Stomaphis quercus (Linnaeus, 1758) and *S. wojciechowskii* Depa, 2012, two myrmecophilous oak aphids in Norway (Hemiptera, Aphididae, Lachninae)

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Fjellberg, A. 2022. *Stomaphis quercus* (Linnaeus, 1758) and *S. wojciechowskii* Depa, 2012, two myrmecophilous oak aphids in Norway (Hemiptera, Aphididae, Lachninae). *Norwegian Journal of Entomology* 69, 68–72.

The pale giant oak aphid *Stomaphis wojciechowskii* Depa, 2012 is reported from Norway for the first time. It appears to be sympatrically distributed with the ant *Lasius brunneus* (Latreille, 1798) along the SE coast of Norway. The other giant oak aphid *Stomaphis quercus* Linnaeus, 1758, living with the ant *Lasius fuliginosus* (Latreille, 1798) appears to be less common, and is reported from four localities in SE Norway. It appears to be extinct from its first recorded locality dating back to 1966. Males and egglaying females of both species were observed from the beginning of October.

Key words: Hemiptera, Aphididae, *Stomaphis wojciechowskii*, *Stomaphis quercus*, distribution, first records, Norway.

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Introduction

The giant oak aphid (*Stomaphis quercus* Linnaeus, 1758) and the pale giant oak aphid (*S. wojciechowskii* Depa, 2012) are probably under-recorded in Norway. These large aphids (adults 6-7 mm long) live in obligatory association with ants (myrmecophilous), usually hidden in the runways of the ants on stems of large oak trees (*Quercus robur*), using their long rostrum to reach the sap flowing in the xylem inside the bark. *Stomaphis quercus* lives with *Lasius fuliginosus* (Latreille, 1798) while *S. wojciechowskii* uses *Lasius brunneus* (Latreille, 1798)) as host.

The first Norwegian record of *Stomaphis quercus* dates back to 1966 when the present author collected several specimens among *Lasius fuliginosus* on an oak at the island of Sandø in Færder municipality. An attempt to recollect it in the summer 2021 failed. The ants and their aphid are probably extinct on that locality. The second known record is from an oak in Sandefjord municipality in 2015, figured in Ødegaard *et al*. (2018, p. 33). This record went unnoticed until one of the authors (A. Staverløkk) draw my attention to it on 4th August 2021. The day after I checked the actaul site and could verify that the species still were present with *L. fuliginosus* on the same oak tree.

Stomaphis wojciechowskii was unknown until Depa (2012) described it from Poland as a new species, different from *S. quercus*, with *Lasius brunneus* as a specific host. Hodgson *et al*. (2019) published the species from Britain with records from Cambridgeshire, England. The species has also been recorded from Belarus, Hungary, Romania, Slovakia and Slovenia (Depa *et al*. 2017, Ostrovsky 2021). Up to 2021 the species had not been recorded in the Nordic countries, although A. Staverløkk had published photos of unmistakable *S. wojciechowskii* with *Lasius brunneus* from Vemannsås in Larvik, 03.10.2017

(Artsobservasjoner 2021)

Oak (*Quercus* spp.) appears to be the preferred tree for both aphids, but *S. quercus* has also been collected on *Betula*, *Alnus* and *Acer* (Heie 1995) and *S. wojciechowskii* on *Tilia, Alnus*, *Salix* and *Juglans* (Depa *et al*., 2017).

Material and methods

During the field season of 2021 both species were searched for in known and unknown sites for their respective ant hosts in districts of Vestfold and Telemark. When aphids are present they will usually be found in bark crevices and hollows partly covered by bark scales, being attended by the ants. Trunks with presence of ants were carefully inspected, using a knife to uncover the runways of the ants and the hiding places for the aphids. Removal of moss covering the lower part of the stem proved to be a successful searching method as small groups of aphids were often found there.

Samples of both species were sent to Prof. Lukasz Depa in Poland for barcoding and the initial species identifications were verified. Samples from the collecting sites are deposited at the Museum of Natural History, University of Oslo, Norway.

