

The invasive seed chalcid *Megastigmus specularis* Walley, 1932 (Hymenoptera, Chalcidoidea, Torymidae) recorded for the first time in Norway

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Megastigmus specularis Walley, 1932 (Hymenoptera, Chalcidoidea, Torymidae) is recorded for the first time in Norway. A total of two males and three females were recorded in a malaise trap set at Røynebergsletta, Forus, Sola in Rogaland in June 2021 and May 2022.

Key words: Hymenoptera, Chalcidoidea, Torymidae, *Megastigmus specularis*, invasive, Norway, Rogaland, new record

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Introduction

Two males and three females of a *Megastigmus* sp. (Torymidae) were collected from malaise trap samples from Forus, Rogaland in June 2021 and May 2022. The trap was set on a short-cut lawn at Røynebergsletta, Sola Municipality, in the NW part of Forus Næringspark, as part of an ongoing study of insect-friendly management of greenery.

Material and methods

The locality Forus is an industrial site on the border between the municipalities of Stavanger, Sola and Sandnes in Rogaland County. Originally, Forus was mainly wetland, which was drained and converted into agricultural land between 1908 and 1913 (Røyneberg 2020). Today, Forus Næringspark is maintaining more than 100.000 m² of lawn and other types of greenery. In 2021, Forus Næringspark and Museum Stavanger (MUST) initialized a small malaise trap project, to

study the effects of insect-friendly management of greenery. Three «Bugdorm» malaise traps were set in different types of green structure, of which one was placed on a short-cut lawn at Røynebergsletta in the NW part of Forus. The traps were emptied twice a month, and samples conserved in 75% alcohol. All insects were weighed (weight of wet samples) and sorted to higher taxonomic ranks. Hymenoptera of the superfamily Chalcidoidea were sent to Germany, to be included in the GBOL III «Dark Taxa»-initiative. *Megastigmus* are comparatively large and eye-catching wasps of the family Torymidae, not often collected in our samples, and possible to identify with the keys from Roques & Skrzypczyńska (2003). Also, some *Megastigmus*-species are economically important pests, therefore these specimens were removed from the sample with an aim to identify which species we were dealing with. One male and two females were glued on cardboard points and keyed with Roques & Skrzypczyńska (2003), and was tentatively identified as *Megastigmus specularis*. A third female was kept i alcohol and

sent to Dr. Petr Janšta, Staatliches Museum Für Naturkunde Stuttgart, for confirmation.

The records

Megastigmus specularis Walley, 1932

(Figures 1–2)

Material: RY, Sola, Røynebergsletta (N 58.90041, E 5.68971) malaise trap, 1♀ 1–15 June, 1♂, 2♀♀ 15–29 June 2021, 1♂ 15–31 May 2022 (leg. Alf Tore Mjøs, det. Alf Tore Mjøs/Petr Janšta, coll. MUST, coll. SMNS).

Discussion

Megastigmus specularis has previously been recorded from Sweden, Finland and Denmark (Hansson 1991, Hedqvist 2003, Kangas 1945, Jensen & Ochsner 1999), as well as a range of

other European countries.

The adults of *Megastigmus specularis* emerge in June and lay their eggs in developing cones of spruce trees (*Abies sp.*). Eggs are deposited in seed embryos, and the larva feed on the seed as it develops. The larva overwinters in the seed on the ground. Larval development occurs entirely within a single seed, with a winter diapause that may extend to several additional years (Hedling 1956, Turgeon *et al.* 1994). Accidental introductions to exotic countries through the seed trade is therefore a significant risk (Hussey 1954).

Phylogenetic analysis of *Megastigmus*-species associated with conifer seeds showed that the taxa formed two monophyletic groups. One clade comprising all the species associated with *Cupressaceae* and *Taxodiaceae* seemed to be single host or genera specialists. By contrast, *Megastigmus*-species associated with *Pinaceae*, including *M. specularis*, appeared capable of shifting onto different congeneric species or even



FIGURE 1. *Megastigmus specularis* Walley, 1932, male, Forus, June 2021. Photo: Kåre Solheim.



FIGURE 2. *Megastigmus specularis* Walley, 1932, female, Forus June 2021. Photo: Kåre Solheim.

onto a new host genus (Auger-Rozenberg *et al.* 2005). This ability might lead to the latter group being more efficient at colonizing new areas with new host species. Also, their invasive potential might be aided by the import of non-native spruce-species, for instance in the christmas-tree industry. Several nearctic *Megastigmus*-species are well established in Europe, and *Megastigmus specularis* is one of them. The species is said to probably originate from North America, and the original description is based on Canadian material. However, it has been known from Finland since 1945 at least (Kangas 1945), and has spread from Finland and Western Siberia to Western Europe in more recent years.

According to Jensen & Ochsner (1999) it is associated with many species of *Abies*, especially of Asian origin. Roques & Skrzypczyńska (2003) records 15 species of *Abies* as hosts for *Megastigmus specularis*, but the native *Picea abies* is not among these. However, the two most commonly grown species in the Norwegian christmas tree industry, *Abies nordmanniana* and *A. lasiocarpa* are both recorded as host species, as

well as *Abies fraseri*, *A. sibirica* and *A. koreana*. The appearance of *Megastigmus specularis* is potentially bad news for the christmas tree industry, as seed infestation rates can become as high as 30%. Infested seeds have normal weights and otherwise appear normal; therefore, growers often have problems identifying chalcid infestations. As a result, infested seeds are often deposited with healthy seeds during the cleaning process (Matallana *et al.* 2017).

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