

Parasitoids in the family Pteromalidae (Hymenoptera, Chalcidoidea) new to Norway

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Two species of Pteromalidae associated with wood-boring beetles, *Pandelus flavipes* (Förster, 1841) and *Cleonymus obscurus* Walker, 1837, are reported new to Norway.

Key words: *Pandelus flavipes*, *Cleonymus obscurus*, Pteromalinae, Cleonyminae, Pteromalidae, Hymenoptera, Norway.

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Introduction

Chalcidoidea is likely the most species rich superfamily among all Hymenoptera (Noyes 2022). Because of their small size and lack of knowledge, little is known about their species richness and ecology worldwide. In Norway, the estimated number of species is 1750, while the recorded number is only 780 (Elven & Søli 2021). Several studies on the chalcid fauna in Norway have been reported over the years. A few focusing on the family Pteromalidae, are Compton (1981) who recorded several species from sweep-netting in Jostedalen in Vestland, while Bakke (1956), Henriksen (1976a, 1976b), Hedquist 1982, studied parasites and parasitoids from trees infested with bark beetles. Both species in this report are associated with wood-boring Coleoptera species that exploits dead or dying wood as basic resource (Graham 1969). At the right time in the season, parasitoids of wood-boring coleoptera can often be spotted on suitable wood while searching for hosts or aggregate due to mating i.e., around emergence holes (Staverløkk & Hansen 2018). The genus *Cleonymus* Latrille, 1809 in the subfamily

Cleonyminae, has a worldwide distribution with 44 described species. The species *Cleonymus obscurus* was described by Walker in 1937. The genus *Pandelus* Förster, 1856, has only two species (Noyes 2022), and *Pandelus flavipes* (Förster, 1841) was described as *Cleonymus flavipes* by Förster in 1841. Already in 1904, Ashmaed, renamed the species into *Pandelus* and moved it into the subfamily of Pteromalinae.

Materials and Methods

The material was collected by Malaise traps and specific search on dead trunks of willow (*Salix caprea* L.). Several partially focused images were taken with a Nikon DSLR and a microscope objective mounted on a Nikon PB-4 bellow, and then combined using Zerene Stacker 1.04 © (2009–2017) software. The coordinates are given in decimal degrees (Grid: Latitude/Longitude hddd. dddd°; datum: WGS84). All photos are taken by the author. The faunistic divisions within Norway follows Endrestøl (2021) and are given in bold. DNA-barcoding was performed through

NorBOL and BOLD systems (Ratnasingham & Hebert 2007). The two species are made publicly available in the dataset DS-NORHYM on the BOLD Systems database online. Identification is based on the keys worked out by Hedqvist (1963), Graham (1969) and Bouček & Rasplus (1991). Reference material is deposited in the insect collections at Norwegian Institute for Nature Research (NINA) and NTNU University Museum in Trondheim (NTNU).

Records

Subfamily Pteromalinae

Pandelus flavipes (Förster, 1841)

Norway, TELEMARKE [TEI], Drangedal: Sannes (Figure 1), N59.03026°, E9.29434°, 81m asl., 16 June 2020, 5♀♀ (Figure 2), leg. Arnstein

Staverløkk, coll. NINA; Drangedal: Søndre Voje, N59.04850°, E9.08896°, 78m asl., 17 June 2020, 1♀, BOLD Sample ID: NOCER-232, Process ID: NOME232-21, leg. Arnstein Staverløkk, coll. NINA. Specimens at Sannes were collected on the surface of a standing, dead old willow tree (*Salix caprea*) (Figure 3), using an aspirator. Several parasitoids were seen inspecting wood-borer holes on the surface.

Biology: The species is not considered a parasitoid of bark beetles (Hedqvist 1982). Bouzek (1957) in Graham (1969) reports *P. flavipes* from trunks of old worm-eaten willows in company with *Ptilinus* sp. (Col. Anobiidae) in Czechoslovakia, also with *Lyctus linearis* (Goeze, 1777) (Lyctidae) and *Teretrius picipes* (Fabricius, 1792) (Histeridae). Hedqvist (pers. comm. in Graham 1969) has reared the species in Sweden from *Ptilinus* sp. Imagines appear in June and July (Graham 1969).



FIGURE 1. The collection site for *Pandelus flavipes* (Förster, 1841) at Sannes, Drangedal in Telemark, 16 June 2020.



FIGURE 2. Specimen of *Pandelus flavipes* (Förster, 1841) found at Sannes, Drangedal in Telemark, 16 June 2020.



FIGURE 3. Specimen of *Pandelus flavipes* (Förster, 1841) was found on the stem of standing dead willow (*Salix caprea* L.) at Sannes, Drangedal in Telemark, 16 June 2020.

Distribution: Sweden (Dyntaxa 2022), Great Britain (Raper 2021), Germany (Schmidt & Monje 2022), The Netherlands (Creuwels & Pieterse 2022), Belgium (Noé 2022), France (Dan Mitroiu 2017).

Subfamily Cleonyminae

Cleonymus obscurus Walker, 1837

Norway, VESTFOLD [VE], Horten: Mellomøya, N59.442°, E10.464°, 5 asl. (Figure 4), MT 4 July–4 October 2017, 1♀, BOLD Sample ID: NOCER 197, Process ID: NOME197-21, leg. Arnstein Staverløkk, coll. NINA; TELEMAR [TEI] Drangedal: Sannes/Liaråsen, N59.03916°, E9.26497°, 170m asl., MT 23 June–19 July 2021, 1♀ (Figure 5), leg. Arnstein Staverløkk, coll. NINA.

Biology: *Cleonymus obscurus* is considered a rare species. Reared from *Scolytus scolytus* (Fabricius, 1775) in France (Graham 1969). A female reared in Czechoslovakia from *Hylesinus toranio* (D'Anthoine, 1788), was considered to probably belong to *C. obscurus*. Most likely, *C. obscurus* is a parasitoid of several wood-boring beetle species. Graham (1969) observed, the closely related *Cleonymus laticornis* Walker, 1837, on sunny days in May and June, searching

for hosts on the trunks and branches of old trees (particularly *Salix* and *Corylus*) attacked by beetles. Females were marching to and from, rather slowly and deliberately, while tapping their antennae on the wood; after walking a few inches they turn abruptly “like a sentry on duty” and proceeded in the opposite direction. Imagines are seen from May to August.

Distribution: Sweden (Hedquist 1963), Great Britain, Germany, The Netherlands (Haas et al. 2021).

Discussion

Bouček (1972) inspected all the 33 specimens available of *Cleonymus obscurus* and *C. laticornis* after the work of Graham (1969) and found no difference of the two species outside the range of intraspecific variation. *Cleonymus obscurus* are therefore a tentative synonym to *C. laticornis* (Haas et al. 2021). More work needs to be done, and more specimens need to be collected for barcoding and further DNA analysis. These species that are parasitoids of wood boring beetles, often tend to belong to a group whose behavior are not caught up by the traditional insect traps like Malaise traps and window traps (Staverløkk & Hansen 2018). This is often the reason why these species are rare



FIGURE 4. Bush forest dominated by *Quercus robur* L., *Fraxinus excelsior* L. and *Tilia cordata* Miller at Mellomøya, Horten in Vestfold, 8 August 2016.



FIGURE 5. Specimen of *Cleonymus obscurus* Walker, 1837 caught with Malaise trap at Liaråsen/Sannes, Drangedal in Telemark, between 23 June–19 July 2021.

in collections. Specific search on newly infested dead wood is recommended for finding these species, and even more new species. This report increases the number of published Pteromalidae in Norway to 281 (Staverløkk 2020).

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