

# First records from Europe for two species of Piophilidae (Diptera)

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*Prochyliza brevicornis* Melander, 1924 and *Protopiophila litigata* Bonduriansky, 1995, both species described from North America, have recently been found in the boreal zone of Sweden and are here reported from Europe for the first time. The necrophagous *P. brevicornis* was found on rotting fish in southern Lapland and *P. litigata*, known to develop in discarded cervid antlers, was found in Hälsingland. *Prochyliza lundbecki* (Duda, 1924) is reported from Sweden for the first time, based on a museum specimen collected in Torne lappmark in 1905.

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Piophilidae is a rather species-poor family of small to medium-sized acalyptrate flies. Roughly 100 species are known; Pape *et al.* (2009) states 81 species globally and 39 species in the Palaearctic region, but these figures are not up to date. Most species develop in decaying organic matter, especially of animal origin, but there are also some that develop in fungi or in bird nests as blood-suckers of nestlings. Several develop in carrion and other protein-rich substrates and some of these species are synanthropic and can be pests in the food industry (Zuska & Laštovka 1965). Some species are also relevant to forensic entomology (Rochefort *et al.* 2015).

Hedström (1995) listed 16 species of Piophilidae from Sweden and he also (Hedström 1994) classified Piophilidae as a rather well-studied family with a more or less accurately known fauna in the Nordic countries. That conclusion was premature and after recent additions, including those reported here, 23 species are presently known from Sweden (Dyntaxa 2017). A few additional species are known but their identity has yet to be fully established. Several of the species found in Sweden are known from only very few specimens

or a few sites and for some of them there are no records from recent times. Two species that have recently been found in Sweden are here presented as new to the fauna of Europe.

## Material

The records presented here are the result of insect collecting activities in Northern Sweden by the author. The specimens are presently in the authors collection but will later be deposited at the Natural History Museum in Stockholm (NHRS). The collections of Piophilidae in NHRS and the Zoological Museum in Lund (MZLU) have been studied as well as Piophilidae material from the Swedish Malaise Trap Project (SMTP) (Karlsson *et al.* 2005).

*Prochyliza brevicornis* Melander, 1924.

**SWEDEN: Åsele lappmark**, Vilhelmina par., Fatsjön, N 64°59'21", E 15°59'55", 11.vii.2015, 1♂, leg. and coll. S. Hellqvist, conf. D. Martín-Vega.

The single specimen (Fig. 1) was swept from a pit filled with rotting fish (perch, *Perca fluviatilis* Linnaeus, 1758) on the shore of a lake in the



Figure 1. Male of the necrophagous *Prochyliza brevicornis* from southern Lapland, Sweden. Wing length: 3.0 mm.

Figur 1. Hane av ostlugan *Prochyliza brevicornis* från Åsele lappmark. Arten utvecklas i kadaver. Vinglängd: 3,0 mm.

boreal region. It was found together with numerous other carrion-breeding flies, among them three other piophilids (*Stearibia nigriceps* (Meigen, 1826), *Parapiophila vulgaris* (Fallén, 1820) and *Liopiophila varipes* (Meigen, 1830)).

### Recognition

The genus *Prochyliza* can be separated from other Palearctic genera of Piophilidae by having a setulose anepisternum, bare anepimeron, 1 (0+1) dorsocentral bristle, evenly distributed mesonotal pubescence and by lacking strong bristles on postpronotum. The genus was recently treated by Martín-Vega (2014) and Martín-Vega *et al.* (2017) with a key to known species. Nine species were recognized, three of them known from the Palearctic region but only two from Northern Europe: *Prochyliza nigrimana* (Meigen, 1826), a synanthropic species with a wide Holarctic and Neotropical distribution and *P. lundbecki* (Duda, 1924), a Holarctic species only found in arctic regions. From these species *P. brevicornis* can

be separated by having yellow fore coxae and a black frons that is anteriorly yellow. The frons of *P. nigrimana* is uniformly coloured, entirely yellow or entirely dark from lunule up to or beyond anterior ocellus. *P. lundbecki* has the fore coxae brownish black. *P. brevicornis* is very similar to the common species *Liopiophila varipes* (Meigen, 1830) as regards colour of head and legs, but *L. varipes* has a few (though easily overlooked!) setulae on anepimeron. Males of *L. varipes* can easily be recognized by the presence of dense, stiff setae on the sternites while *P. brevicornis* has a much sparser and softer pubescence in this area. Males of *L. varipes* are also easily distinguishable as the sternites 3, 4 and 5 are divided along their mid line. *Liopiophila* was synonymized with *Prochyliza* by Ozerov (2004), but Martín-Vega *et al.* (2014) found characters in the larval stage that support the treatment of *Liopiophila* and *Prochyliza* as separate genera. Nonetheless, a proper phylogenetic analysis of the family Piophilidae is still greatly needed. A new classification was presented in the

thesis by Rochefort (2015), but the taxonomic and nomenclatural acts proposed have not been formally published. The morphology of the immature stages of *P. brevicornis* remains unknown.

