Trypophloeus dejevi (Stark, 1936) (Coleoptera, Curculionidae) – a new bark beetle species in Norway and Finland

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Originally, *Trypophloeus dejevi* (Stark, 1936) was described from Sakhalin Island in the Far East of Russia, and it remained undetected in Europe until 2009, when one Swedish specimen was found in the collection of the late Lars Huggert. This specimen was sampled in Northern Sweden in Torne Lappmark: Årosjokk, 67°52' N/19°22'E, in 1968. In 2010, the species was found in five new localities in the same area. Here we present *T. dejevi*, recorded in 2012 as a new species to Norway and Finland. In Norway, galleries with beetles were found in *Salix myrsinifolia* Salisbury and in Finland *Salix glauca* L. was the observed host tree. Both are common willow species in Northern Fennoscandia. The distribution of the beetle within trunks of living *Salix* combined with a low population-density may be an explanation to why *T. dejevi* has been overlooked until now.

Key words: Coleoptera, Curculionidae, Scolytinae, *Trypophloeus dejevi*, Norway, Finland, host trees.

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Introduction

The aim of this paper is to present *Trypophloeus dejevi* (Stark, 1936) (Figure 1) as a new species for Norway and Finland, and some new observations on its biology.

Originally, *T. dejevi* was described from Sakhalin Island in the Far East, Russia (cf. Wood & Bright 1992, Pfeffer 1995). In addition *T. dejevi* is documented from Russia: East and West Siberia, and Mongolia (Knizek 2011).

T. dejevi was first collected in Fennoscandia by late Lars Huggert in 1968 in Northern Sweden, Torne Lappmark: Årosjokk, 67°52'N/19°22'E. One specimen in his collection, which was donated to the Natural Museum in Stockholm, was misidentified to *Trypophloeus bispinulus* Eggers, 1927 (Lindelöw 2009). During a fieldtrip to Årosjokk in Sweden in 2009, *T. dejevi* was found in *Salix myrsinifolia* Salisbury, growing along a small stream (Lindelöw 2009). In 2010 *T. dejevi* was found in the same host plant on four additional sites along the road between Kiruna and Nikkaloukta.

Five species of the genus *Trypophloeus* is traditionally recognised in Fennoscandia (Silfverberg 2010, Knizek 2011). However, many taxonomical and nomenclatural questions within the genus are not solved. The opinions are partly contradicting and a revision is needed (e. g. Pfeffer 1995, Böhme 2005, Silfverberg 2010). We follow the nomenclature applied by Knizek (2011). *T. alni* (Lindemann, 1875) is living in *Alnus* spp., and is the species closest related to *T. dejevi*. *T. bispinulus* Eggers, 1927 and *T. palmi* Hansen, 1956, are monophagous species

FIGURE 1. A newly emerged *Trypophloeus dejevi* (Stark, 1936) reared from *Salix myrsinifolia* Salisbury, sampled at Jargul, Finnmark County in Norway, 3 July 2012. When fully coloured the species is blackish. Photo: K. Sund.

on *Populus tremula* L. *T. binodulus* (Ratzeburg, 1837) (= *grothii* (Hagendorn, 1904)) and *T. granulatus* (Ratzeburg, 1837) are living in *Populus* spp.

The new records of *T. dejevi*

During a field trip in July 2012, suitable habitats for *T. dejevi* were visited in Northern Norway and Northern Finland. These were small creeks surrounded with *Salix* spp. and *Betula* spp. (Figure 3). By careful scrutinizing the stems, exit holes were easily found. The stems were then examined carefully for insects by debarking with a knife. Pieces of bark or stems containing larvae/pupae were collected for rearing. *T. dejevi* was found in two sites, one locality in Norway and one in Finland (Figure 2).

Material. **Norway FI**, Karasjok: Jergul, 69°25'N/24°58'E (EIS 166), 3.VII.2012, leg. et det. Å. Lindelöw. Galleries with beetles were found on two stems of *S. myrsinifolia*. The host trees were growing along a small river dominated by *Betula* and *Salix*; **Finland**, Province of Enontekis Lappmark: Jatuni, 68°26'N/22°43'E, 3.VII.2013, leg. et det. Å. Lindelöw. Along a small creek, the vegetation on the sandy and partly very moist shore was dominated by three different species of *Salix*. Exit holes and galleries were found on 1–2cm thick stems on one meter high *S. glauca* stems. The exit holes were located in small clusters with approximately five holes in each cluster. One dead adult as well as one pupa was observed in the phloem.

Biological observations

In sun-exposed places, some of the trees showed patches of necrosis along the trunk. In the border

FIGURE 2. The records of *Trypophloeus dejevi* (Stark, 1936) in Fennoscandia. The new records at Jergul, Norway and Jatuni, Finland are indicated with red stars. The first record in Årosjokk, Sweden is indicated by a green triangle.

