


## Two predatory *Medetera* (Diptera: Dolichopodidae) species associated with *Ips acuminatus* (Gyllenhal) (Coleoptera: Curculionidae) in Bulgaria

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**Abstract:** In 2021 and 2022, two predatory flies from the genus *Medetera* (Diptera: Dolichopodidae) were recorded in galleries of *Ips acuminatus* (Coleoptera: Curculionidae) on *Pinus sylvestris* trees in Sredna Gora Mountain in Bulgaria: *M. pinicola* and *M. dendrobaena*. These findings appear to be the first associations with *I. acuminatus*. In addition, the first record of *Medetera* cf. *dendrobaena* for the fauna of Bulgaria was also recorded. As only a female specimen was found, the identification remains doubtful for the moment.

**Keywords:** *Ips acuminatus*, *Medetera dendrobaena*, *Medetera pinicola*, new record, predators, trophic associations

### Introduction

The sharp-toothed bark beetle, *Ips acuminatus* (Gyllenhal, 1827) (Coleoptera: Curculionidae) is one of the most dangerous pest on pines (*Pinus* spp.) in Europe (Grégoire & Evans, 2004). It attacks the upper part of the stems and branches (Sauvard, 2004), causing severe damage. In Bulgaria, *I. acuminatus* is the most abundant among the complex of bark beetles in pine plantations (Doychev, 2014) where is considered as a most aggressive and destructive xylophagous insect pest (Mirchev et al., 2016).

The genus *Medetera* Fischer von Waldheim, 1819 is one of the most species rich genera within the family Dolichopodidae encompassing about 180 Palearctic species (Negrobov & Naglis, 2016). In Bulgaria, this genus is not well studied and only 15 species are known (Kechev et al., 2020; Kechev, 2021a, 2021b). In addition, special researches on the predator-prey relationship between *Medetera* and bark beetles have not been conducted in the country and only one species

(*M. pinicola*) has been found in the galleries of *Ips typographus* (Linnaeus, 1758) (Doychev et al., 2016).

This article reports new associations of two *Medetera* species with *I. acuminatus* and a new record for dolichopodid fauna in Bulgaria.

### Material and methods

The biological material was collected in 2021 and 2022 in 35-year-old Scots pine (*Pinus sylvestris* L.) plantation situated in Sredna Gora Mountain near Bardo Village, Ihtiman Municipality (Fig. 1). The geographical coordinates of the locality are 42.5499 N and 23.8198 E, and the altitude – 1070 m.

The samples (stem cuttings of approximate length 30 x 30 cm) were collected in bark beetle spots of *Ips acuminatus* (av. diameter 18.0 cm, length 14.0 m) in which newly infested and dead trees occurred (Fig. 2). Sampling was conducted in June from five trees infested by the first generation of the pest. Three samples



Fig. 1. Studied locality in Bulgaria.

per a tree were taken from the middle and upper part of the stem where the entrance holes of the imago were formed. The samples were transported to the Forest Research Institute in Sofia and put in photoelector at room temperature (18–22°C). The photoelector were observed weekly and the newly emerged parasitoids and predators were individually placed in 70% alcohol in plastic Eppendorf tubes for identification.

The emerged *Medetera* adults were identified by the keys of Parent (1938), Negrobov & Stackelberg (1969), d'Assis Fonseca (1978) and Bickel (1985).

The biological material was deposited in the entomological collection of Forest Research Institute in Sofia.

## Results and discussion

*Medetera pinicola* Kowarz, 1877 (Fig. 3 A, B)

Material examined: cutting and collection of stem samples – 18 June 2021 and 27 June 2022; adult

emergence – between 25 June and 1 July 2021 (1 ♂, 1 ♀), between 17 and 25 July 2022 (2 ♂♂, 4 ♀♀); leg. S. Belilov; det. M. Kechev.

Distribution: Holarctic species, Europe: Britain, Bulgaria, Estonia, Finland, France, Germany, Norway, Russia (central, northwest), Sweden, Switzerland, the Netherlands (Grichanov, 2007; Pollet, 2011); North America: Rocky Mountains south to Arizona, northern Coastal Ranges, boreal Canada, from Ungava south along Atlantic Coastal Plain and Appalachians to Georgia (Bickel, 1985).

