

Fungivory and flies (Diptera: Brachycera)



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Who am I



- Laboratory manager of DNA lab at the Finnish Museum of Natural History
- Research interests: hoverflies (Syrphidae) and flatfooted flies (Platypezidae)
- Molecular data: taxonomy and systematics, phylogeography, taxonomy and phylogenetics
- Collaborator Elvira Rättel

Fungivorous flies



- Species with **primary (obligate) fungivorous** larvae in agarics
- Phoridae, Platypezidae, Heleomyzidae, Anthomyiidae, Anthomyzidae, Drosophilidae, Asteiidae (diptera.info)
- **Secondary fungivores** (saprophagous) (Sphaeroceridae, Fanniidae)
- **Predatory species** with preference for fungi (Muscidae)

Fungivorous flies



- Drosophilidae, species of *Hirtodrosophila* and *Mycodrosophila* are obligate fungus feeders (polyphagous) in agarics
- **Flatfooted flies (Platypezidae)** develop solely in/on fungi, mainly on wood-associated fungi
- The single family with all species associated with fungi

Fungi and flies: Flatfooted flies (Platypezidae)



- Flies dependent on **wood-decaying and wood inhabiting fungi** (both annual and perennial)
- Basidiomycetes
- Polypores (*Polyporus*)
- Corticoids (*Phanerochaete*)
- Wood-inhabiting agarics (*Armillaria*)

Fungi and flies: Platypezidae



- Obligate fungivores
- 'Soft' bracket fungi
- All known host fungi are white-rot fungi
- Both on deciduous and coniferous trees
- Species are oligophagous on a few fungal species of same genus
- Some are monophagous

Fungi and flies: Platypezidae

- Size of adult 4-6 mm
- Main species occurrence in late summer or autumn
- Larvae feed on spores and fungal tissue
- Adult flies ingest organic matter on plant leaves



Agathomyia sexmaculata



Agathomyia elegantula



Fungi and flies: Platypezidae

- Females oviposit in pores or between gills
- Larvae consume spores and move between pores or gills
- Three larval stages (2 weeks – 1 month)
- Overwintering as third stage larva in fungus, or as pupae in the ground



Flat-footed flies (PLATYPEZIDAE)

- in Finland, 38 species (but several species new to science in prep.), in Europe 46
- **Callomyinae**: 2 genera ~20 species
- **Platypezinae**: 5 genera (13 species)
- **Melanderomyiinae**: Nearctic, 1 species (in *Phallus* spp.)
- **Microsaninae**: larvae unknown (mycelium feeding suggested)

Fungi and flies:
 Platypezidae
 Subfamily Callomyiinae



Agathomyia elegantula

- ***Agathomyia***: in Finland 16 species
- Adult body length 4-6 mm
- Larvae develop in a wide range of polypores
- Larvae whitish, semicylindrical (ventrally flattened), 2.5-7 mm





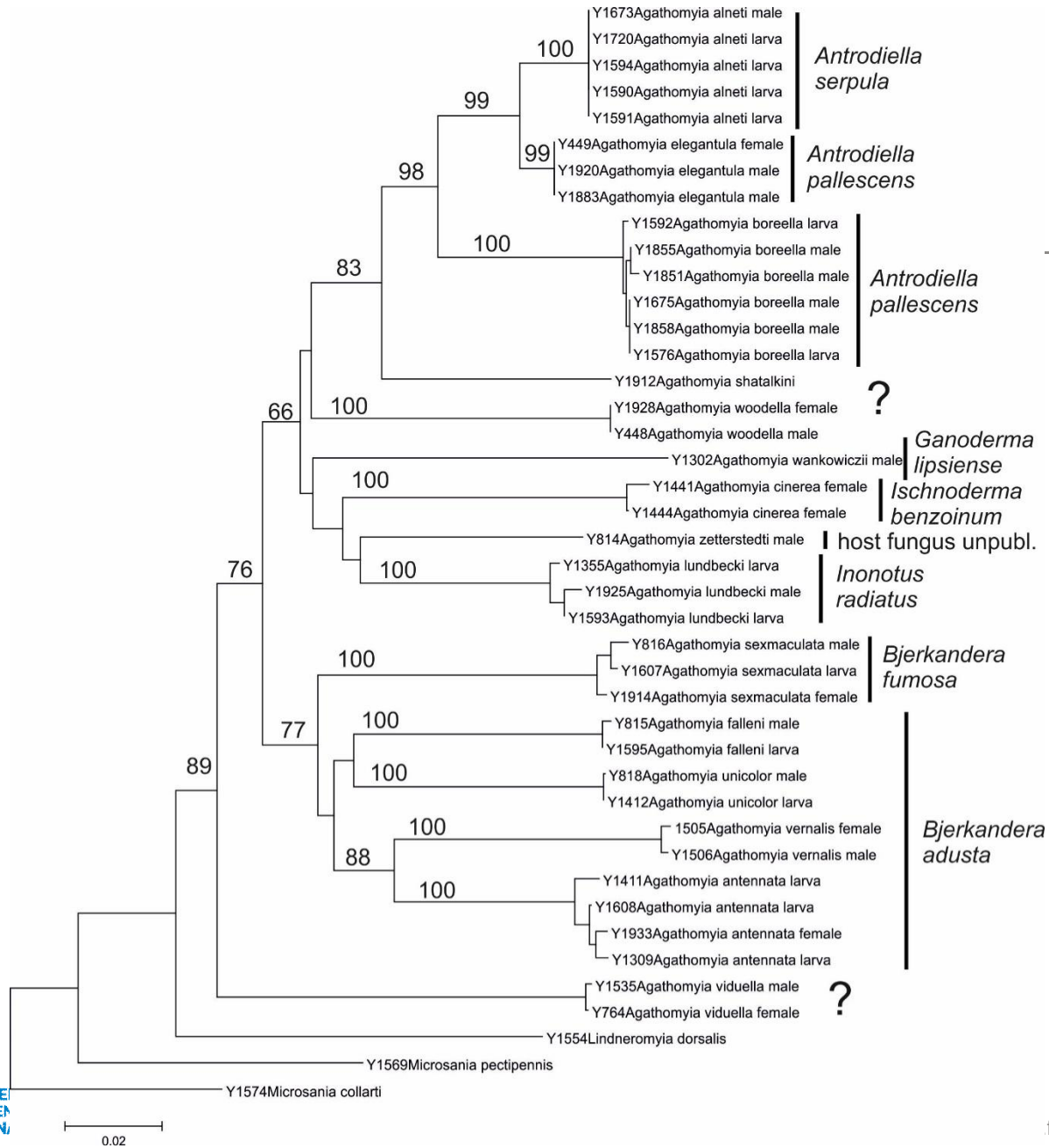
Agathomyia alneti sp.n., third stage larva, dorsal view

