; 1 ♀, province of Limburg, Meinweg, Vlodrop station, Roode Beek, AC 208-351, 26.vi/6.vii.2013, leg. P. Thomas, col. NHMM [in ethanol]; 1 ♂, [idem], 16-25.viii.2013, leg. P. Thomas, col. NHMM [in ethanol]; 3 ♂ 3 ♀, province of Limburg, Plasmolen, Sint Jansberg, AC 192-416, 10.vi.6.2017, sweeping *Carex acuta*, Leg. & col. E. de Bree [in ethanol].

Stenomicra cogani is found only in Europe and is described



3. *Podocera soniae*, male. Photographed on a wooden fence in Switzerland. Photo: Pierre Bornand

3. *Podocera soniae*, man. Gefotografeerd op een houten hek in Zwitserland.



4. Habitat of *Stenomicroa cogani* in the Netherlands, at the Sint Jansberg. Photo: Elias de Bree
4. Habitat van *Stenomicroa cogani* in Nederland op de Sint Jansberg.



5. Habitat of *Podocera delicata* in the Netherlands, at the Sint Jansberg (province of Limburg). Photo: Elias de Bree
5. Habitat van *Podocera delicata* in Nederland op de Sint Jansberg (Limburg).



6. Habitat of *Podocera soniae* in the Netherlands, in National Park De Veluwezoom (province of Gelderland). Photo: Elias de Bree
6. Habitat van *Podocera soniae* in Nederland in Nationaal Park De Veluwezoom (Gelderland).

based on British material. *Stenomicroa cogani* is the most widespread species in the family, and is known from the Czech Republic, Germany, Great Britain, Ireland, Italy, Romania, Slovakia, Spain and Sweden (Roháček 2009, 2011b, Roháček et al. 2017). It is reported from swampy habitats where large stands of *Carex* species are found, either in forested wetland habitats or in marshland meadows (Roháček 2009). *Stenomicroa cogani* has been reared from wood club-rush *Scripus sylvaticus* and the sedge *Carex elongata* (Roháček 2009). It is further known from many species of other sedges (*Carex acuta*, *C. acutiformis*, *C. elata*, *C. elongata*, *C. paniculata*, *C. riparia*, *C. rostrata* and *C. versicaria*) but also from stands of great manna-grass *Glyceria maxima* (Roháček 2009). In the Netherlands the species has been found in a boggy forest where large vegetations of slender tufted-sedge *Carex acuta* are present (figure 4). Occasionally, *P. delicata* and *S. cogani* can be found together, but this was not the case in the Netherlands as the two species were found in different habitats at the same locality. Reported flight period ranges from May to August, with most specimens being found in June (Roháček 2009).

Podocera delicata (Collin, 1944) (figure 2)

Material 1 ♀, province of Limburg, Meinweg, Vlodrop station, Roode Beek, AC 208-351, 17-20.vi.2013, leg. P. Thomas, col. NHMM [in ethanol]; 1 ♂, [idem], 16-25.viii.2013, leg. P. Thomas, col. NHMM [in ethanol]; 1 ♂, province of Limburg, Plasmolen, Sint Jansberg, AC 192-416, 1.vii.2018, sweeping *Scripus sylvaticus*, leg. & col. E. de Bree [in ethanol].

Podocera delicata is found only in Europe and is described based on British material. *Podocera delicata* is known from the Czech Republic, Germany, Great Britain and Switzerland (Roháček 2009, 2011a). It is reported from swampy habitats where large stands of *Carex* species are found, either in forests or in meadows (Roháček 2009). In the Netherlands, it was found on the shore of an artificial stream, where large sedges *Carex* and wood club-rush *Scripus sylvaticus* are present (figure 5). *Podocera delicata* is mainly found on greater tussock-sedge *Carex paniculata*, sometimes on other sedges, namely *Carex acutiformis*, *C. pseudocyperus*, *C. rostrata*, *C. acuta*, *C. versicaria* and *Scipus sylvaticus* (Roháček 2009). The reported flight period ranges from May to August, with most specimens being found in June (Roháček 2009).

Podocera soniae (Merz & Roháček 2005) (figure 3)

Material 1 ♂, province of Gelderland, Nationaal Park Veluwezoom, AC 195-454, 8-23.vi.2019, Malaise trap, leg. & col. E. de Bree [in ethanol].

Podocera soniae is known from Bulgaria, Czech Republic, Germany, Great Britain, Italy, Romania, Slovakia, Sweden and Switzerland (Godfrey 2018, Merz & Roháček 2005, Roháček 2011b). There are no breeding records of this species. It has

mostly been found in Malaise traps. Its host plant could be *Angelica silvestris* according to Von Tschirnhaus (1992). In the Netherlands, it was found in a horse meadow surrounded by woodland with scots pine *Pinus sylvestris* (figure 6). The locality is situated on the Veluwe, a geological formation of Pleistocene sands. The area of the National Parc where the specimen was caught, is the driest part of the parc.

Behaviour

A fascinating behaviour has been described and observed in the three stenomicrid flies reported here. *Podocera soniae* can walk in any direction, whilst keeping their head pointed in the same direction (Pierre Bornand unpublished observations). This behaviour was also described for *P. delicata* by Merz & Roháček (2005) and observed in *S. cogani* during our collecting at Plasmolen. We also observed that the small flies would hide behind leaf litter in the net. After capture, it was observed that specimens remained immobile at the bottom of the net and only started moving again after several dozen seconds. They then walked in the manner described, and only rarely flew.

The two species who occur in *Carex* stands are rarely found by accident. Only when searching in the appropriate habitat are they likely to be found. Irwin (1982) found Stenomicroidae by taking a beating sample from tussocks of *Carex* which he calls 'tussocking'. Roháček reports most specimens captured by sweepnet (Roháček 2009, 2011a, 2011b) in sedge stands.

Discussion

Interestingly, Roháček (2009) reported that *S. cogani* may have recently expanded its range eastwards, because it was found only recently in the Czech Republic. Sites examined previously by Roháček from 2005 to 2007 for Anthomyzidae did not yield *S. cogani*. However, in 2008 and 2009, the species was present. Also, in Slovakia, the species was recently found (Roháček 2017) at sites that were sampled thoroughly but unsuccessfully in the past.

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Samenvatting

Stenomicridae, een nieuwe vliegenfamilie voor Nederland (Diptera: Opomyzoidea)

Stenomicridae zijn kleine acalyptrate vliegen van ongeveer twee millimeter. Er zijn drie soorten bekend uit Europa. *Stenomicra cogani* werd gevonden op één plek in Noord-Holland en twee plekken in Limburg. *Podocera delicata* is verzameld op twee plekken in Limburg. *Podocera soniae* werd verzameld met een malaiseval in Nationaal Park Veluwezoom (Gelderland). *Stenomicra cogani* en *Podocera delicata* zijn bekend van moerasbiotopen waar de larven fytofaag leven op zeggen *Carex* en bosbies *Scirpus sylvaticus*. De voedselplant van *Podocera sonia* is niet bekend, maar is mogelijk gewone engelwortel *Angelica silvestris*. Opmerkelijk is het gedrag van de vliegen: ze kunnen met hetzelfde tempo zowel vooruit, opzij en achteruit lopen.



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