### Distribution

*P. brevicornis* is widespread in the Nearctic region and has also been found in Mexico (McAlpine 1977, Rochefort *et al.* 2015). Rochefort (2015) gives additional records from Costa Rica in the Neotropical region and from the Altai region (Russia) in the Eastern Palearctic.

### Ecology

The larvae are primarily necrophagous and the species has been documented in the entomological forensic literature (Rochefort *et al.* 2015). Adults have been reared from human cadavers (Syed 1994). *P. brevicornis* has also been found on household garbage (McAlpine 1977).

***Protopiophila litigata*** Bonduriansky, 1995  
**SWEDEN: Hälsingland**, Ytterhogdal par., Getryggen, N 62°13'30", E 14°50'4", 24.vi–12.vii.2020, 1♂, 1♀; Ytterhogdal par.: Fåssjö shooting range, N 62°10'28", E 15°8'23", 24.vi–12.vii.2020, 1♂, leg. and coll. S. Hellqvist.

All specimens (a male shown in Fig. 2) were collected in white or yellow pan traps, in Getryggen at the edge of a large sand pit and in Fåssjö at a shooting range; both sites situated in the boreal zone and surrounded by pine-dominated forests.

### Recognition

The genus *Protopiophila* can be separated from other Palearctic genera of Piophilidae by having a bare anepisternum, 4 (1+3) dorsocentral bristles and two bristles on postpronotum, the inner one directed medially. Tarsomeres on front leg are slightly dilated. There are 13 recognized species worldwide (Ozerov 2004, 2007), but only two species are known from northern areas, *P. latipes* (Meigen, 1838) and *P. litigata*. The two species can most easily be separated by the colour of the legs: mid and hind legs are entirely yellow in *P. latipes* while mid and hind femur and hind tibia are predominantly dark in *P. litigata* (both species have dark fore legs except for pale coxa and base of femur). Anepisternum is glossy in *P. latipes* while it is pruinose in *P. litigata*. There is

also a slight difference in size, *P. litigata* being on average smaller, and differences in the genitalia (Bonduriansky 1995). Despite clear differences in morphology, DNA (Rochefort 2015) and ecology the two species are closely related as female *P. latipes*, in copula with male *P. litigata*, have been found in collections (Rochefort *et al.* 2015). Two Palearctic species recently described from Caucasus and Turkey, *P. caucasica* Ozerov, 2007 and *P. vikhrevi* Ozerov, 2007, have a polished anepisternum like *P. latipes* and differ from *P. litigata* also in having pale hind tibia (Ozerov 2007). The Swedish specimens agree in all respects with the description of *P. litigata*.

### Distribution

*P. litigata* was previously only known from the Nearctic region where it is found in Eastern Canada (Bonduriansky, 1995, Bonduriansky *in litt.*).

### Ecology

*P. litigata*, the “antler fly”, develop in the porous matrix of discarded antlers from cervids, especially moose *Alces alces* (Linnaeus, 1758), where oviposition takes place in cracks and pores (Bonduriansky 1995). Adults are active in warm weather in the early summer. When full-grown, the larvae leap off the antler to pupate in the soil. On the antlers, males may aggressively defend territories against males of the same species as well other insects. *P. litigata* has been intensively studied by Bonduriansky and his colleagues during the last decades and the species has been used as a model organism in studies of e.g. ageing and reproductive behaviour and how that relates to size, see Bonduriansky (2020) for an overview. The congener *P. latipes* develop primarily in carcasses (Bonduriansky 1995).

### Faunistical notes on other species of *Prochyliza* and *Protopiophila* in Sweden

*Protopiophila latipes*. The species is widely distributed in the Holarctic region but rare in Northern Europe. In Sweden it is known from scattered sites in the south (the provinces Skåne, Öland, Södermanland and Uppland are represented in the museum collections at MZLU and NHRS and/or in the material from SMTP), mostly from synanthropic habitats. There were several specimens in SMTP-material from Södermanland,





Figure 2. Male of the “antler fly” *Protopiophila litigata* from Hälsingland, Sweden. Wing length 1.8 mm.

