Two new species of the genus *Phronia* Winnertz (Diptera: Mycetophilidae) from Finland and Russian Karelia

Jevgeni Jakovlev & Alexei Polevoi


*Phronia avidoides* sp.n. and *Phronia fennica* sp.n. are described based on several adult males collected by Malaise trapping, sweep-netting and rearing from decaying wood in Finland and Russian Karelia in the period 1989–2005. Detailed illustrations of male terminalia are also presented for three further closely related but poorly known species, *Phronia avida* Gagne, 1975, *Phronia petulans* Dziedzicki, 1889 and *Phronia subsilvatica* Hackman, 1970.

J. Jakovlev, Finnish Forest Research Institute, Vantaa Research Centre. P.O. Box 18, FI-01301, Vantaa, Finland; E-mail: jevgeni.jakovlev@metla.fi

A. Polevoi, Forest Research Institute, RU-185910, Pushkinskaya 11, Petrozavodsk, Russia; E-mail: alexei.polevoi@krc.karelia.ru

Received 10 July 2007, accepted 1 November 2007

1. Introduction

The genus *Phronia* Winnertz, 1863 is one of the largest genera of Mycetophilidae. It is best known in the Holarctic region, including nearly 85 Palearctic and 50 Nearctic species, while rather few species are known from the other biogeographic regions (Bechev 2000). The recognition of the first species of the genus dates back to the middle of the 1800s. H. Dziedzicki (1889) published the first comprehensive monograph on *Phronia*. This excellently illustrated work included 51 European species (some of them are now transferred to the genus *Trichonta* Winnertz, 1863), of which 33 were described as new. Gagné (1975) presented a revision of the Nearctic species of *Phronia*, and Plassmann (1977) revised the European fauna. After these comprehensive studies only a few species have been described from Europe (Chandler 1992, Chandler & Ribeiro 1995, Zaitzov & Polevoi 1995, Plassmann 1999), increasing the number of recognized species known from Europe to 65 (Chandler 2005). Altogether 60 species are recorded from the Nordic region where the fauna of *Phronia* is fairly well known. The level of faunal knowledge of *Phronia* is particularly good in Finland owing to the contribution made by Lundström (1906, 1909, 1911, 1914) and especially Hackman (1970), who recognized 54 species of *Phronia*, including eleven newly described species. Two further species, *P. gagni* Chandler, 1992 and *P. coritanica* Chandler, 1992 were added to the Finnish fauna by Polevoi (1995) and Kurina (2003), respectively. Including the two new species presented here, 58 species are currently recorded from Finland, 49 from Sweden (Kjærandsen et al. 2007), 39 from Russian Karelia (Polevoi 2000) and 39 from Norway (Gammelmo & Soli 2006).

Larval biology of *Phronia* is poorly known. Generally, the larvae are saproxylic, associated
with dead wood and wood-growing fungi. Since *Phronia* larvae are not common inhabitants of fungal fruiting bodies, fungal hosts have been recorded for few species only (Chandler 1978, Jakovlev 1994). Unlike most other Mycetophilinae that usually develop inside fungal fruiting bodies or under bark, *Phronia* species have case-bearing larvae which are protected by slime and able to live on the surface of encrusting fungi growing on decaying wood, or on moulds growing on fallen, wet and barkless branches.

2. Material and methods

During the treatment of a large material of ca. 100,000 specimens of fungus gnats collected in Finland and Russian Karelia in the years 1989–2005 (for details see Polevoi et al. 2006, Jakovlev et al. 2006) we have found two new species of *Phronia*. Additional records of species new to Finland were obtained by reviewing selected parts of the collections of the Zoological Museum of Helsinki University (*Museum Zoologicum Helsingiensis*, MZH) and Forest Research Institute of Karelian Scientific Centre, Petrozavodsk, Russia (FRIP).

The holotypes and paratypes of the new species are dry-pinned. Terminalia were treated in a standard way (heating in a solution of KOH, neutralization in acetic acid, washing in distilled water) and preserved as glycerine preparations in small vials on the same pin as the rest of the body. Other specimens studied are kept pinned or in ethanol. Material is stored in MZH, in FRIP, in Finnish Forest Research Institute, Vantaa, Finland (METLA), in Natural History Museum of Central Finland (NHMCF) and in personal collection of Jouni Penttinen (JP).

