First record of *Aulacigaster pappi* Kassebeer, 2001 from Norway (Diptera, Aulacigastridae)

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Aulacigaster pappi Kassebeer, 2001 is recorded for the first time from Norway. One female was caught in a Malaise trap in a rich fen surrounded by mixed forest dominated by spruce in Hedmark, eastern Norway. Comparison of the DNA barcode with records in the BOLD database confirmed the identification of the species. This is the second species of the family Aulacigastridae to be found in Norway.

Key words: Diptera, Aulacigastridae, *Aulacigaster pappi*, new record, distribution, DNA barcoding, Hedmark, Norway.

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Introduction

The Aulacigastridae is a small family comprising 56 described species worldwide with four species known from Europe (Rung & Mathis 2011). The larvae of *Aulacigaster* Macquart, 1835 develop in sap exuding from various species of trees (Papp 1998). The species are small (2–5 mm) and mostly dark-coloured with pale tarsi and red eyes. They can be recognized based on the head having two fronto-orbital bristles, the lower one being set closer to the eye margin, curving forward and somewhat inward, and the other curving backward. Post-ocellar bristles are absent and ocellar bristles are reduced or absent. Vibrissae are present. The wing has both humeral and subcostal breaks. Vein Sc is thin, and veins Sc and R_1 merge or touch for a short distance just before reaching the costa separately. Crossvein Bm-Cu is absent or very thin. Tibiae of all legs lack a dorsal preapical bristle (Oosterbroek 2006, Papp 1998).

During the project "Insects from rich fens in Hedmark, eastern Norway" a single female of *Aulacigaster pappi* Kassebeer, 2001 was collected in Hedmark, eastern Norway. The presence of the family Aulacigastridae in Norway was recently discovered, when *A. leucopeza* (Meigen, 1830) was collected in Akershus: Asker and Bærum (Artsdatabanken 2017).

Material and methods

The specimen is preserved in alcohol and deposited in the entomological collections at the Department of Natural History, University Museum of Bergen (ZMBN). The geographical region is given according to the revised "Strand-system" (Økland 1981).

The specimen was barcoded according to the protocol of the Norwegian Barcode of Life (NorBOL 2017) and the Barcode of Life Data System – BOLD (Ratnasingham & Hebert 2007). The retrieved barcode was assigned a Barcode Index Number (BIN, see Ratnasingham & Hebert 2013) and compared with the existing barcodes in the BOLD database.

FIGURE 1. The female of *Aulacigaster pappi* Kassebeer, 2001 caught in a Malaise trap in Hedmark, eastern Norway.

FIGURE 2. The rich fen at Kildesaga, Åmot municipality, Hedmark where *Aulacigaster pappi* was caught (Photo: Oddmund Wold, 2012 (Miljødirektoratet 2017)).

Aulacigaster pappi Kassebeer, 2001 (Figure 1)

Material. HEN, Åmot: Kildesaga, 61.178778°N 11.402167°E, 290 m a.s.l., 26 May–9 June 2016, 1♀, Malaise trap, leg. T. Andersen *et al*., ZMBN, BOLD Sample ID "RIKDIP11".

Remarks. The species is very similar to *A. leucopeza* (Meigen, 1830), the only other species of the family known from Fennoscandia (Artsdatabanken 2017). It can be separated from this species based on colouration and characters of the male genitalia. The head has two shiny spots on the vertex; in *A. pappi* these are large and trapezoid and extend from the lateral ocelli close to the eye margin (separated from the eye margin by about the width of an ocellus), while in *A. leucopeza* these spots are small and rounded and extend at most half the distance from the lateral ocelli to the eye margin. *Aulacigaster leucopeza* also has considerably lighter coxal apices and tibial bases, along with lighter head markings than *A. pappi*. In the male genitalia of *A. pappi* surstyli are short and thin with a blunt apex, while in *A. leucopeza* the surstyli are longer and stouter with a rounded apex (Kassebeer 2001, Nilsson-Örtman 2010, Rung & Mathis 2011).

The DNA barcode of the specimen from Hedmark was assigned to the same BIN (BOLD:ABW9182) as two Finnish specimens of *A. pappi* already present in the BOLD database. There was a maximum divergence of 0.17% between the sequences. With 5.73% distance to the nearest neighbour, *A. mcalpinei* Mathis & Freidberg, 1994 (BOLD:ACA3520), it is clearly separated from this species.

Biology and distribution. The trap was located on a small (6.8 daa) extremely rich lowland fen (NiN 2.0 nature type V1-C-4, Halvorsen *et al.* 2015). The fen itself was partly grown with trees and *Juniperus communis* L. and *Salix* spp. shrubs and surrounded by aging forest dominated by *Picea abies* L, with some *Pinus sylvestris* L., *Betula pubescens* Ehrh., and *Alnus incana* (L.) Moench (Figure 2). The area has mostly calcareous bedrock. Two areas of rich swamp forest and other rich fens are present not far from the trap site (Miljødirektoratet 2017). The closely related *A. leucopeza* is not host specific and may live off both deciduous trees and conifers. Little is known about the host preferences of *A. pappi*, but it may be found in the same habitats as *A. leucopeza* (Roháček *et al*. 2013). In Germany *A. pappi* has been collected in *Quercus* sp. and *Fagus sylvatica* L. forests, and in Sweden it has been reported from *Populus tremula* L. (Kassebeer 2001, Nilsson-Örtman 2010). It may also be baited to traps with beer, wine, etc. (Nilsson-Örtman 2010, Roháček 2013). European species of *Aulacigaster* are bivoltine and the second generation overwinters as adults in hollow trees (Roháček 2013).

Aulacigaster pappi was described by Kassebeer (2001) from Central Europe (Germany, France and Switzerland) based on material misidentified as *A. neoleucopeza* Mathis & Freidberg, 1994. It has since been found in the Czech Republic, Hungary, Slovakia, Finland, and Sweden (Carles-Tolrá 2015, Nilsson-Örtman 2010, Roháček 2009, Roháček *et al.* 2013). Although both species may be found in the same localities, *A. pappi* seems to reach further north than *A. leucopeza* in Fennoscandia (Nilsson-Örtman 2010).

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