

The first records of *Solva marginata* (Meigen, 1820) and the fly family Xylomyidae (Diptera) in Norway

FRODE ØDEGAARD & ARNSTEIN STAVERLØKK

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The fly family Xylomyidae is reported from Norway for the first time. Two specimens of *Solva marginata* (Meigen, 1820) were found in Malaise traps situated in marshy habitats close to old growth forests in Vestfold in southern Norway. The species has a southern distribution in northern Europe and seems to be a rather recent immigrant to Fennoscandia.

Key words: Diptera, Xylomyidae, *Solva*, *Solva marginata*, Norway, Fennoscandia, Palaearctic, new record.

Frøde Ødegaard, Norwegian University of Science and Technology (NTNU), Department of Natural History, NO-7491 Trondheim, Norway. E-mail: frøde.odegaard@ntnu.no

Arnstein Staverløkk, Norwegian Institute for Nature Research (NINA), PB 5685 Torgarden, NO-7485 Trondheim, Norway. E-mail: arnstein.staverlokk@nina.no

Introduction

The fly family Xylomyidae belongs to the lower Brachycera and the infraorder Stratiomyomorpha, and these flies are closely related to Stratiomyidae. It is a small family with 134 known species worldwide (Courtney *et al.* 2009), of which eight are found in Europe (Fauna Europaea 2022), and three in Fennoscandia (Rozkošný 1973).

All Xylomyidae are associated with dead wood as larvae. The larvae feed on rotting organic matter under bark or in decaying wood detritus and are rather inactive (Stubbs & Drake 2014). The adults are rarely found but can occasionally be seen on tree trunks or foliage close to their breeding sites. Observations from England indicate that adults use advanced communication by stridulation (Drake 1990). Adult Xylomyidae can be separated from Stratiomyidae by having

a closed M3 cell below the discal cell, and the middle and hind tibiae with spurs. They also have a distinct membranous area in the frontal half of the dorsal surface of the first tergite (Rozkošný 1973).

Within the Xylomyidae the genus *Solva* Walker, 1860 can be distinguished from the other European genus *Xylomya* Rondani, 1861 by the thickened yellow hind femura possessing small black tubercles on the ventral surface, and the mainly dark body color except for a distinctive pale scutellum. The *Xylomya* species have slender hind femura and more distinct yellow and black color patterns. *Solva marginata* (Meigen, 1820) is 6–7 mm in length and can be separated from the other *Solva*-species occurring in northern Europe, *Solva varia* (Meigen, 1829), by having black coxae.

Solva marginata is a palearctic species

distributed in Central and Southern Europe including Turkey. In northern Europe the species is recorded from England, The Netherlands, Germany, Denmark, Finland, Sweden, and Estonia (Global Biodiversity Information Facility 2022). The species might utilize different species of deciduous trees as hosts, but seems to prefer elm *Ulmus glabra*, and aspen *Populus tremula* in Fennoscandia (Struwe 2008). Elsewhere in Europe it is also found on *Salix*-species and Norway maple *Acer plantanoides* (Aleksander 2002). The larvae develop in stems of recently

dead, large trees of more than 50 cm in diameter for aspen and elm (Struwe 2008).

Material and methods

The specimens were collected by using Malaise traps. The morphological study of the specimen was conducted with Wild M10 stereomicroscope. The specimen images were created using the photography technique of focus stacking. Several partially focused images were taken with a Nikon



FIGURE 1. Female of *Solva marginata* (Meigen, 1820), dorsal view. Photo: Arnstein Staverløkk.

D850 mounted on a Nikon PB-4 bellow with microscope objectives of different magnifications. The separate images were combined using Zerene Stacker 1.04 © (2009–2017) software.

A part of the front leg of one of the specimens was submitted for COI DNA barcoding. The result is available through the public project “Norwegian Diptera, larger Brachycera” (NOBRA) in the Barcode of Life Data Systems 4.0 (BOLD Systems 2022, Ratnasingham & Hebert 2007). Comparisons of COI-sequences from this study with data present in other public BOLD-projects were performed using a selection of tools provided

by BOLD, including Neighbor Joining clustering using the Kimura 2-parameter substitution model (Kimura 1980).

Reference material is deposited in the insect collections at Norwegian Institute for Nature Research (NINA) and NTNU University Museum in Trondheim (NTNU). The coordinates are given in decimal degrees (Grid: Latitude/Longitude hddd.dddd°; datum: WGS84). The faunistic divisions within Norway follow Endrestøl (2021) and are given in bold. The new county division introduced from 1 January 2020 has not been implemented in this study.



FIGURE 2. Female of *Solva marginata* (Meigen, 1820) lateral view. Photo: Arnstein Staverløkk.



FIGURE 3. Habitat of *Solva marginata* (Meigen, 1820) at Rønnebergdammen, Holmestrand, Vestfold. Photo: Frode Ødegaard.



FIGURE 4. Habitat of *Solva marginata* (Meigen, 1820) at Horten Natursenter, Horten, Vestfold. Photo: Arnstein Staverløkk.

Results

Solva marginata was recorded with the following data: Norway, VESTFOLD [VE], Horten municipality: Borrevann, Horten natursenter [59.41715°N–10.43855°E], Malaise trap 1 July–2 August 2015, 1 female, BOLD Sample ID: NOBRA 382, Process ID NODRY575-15, leg. Arnstein Staverløkk, coll. NTNU; Holmestrand, Rønnebergdammen [59.52312°N–10.10120°E], Malaise trap 22 June–19 July 2021, 1 male, leg. Arnstein Staverløkk, coll. NINA (Figure 1 and 2). The barcoded specimen (NOBRA 382) belongs to BIN: BOLD ACP-4857 which include 38 specimens of *Solva marginata* from Central Europe.

The locality at Rønnebergdammen includes a mesotrophic lake with large areas of floating mat bog. The surrounding area of the bog consists of mixed deciduous forest patches of old growth willows *Salix cinerea* and *Salix caprea*, bird cherry *Prunus padus* and gray alders *Alnus incana*.

The locality at Horten natursenter, close to Borrevannet consists of mixed forest with young and old trees of ash *Fraxinus excelsior*, beech *Fagus sylvatica*, alders *Alnus* spp., oak *Quercus* spp., birch *Betula* spp., linden *Tilia cordata* and elm *Ulmus glabra*. Dead and decaying logs of different sizes are spread in the area. The soil is moist with a small stream not too far from the trap site. The field vegetation is dominated by ferns, raspberry *Rubus idaeus* and meadowsweet *Filipendula ulmaria*.

Discussion

The present findings of *Solva marginata* represent the first confirmed records of the species from Norway as well as the only representant of the family Xylomyidae hitherto reported from Norway. Records from elsewhere in Fennoscandia indicate that this species has expanded towards the north during the last decades. The first record from Fennoscandia was from Falsterbo in Sweden 1920 (Wahlgren 1921), however, it was not rediscovered in Sweden before the 1990s. Currently the species is quite widespread in southern Sweden (Struwe

2008). The species was first found in Denmark in 1943 (Lyneborg 1969) and later rediscovered in 1994 (Munk 2000). The expansion of this species may be due to climatic change in combination with the rapid spread of elm disease (Struwe 2008). Due to this distributional range shift, we expect to see more frequent records of *Solva marginata* in Norway in the future, however, it will probably never become a common species due to the strict habitat requirements including the dependence of dead wood of rough dimensions.

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