The structure of the records presented below is: number of males studied, code for biogeographical province (Heikinheimo & Raatikainen 1971), municipality, location, date and collector. For new records from Finland we present coordinates according to the Finnish national grid coordinate system. Collecting method (if not specified elsewhere) is Malaise trapping. Detailed information on the collecting localities for each species is given separately. The morphological terminology follows Soli (1997).

3. Description of species

3.1. *Phronia avidoides* sp. n. (Fig. 1)


fine woody debris. In Pirhu (Kb: Ilomantsi) specimens were collected in young forest on the abandoned agriculture lands.

**Description.** Male (n=5). Head dark brown. Mouthparts light brown, palp yellow, the third palpal segment slightly darkened at the apical half. Antenna uniformly dark brown, but in some specimens pedicel and the basal half of the first flagellomere lighter. Sixth flagellomere 1.5 times as long as wide.

Thorax. Mesonotum brown covered with dense yellowish hairs and scattered yellowish bristles. Pleuron brown. Pale specimens have more or less developed yellow humeral spots and yellowish propleuron. Propleuron with two strong pale bristles. Scutellum with four bristles, two strong ones medially and two smaller ones along the edges.

Wings. Wing length 2.3–2.7 mm. Hyaline, veins yellow. Sc short, ending free. C very slightly extending beyond the tip of R5. Stem of M-fork 1.3 times as long as ta. The vein ta with 3–5 macrotrichia. Haltere pale yellow.

Legs. Yellow, hind femur darkened apically and mid femur slightly infuscated on the very tip. Mid tibia with 4–5 a, 3–4 d, 4–6 p and 5–7 v. Hind tibia with 7–8 a, 7–10 d and 2–4 p. Ratio of tibia to first tarsomere for front, mid and hind legs: 1.10–1.12 [mean value 1.11]; 1.19–1.26 [1.23]; 1.52–1.56 [1.53].

Abdomen. Brown, darkened caudally, tergites 2–3 with small to large yellowish lateral spots (obscure in darker specimens). Terminalia (Fig. 1) brown. The apicoventral margin of the gonocoxite have distinct, stepped emargination (occupying about 1/4 of its total width) with almost abrupt lateral margins and small elevation in the bottom. Ventral lobe of gonostylus with elon-
gated basoventral projection bearing strong bristles and with two bare elongated processes. One of these processes, near the middle of the ventral lobe is apically pointed. The other one, near the caudal edge of the ventral lobe has an apex forked into two branches of which one is apically pointed and the other rounded.

**Female.** Unknown.

**Larval biology.** Unknown.

**Etymology.** The species’ name indicates its resemblance to *P. avida* Gagné, 1975.

**Diagnostic characters.** The new species, *P. avidoides*, resembles *P. avida*, but differs clearly by the following characters of the male terminalia. The apicoventral margin of the gonocoxite is narrowly and deeply excised in *P. avidoides*, while it is wide and shallowly concave in *P. avida* (Fig. 1b, 2c). The two elongated, bare processes on the ventral lobe of the gonostylus have pointed apices in *P. avidoides* (Fig. 1c), while they are rounded and apically spatulated in *P. avida* (Fig. 2a). In *P. avidoides* the apex of the paramere is wide, abruptly pointed (Fig.1d), while it is more elongated and stretched in *P. avida* (Fig. 2b). The inner edge of the cercus is slightly excised along the apical third in *P. avidoides* (Fig.1a), while it is almost straight, smoothly pointed apically in *P. avida* (Fig. 2d). Another related species is *P. strenua* Winnertz, 1863, which clearly differs in having a weakly developed basoventral process of the ventral lobe of gonostylus (see Gagné 1975, p. 313, fig. 78; Zaitzev 2003, p. 324, fig. 97, 4).

### 3.2. Phronia fennica sp. n. (Fig. 3)


**Additional material examined.** Finland: ♀ Ta: Lammi, Kotinen, 6794400: 3396400, reared from

**Description.** Male (n=5). Head brown, mouthparts and palp light brown. Antenna brown, scape, pedicel and the basal half of the first flagellomere light brown to pale. Sixth flagellomere twice as long as wide.