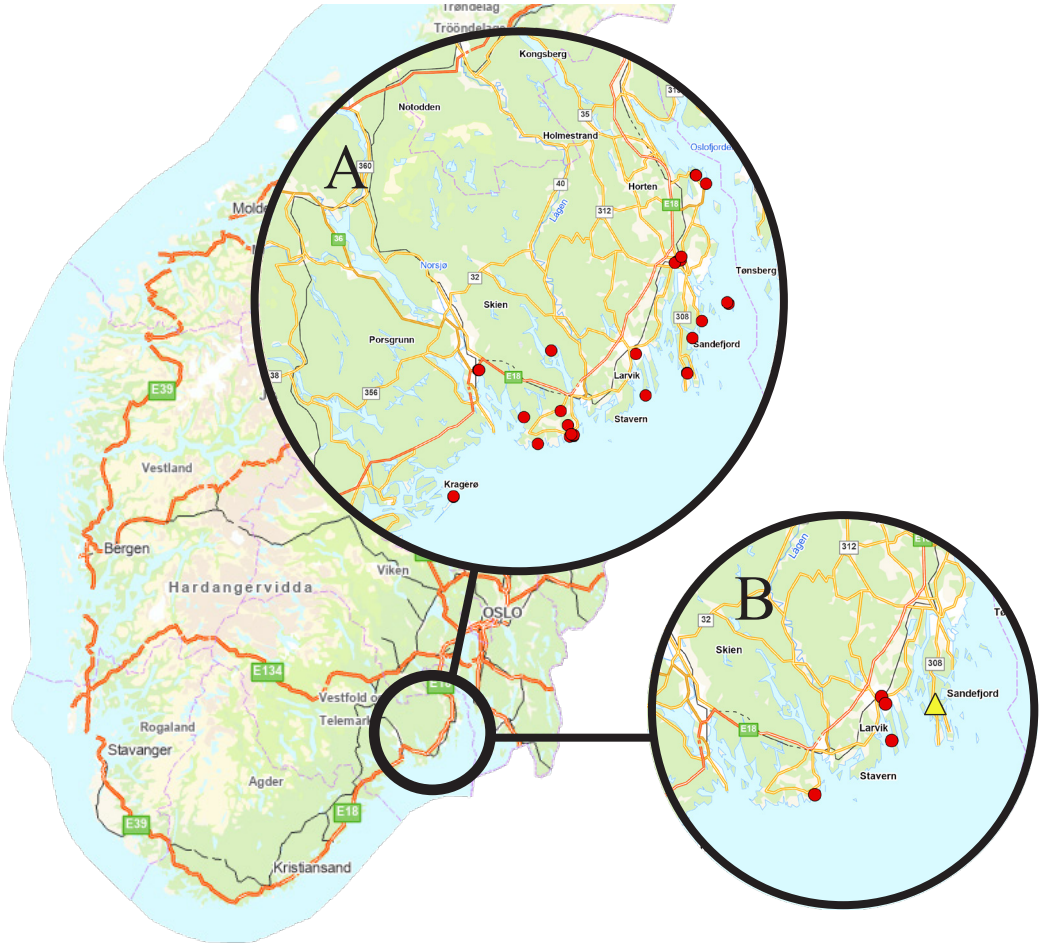

FIGURE 1. Distribution maps of *Stomaphis wojciechowskii* (**A**) and *S. quercus* (**B**) in Norway. Yellow triangle: Probably extinct.

TABLE 1. Norwegian records of *Stomaphis wojciechowskii*. (1) record from A. Staverløkk, others by the author; (2) collected on linden (*Tilia cordata*), all others on oak (*Quercus robur*); (3) males present.