FIGURE 3. Habitat for *Trypophloeus dejevi* (Stark, 1936) in Finland. *Salix glauca* L. is one of the dominating willow plants along the stream. Photo: Å. Lindelöw.

between dead and living tissue, entrance holes were found. These could be either from maturation feeding or from establishment for reproduction (Figure 4). Entrance holes were mainly found on the most sun exposed parts of the trunk. Galleries and maturation feeding were observed on *S. myrcinifolia* in Norway trees 3–5m high and 4–5cm in diameter**.** In the seven known sites where *T. dejevi* has been recorded, the number of exit holes/individuals found is low, less than 100 specimens per site. In *Trypophloeus* spp. living in *Populus tremula*, there are generally more than 100 individuals in a single tree. These species usually colonize and reproduce in twigs, branches and trunks of large dead or dying aspen trees, providing space for many individuals.

Numerous signs of the saproxylic poplar and willow borer *Crypthorhynchus lapathi* (Linnaeus, 1758) (Curculionidae) were observed in many *Salix* trees on the locality in Norway. In the Finnish locality there were no signs of *C. lapathi*. In general, the holes are more irregular and not as perfectly round as those of *T. dejevi*. It is not known if *C. lapathi* competes with *T. dejevi* or not. The activity of *C. lapathi* in the trunks may facilitate the colonization by the bark beetle.

Discussion

The type locality of *T. dejevi* is on Sakhalin Island in Russia. The host tree of the type is *Salix sachalinensis* F. Schmidt (cf. Wood & Bright 1992), which is distributed in China, Japan, Korea, Russian Far East and East Siberia. The typical habitat for this host tree is along rivers (Wu & Raven 1999). So far, the only known host tree species in Europe are *S. myrsinifolia* and *S. glauca*. These species are widely distributed in Fennoscandia, and more common in the northern than southern parts (Hultén 1971). *S. glauca* is a complex of insufficiently known subspecies (or species) with an Arctic circumpolar distribution, including Greenland. *S. myrsinifolia* is distributed from the British Isles, through north and central Europe eastwards to the Ob valley in Russia

FIGURE 4. Maturation feeding and/or establishment for reproduction in the living phloem of *Salix myrcinifolia* Salisbury by *Trypophloeus dejevi* (Stark, 1936). Photo: Å. Lindelöw.

FIGURE 5. Tendrils of *Cytospora* sp. protruding from the bark of *Salix glauca* L. stems colonized by *Trypophloeus dejevi* (Stark, 1936), Finland: Jatuni, 3.VII.2013. Photo: Å. Lindelöw.

(Jonsell 2000). Both species have a number of closely related species distributed in North America as well as in Palaearctic (Jonsell 2000). *T. dejevi* is also found on *Populus tremula* in Russia: Far East (Mandelshtam pers. comm.). Since *T. dejevi* now is documented from four host tree species, belonging to two different genera, it is possible that other species will act as hosts. Consequently, *T. dejevi* has a good potential to be a circumpolar species. Interestingly, one of the host species for *Trypophloeus striatulus* (Mannerheim, 1853) in North America is *S. glauca* (Furniss 2004).

Adults emerged from the stem pieces brought home during a period of several weeks. From the bark surface, orange tendrils of fungus protruded (Figure 5). They bear a close resemblance to *Cytospora* sp. that Furniss (2004) observed on the bark surface of *Salix alexensis* (Andersson) which was attacked by *T. striatulus*. Any possible relation between the fungus and the beetles is unknown. Spores found on the surface of the pronotum of *T. striatulus* did not belong to *Cytospora* sp. (Furniss 2004).

T. dejevi seems to occur in small populations. Galleries are patchily distributed in the host tree, probably related to parts of the trunk where host resistance is lowered by abiotic or biotic factors e.g. fungal infections. In *Trypophloeus* spp. living in *Populus tremula*, there are generally more than 100 individuals in a single tree. These species usually colonize and reproduce in twigs, branches and trunks of large dead or dying aspen trees, providing space for many individuals. The low population density of *T. dejevi* compared to *Trypophloeus* species living in dead trees is probably one explanation why this species has been overlooked. In addition, the fact that it colonizes small patches on living trees that are difficult to find amongst all other living trees. Most bark beetle species can be found in easily recognizable dead trees.

Based on only one record from Norway and Finland respectively, it is great uncertainty about population size and range. We evaluate assessment of the risk of extinction as impossible at the moment. Further, the habitat is not much exploited by humans and not considered to be

under threat. When combined with the probability that the species is overlooked, we consequently propose that *T. dejevi* should be listed as DD, if it is to be included in the national red lists of Norway and Finland. In the red list of Sweden *T. dejevi* is listed as DD. (Gärdenfors 2010).

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