In Europe, *M. pinicola* has been found in coniferous (*Pinus* and *Picea*) trees from galleries of *Ips typographus*, *Hylurgops palliatus* (Gyllenhal, 1813) and *Tomicus* spp. (Kenis et al., 2004; Hulcr et al., 2005; Wegensteiner et al., 2015; Sousa, 2019). In North America it has been found in wide range of coniferous tree hosts, associated with Scolytidae: *Picea engelmannii* Parry ex Engelm., *Pinus banksiana* Lamb., *P. echinata* Mill., *P. resinosa* Aiton, *P. strobus* L., *P. taeda* L., *Pseudotsuga menziesii* (Mirb.) Franco (Bickel, 1985).



Fig. 2. Larval galleries and exit holes of *Ips acuminatus* on dead *Pinus sylvestris* tree.

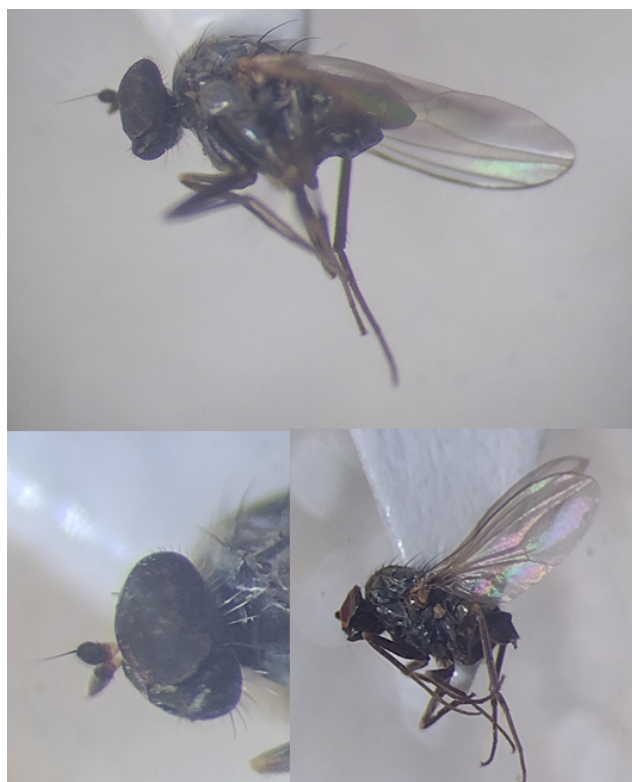


Fig. 3. Reared *Medetera* species from *Ips acuminatus* galleries: A – *M. pinicola* (male), habitus; B – *M. pinicola* (male), antennae; C – *M. dendrobaena* (female), habitus.

*Medetera* cf. *dendrobaena* Kowarz, 1877 (Fig. 3 C)

Material examined: cutting and collection of stem samples – 18 June 2021; adult emergence – between 25 June and 1 July 2021 (1 ♀); leg. S. Belilov; det. M. Kechev.

Distribution: Europe: Austria, Belgium, Britain, Corsica, Czech Republic, France, Germany, Gibraltar, Greece, Hungary, Ireland, Italy, Spain, the Netherlands; Asia: Iraq, Israel (Grichanov, 2007; Pollet, 2011).

Remarks: The species shows the following features leading to *M. dendrobaena*: frons and upper part of epistome dusted pale grey; clypeus only narrowly dusted at sides; all segments of antennae black (in *M. pinicola* scape and pedicel yellow) (Fig. 3 B), postpedicel more triangular; two rows of dorsocentral setae; greatest distance between M1+2 and R4+5 3 times as long as that at their tips; anteroventral bristles at tip of hind femur short. As only a female specimen was found, the identification remains doubtful for the moment.

*M. dendrobaena* has been found from coniferous (*Picea*) and deciduous (Fagaceae) trees in galleries of *Ips typographus*, *Pityogenes chalcographus* (Linnaeus, 1761), *Taphrorychus bicolor* (Herbst, 1793) and

*Trypodendron lineatum* (Olivier, 1795) (Kenis et al., 2004; Hulcr et al., 2005; Wegensteiner et al., 2015).

*Medetera* spp. have been established as major predators on scolytid larvae (Bickel, 1985). According to the author, the genus is of considerable importance as an agent of biological control. However, there is insufficient knowledge about the specificity to different species of scolytids.

In conclusion, it should be noted that the new records expand the range of trophic associations of *M. pinicola* and *M. dendrobaena* and increase the richness of the Bulgarian dolichopodid fauna.

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