Municipality	Locality	Date	Coordinates	
Færder	Havna	21.V.2021	59.08969°N	10.41187°E
Færder	Havna	21.V.2021	59.08916°N	10.41224°E
Færder	Havna	21.V.2021	59.08869°N	10.41254°E
Færder	Mellom Bolæren	8.VI.2021	59.20961°N	10.55894°E
Færder	Mellom Bolæren	8.VI.2021	59.21191°N	10.55411°E
Færder	Mågerø	9.VI.2021	59.15091°N	10.43201°E
Færder	Nordre Årø	1.IX.2021	59.18031°N	10.46644°E
Horten	Hortensskogen	14.IX.2021	59.42141°N	10.49134°E
Horten	Reverumpa	10.VI.2021	59.43721°N	10.45622°E
Horten	Reverumpa (2)	10.VI.2021	59.43661°N	10.45667°E
Kragerø	Jomfruland	6.VI.2021	58.87783°N	9.60891°E
Kragerø	Jomfruland	6.VI.2021	58.87887°N	9.60933°E
Larvik	Fuglevik	12.V.2021	58.98150°N	10.00799°E
Larvik	Grevle	8.VI.2021	58.98368°N	10.01820°E
Larvik	Grevle	12.V.2011	58.98240°N	10.01979°E
Larvik	Grevle	19.V.2021	58.98326°N	10.01966°E
Larvik	Grevle	19.V.2021	58.98437°N	10.02161°E
Larvik	Grevle	25.V.2021	59.98445°N	10.01579°E
Larvik	Grevle (3)	14.10.2021	58.98568°N	10.01291°E
Larvik	Haugeneåsen	23.V.2021	59.00137°N	10.00164°E
Larvik	Løvallveien	7.VI.2021	58.96941°N	9.89872°E
Larvik	Mølleberget	12.V.2021	58.98603°N	10.01270°E
Larvik	Tanum Skole (3)	7.11.2021	59.02657°N	9.97767°E
Larvik	Vemannsås (1)	3.10.2017	59.13319°N	9.94860°E
Larvik	Ødegårdsåsen	5.VI.2021	59.01690°N	9.85178°E
Porsgrunn	Mule Varde	24.IV.2021	59.10037°N	9.69845°E
Porsgrunn	Mule Varde	24.IV.2021	59.10070°N	9.69915°E
Porsgrunn	Mule Varde	24.IV.2021	59.10047°N	9.70043°E
Sandefjord	E Tjønnestranda	1.VI.2021	59.05152°N	10.26880°E
Sandefjord	Fjellvikåsen	1.VI.2021	59.12466°N	10.23806°E
Tønsberg	S Tomsbakken (3)	21.10.2021	59.28810°N	10.39771°E
Tønsberg	Tomsbakken	8.V.2021	59.29405°N	10.39990°E
Tønsberg	Vestre Gullkrona	3.VI.2021	59.28390°N	10.37747°E
Tønsberg	Østre Gullkrona	3.VI.2021	59.28555°N	10.38322°E

TABLE 2. Norwegian records of *Stomaphis quercus* on oak (*Quercus robur*). (1) probably extinct; (2) males present.

Municipality	Locality	Date	Coordinates	
Færder	Sandø (1)	19.VIII.1966	59.08198°N	10.46544°E
Larvik	Grevle (2)	4.10.2021	58.98227°N	10.01997°E
Sandefjord	E Tjønnestranda (2)	21.10.2021	59.05146°N	10.26934°E
Sandefjord	Fjellvikåsen	5.VIII.2021	59.12442°N	10.23785°E
Sandefjord	Orelund	5.VIII.2021	59.13654°N	10.23113°E