Figur 2. Hane av ostlugan *Protopiophila litigata* från Hälsingland. Arten utvecklas i fällhorn. Vinglängd: 1,8 mm.

Sofielunds återvinningsanläggning, a garbage dump. The species is not known from Norway (Greve 2005) and the first record of *P. latipes* from Finland was recently reported (Haarto *et al.* 2019).

*P. nigrimana*. In MZLU and NHRS there are Swedish specimens of this species from the southern provinces Skåne, Småland, Gotland and Bohuslän, mostly from coastal sites. All findings are old and the latest record is from Skåne, Helsingborg, Raus, 7.v.1946, leg. O. Ringdahl (MZLU). Both the pale and the dark form (previously considered a separate species, *P. nigricornis* Meigen, 1826) are represented in the collections. The species is known from both Norway (Greve 2005) and Finland (Kahanpää & Winqvist 2014).

*P. lundbecki*. There is a single Swedish record of this species, a previously undetermined male

from Torne lappmark, Vassijaure, 16.vii.1905, collector unknown (MZLU). The species has not previously been reported from Sweden but in MZLU there were two misidentified specimens labelled as *P. lundbecki*: a female *Liopiophila varipes* from Torne lappmark, Vittangi, 16.vii.1955, leg. H. Andersson and a dark female *Prochyliza nigrimana* from Skåne, Helsingborg, 14.v.1916, leg. O. Ringdahl. The species is listed from Norway by Ozerov (2013) but was not included by Greve (2005) in the Norwegian catalogue of Piophilidae. Previous records from Finland were based on misidentifications (Kahanpää & Winqvist 2014).

### Discussion

A high proportion of Piophilidae species are found in the cooler parts of the North temperate zone (McAlpine, 1977). This pattern is also observed in the Swedish fauna. Three species (*Prochyliza*

*nigrimana*, *Protopiophila latipes* and *Neottiophilum praeustum* (Meigen, 1826) have only been found in the southern parts of the country while nine species are only found in the north and three of these (*Boreopiophila tomentosa* Frey, 1930, *Parapiophila kugluktuk* Rochefort & Wheeler, 2015 and *Prochyliza lundbecki*) are yet only known from the northernmost province Torne lappmark.

McAlpine (1977) noted that a high proportion, 19/45 at that time, of the northern species of Piophilidae have a Holarctic distribution. This proportion is even higher now as some species previously only known from the Palaearctic region have been reported from the Nearctic (Rochefort & Wheeler 2015, Rochefort, 2015) and here two Nearctic species are reported from the Palaearctic region. Of the 17 species found by Rochefort & Wheeler (2015) during an inventory in northern Canada, 13 are also known from the Palaearctic region. Among the 23 known Swedish species of Piophilidae, only *Neottiophilum praeustum* (Meigen, 1826), *Amphipogon flavum* (Zetterstedt, 1838) and *Pseudoeps signata* (Fallén, 1820) are not known from the Nearctic region.

None of the Swedish specimens of *P. litigata* were found in association with discarded antlers despite many tracks and droppings of moose being found in the vicinity of the traps. To those who are lucky to find discarded antlers in early summer, I urge you to carefully search for tiny flies on the antlers.

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### Sammanfattning

Ostflugorna, familjen Piophilidae, är en ganska artfattig familj globalt med flertalet av de cirka 100 arterna i nordliga regioner. I Sverige är artdiversiteten störst i norr och flertalet av dessa nordliga arter har också holarktisk utbredning. De flesta arterna har larvutveckling i dött organiskt material av animaliskt ursprung, exempelvis i kadaver.

Två arter som nyligen påträffats i norra Sverige rapporteras här som nya för Europa. Båda arterna är tidigare kända från Nordamerika. *Prochyliza brevicornis* håvades 2015 på rutten fisk på en fjällnära sjöstrand vid Fatsjön i Åsele lappmark. Arten utvecklas i kadaver. *Protopiophila litigata* hittades 2020 på två lokaler nära Ytterhogdal i NV Hälsingland. Arten är välstuderad i Kanada där den utvecklas i fällhorn, främst från älg.

Kommentarer ges även till de andra *Protopiophila*- och *Prochyliza*-arterna i den svenska faunan. Alla dessa är mer eller mindre sällan påträffade. *Prochyliza lundbecki* rapporteras som ny för Sverige efter att en hane av arten, insamlad 1905 i Torne lappmark: Vassijaur, påträffats i en museisamling. Det senaste svenska fyndet av *Prochyliza nigrimana* är från 1946, från Skåne, Helsingborg.

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