Thorax. Mesonotum brown, covered with fine dense yellowish hairs and strong scattered yellowish bristles. Pale specimens with yellow lateral spots and propleuron. Pleuron brown. Scutellum with four bristles, two strong ones medially and two smaller ones along the edges. Propleuron with two strong, pale bristles. Legs. Pale yellow to dark brown, hind femur and tibia sometimes slightly darkened apically. Mid tibia with 3–5 a, 2–3 d, 3 p and 7 v. Hind tibia with 6 a, 7–8 d and 3 p. Ratio of tibia to first tarsomere of front, mid and hind legs: 1.03–1.09 [mean value 1.06]; 1.23–1.32 [1.27]; 1.47–1.53 [1.51].

Wings. Wing length 2.5–3 mm. Wings hyaline, yellowish, veins yellow. Sc short, ending free. C very slightly extending beyond the tip R₃. Stem of M-fork 1.2 times as long as ta. The vein ta with 3–5 macrotrichia. Haltere pale yellow.

Abdomen. Brown, darkened caudally. Ter-
gites 1–3 with big, yellowish lateral spots. Terminalia (Fig. 3) brown. Apicoventral margin of gonocoxite almost straight. Ventral lobe of gonostylus humpbacked with short basoventral projection bearing 2 apical bristles and several smaller bristles near the apex.

Female. Unknown.

Larval biology. One male has been reared from decaying spruce log bearing fruiting bodies of Antrodia serialis.

Etymology. The species' name indicates the first records being from Finland.

Diagnostic characters. The new species most closely resembles P. subsilvatica Hackman, but differs by the almost straight apical edge of the ventral lobe of gonostylus (Fig. 3b), which has a distinct rectangular excavation in P. subsilvatica (Fig. 4b). Other related species are P. petulans Dziedzicki, 1889 and P. cupida Gagné, 1975. P. petulans differs by more rounded ventral lobe of the gonostylus, presence of small curved spines near the apical edge on inner surface of the gonostylus, and different structure of basal parts of the aedeagal complex (Fig. 5). P. cupida has the same type of aedeagal complex, but the ventral lobe of gonostylus has a distinct apical depression (though not so distinctly excavated as P. subsilvatica) and some strong elongated setae along the apical edge (see Gagné 1975, p. 313, figs 74–77).

4. Other related species of Phronia studied

4.1. Phronia avida Gagné, 1975 (Fig. 2)

Material examined. ♂, (Paratype, Smithsonian Institution, National Museum of Natural History, Washington, USA, dry-pinned, terminalia preserved as glycerine preparation in small vial on the same pin as the rest of the body), USA, Alaska, Matanuska, rotary trap, 5.–16.VI.1944, J.C. Chamberlin leg.

4.2. Phronia subsilvatica Hackman, 1970 (Fig. 4)

Material examined. Holotype ♂ (No. 14254, pinned with terminalia in balsam preparation on slide) Finland, Ks: Kuusamo, Kiuataköngäs 21.VIII.1964, Tuomikoski & Mikkola leg. (MZH). Paratype ♂ (No 14248, pinned with ter-

4.3. Phronia petulans Dziedzicki, 1889 (Fig. 5)

Since Hackman (1970) has provided the most detailed figures of the male terminalia of P. petulans, we follow his interpretation of this species. However, Hackman (1980) marked P. petulans with a question mark in the checklist of the Finnish Diptera.


Acknowledgements. Authors are grateful to Dr. F. Christian Thompson and Dr. David G. Furth, Smithsonian Institution, National Museum of Natural History, Department of Entomology, Washington, USA for the loan of type material on Phronia avida Gagné. We are indebted to Dr. Jostein Kjærandsen (Zoological Museum of Lund University, Sweden), Jouni Penttinen (University of Jyväskylä, Finland) for the help during preparation of the manuscript and to the referees for the valuable comments on the manuscript. This paper is a part of the project “Finnish fungus gnats (Diptera, Mycetophilidae, etc.) and log midges (Diptera, Porricondylinae): faunistics, habitat requirements and threat status”. The financial support from the Finnish Ministry of Environment is hereby acknowledged.

References