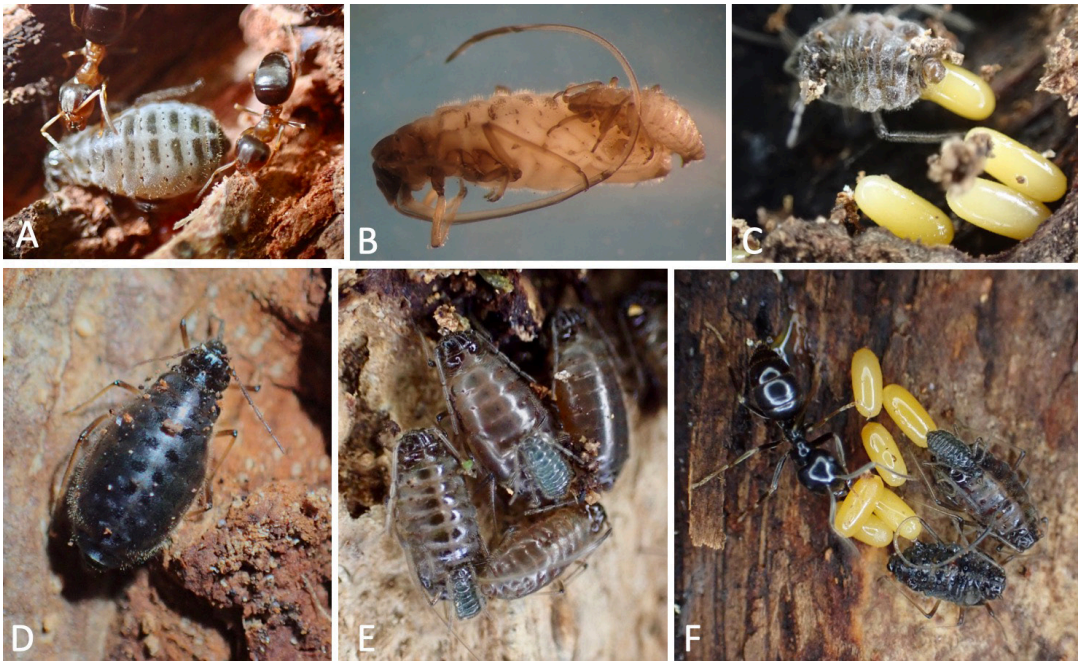

FIGURE 2. A–C. *Stomaphis wojciechowskii*. (**A**) Adult viviparous fundatrix attended by *Lasius brunneus*; (**B**) adult oviparous female with neotenic male on the back (specimens fixed in alcohol); (**C**) egglaying female; D–F. *Stomaphis quercus*. (**D**) Adult oviparous female; (**E**) oviparous females with neotenic males on the back; (**F**) egglaying females and neotenic males attended by *Lasius fuliginosus*.

Results

The two species can normally be correctly identified due to their dependence of the respective ant species. Morphologically they also differ sharply: S. *wojciechowskii* has a pale greyish colour (sometimes with a greenish tinge), dusted with wax powdering and densely coverd with short pubescence (Figure 2A), giving the animal a dull impression. *S. quercus* is glabrous, shiny, almost black (Figure 2D). The fullgrown fundatrix (1st generation viviparous female, hatched from overwintering eggs) of *S. wojciechowskii* has a set of transverse dark spinal plates on the tergites (Figure 2A), while the later viviparous and the final oviparous females have these plates more diffuse, split in smaller fragments. Males of both species are neotenic and usually cling to the females (Figures 2B, E–F) .

Both species hibernate as eggs hidden in bark crevices while the parental generation dies in late fall. The latest live *S.wojciechowskii* were observed on November 7th. Very small viviparous females (fundatrices) of *S. wojciechowskii* were observed in early May, but may have appeared earlier. Alate (winged) viviparous females, which

usually appear during the summer, are so far not observed in Norway. The first observations of males and egglaying females of both *S. quercus* and *S. wojciechowskii* appeared during the first week of October (Figures 2C, F). Single groups were generally small, usually less than ten individuals and located to the lower part of the stem (up to about 1.5 m).

Table 1–2 and Figure 1 give an overview of the records so far. Both species appear to be coastal, although this may reflect collecting intensity rather than true distribution.

Acknowledgements. I am grateful to Mr. Arnstein Staverløkk, Trondheim, for allowing me to include his record of *S. wojciechowskii* (first Norwegian record), and to Prof. Lukasz Depa, Katowice, for barcoding Norwegian samples of both species.

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Received: 22 February 2022
Accepted: 19 April 2022