- MtDNA COI barcode for DNA identification of larvae

Morphological descriptions of previously unknown larvae



Agathomyia unicolor, third stage larva, dorsal view



Agathomyia wankowiczii, larvae induce galls in the hymenophore of bracket fungus *Ganoderma lipsiense* (*applanatum*)





Inonotus radiatus
with *A. serpula*



- *Agathomyia elegantula* group species are specialized on follower fungi species
- *Antrodiella serpula*, *A. pallescens*, *A. faginea*



Species of *Callomyia* feed on corticoid fungi

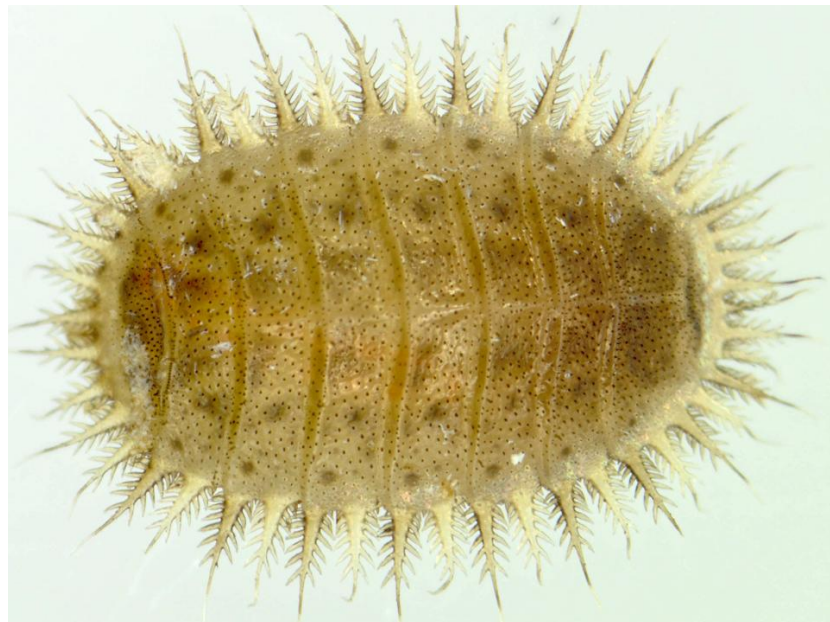


Larva on *Phanerochaete sordida*
(rähjäorvakka)



Female fly.
Photo: J. Flinck

*Callomyia
amoena*



Pupa.
Photo: E. Rättel



Callomyia amoena larvae
 on *Phanerochaete sordida* on *Alnus* sp. (O. Miettinen) Kuopio,
 Kolmisoppi.

Fungi and flies: examples from subfamily Platypezinae



- *Trametes* spp. (vyökäävät) are host fungi for the *Polyporivora* species



Polyporivora picta, female
ovipositing under *Trametes
versicolor* (Serbia, Fruska Gora)



Suomukääpä, *Polyporus squamosus* (on *Ulmus glabra*) (Karis, Billnäs, 21.6.2011)



Platypezidae:
Bolopus furcatus
(Fallén), monophagous
on *Polyporus*
squamosus





- *Seri obscuripennis*, adult female
- The species is oligophagous on *Polyporus* spp.



Subfamily Platypezinae

- Genus *Platypeza*, 4 species
- *Armillaria borealis*

