

## TWO NEW HYMENOPTERAN FINDINGS IN SERBIA: *DIPRION SIMILIS* (DIPRIONIDAE) AS HOST AND ITS PARASITOID, *MONODONTOMERUS DENTIPES* (TORYMIDAE)

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### Abstract

New findings of two hymenopteran species are reported for the Serbian fauna. *Diprion similis*, from the family Diprionidae, served as a host for the parasitoid wasp *Monodontomerus dentipes*, from the family Torymidae. The specimens were collected from Mt. Zlatibor in western Serbia. The parasitoid specimens were reared from the pupal stadium of the host *D. similis*.

KEYWORDS: white pine sawfly, forest pest, parasitic wasp, *Pinus*

### Introduction

Although Diprionidae (conifer-feeding sawflies) are a very important group of insects in forestry along with other sawflies, they have never been seriously or systematically investigated in Serbia. According to the Fauna Europaea database (Achterberg *et al.*, 2017), the genus *Diprion* Schrank 1802 contains four species in European fauna. New analyses have revealed that there are actually only two species: *Diprion pini* (L. 1758) and *D. similis* (Hartig 1836) (Tager *et al.* 2010). *D. similis* is a native species of central and northern Europe and Asia (Achterberg *et al.* 2017). Its biology is related to various pine species; the larvae feeding on the needles of pine trees, especially *Pinus nigra* Arnold, *P. sylvestris* L., *P. mugo* Turra and *P. cembra* (L.),

which are common in Europe. Known as the white pine sawfly, *D. similis* was accidentally introduced into the USA in 1914 (Britton, 1915). After conquering Canada, it immediately attacked its new hosts, *Pinus strobus* L. and *P. banksiana* Lambert as an invasive species (Wilson, 1966). Since damages to the new continent were significant, many efforts were made to investigate its behavior in the new environment and to find a potential agent for biological control (Hartley, 1923; Fedde, 1974; Drooz *et al.*, 1985).

Like *D. similis*, the other pine sawfly species associated with the genus *Pinus* L. is *D. pini* (L. 1758), the common pine sawfly. It has a broader European distribution than the white pine sawfly. However, it is not registered in southern countries such as Greece, Spain, Portugal, North Macedonia and Albania (Achterberg *et al.*, 2017).

Two more *Diprion* species listed in the Fauna Europaea database are *D. butovitschi* Hedqvist, 1967, described from Sweden and *D. rufiventris* Zirngiebl 1937, described from Albania. *D. butovitschi* is a younger synonym of *D. pini*. The fourth species, *D. rufiventris* is an *incertae sedis* species (a species of the genus *Gilpinia* Benson 1939, probably a synonym of *G. virens* (Klug, 1812)), but the type is lost.

Diprionidae are attacked by 283 species of the superfamily Chalcidoidea (Noyes, 2019), of which 117 species from eight families have been listed for *Diprion* spp. Within this wide range of parasitoids is the species *Monodontomerus dentipes* (Dalman, 1820). It has been recorded on 22 species of Diprionidae (Noyes, 2019). *M. dentipes* is a common gregarious parasitoid of *Diprion similis*. There are many data that this species exhibits broad host specificity encompassing both primary and secondary hosts (Noyes & Sadka, 2003). Most common primary hosts come from families belonging to the suborder Symphyta, such as many *Diprion* and *Neodiprion* Rohwer, species from the family Diprionidae and a few from Tenthredinidae and Cimbicidae (Noyes & Sadka, 2003). On the host list are also some lepidopterans, primarily those whose larvae feed on conifers such as *Dendrolimus* Germar (Lasiocampidae), some Erebididae and sporadically Pieridae, Yponomeutidae, Pyralidae, Tortricidae and Zygaenidae. As a hyperparasitoid, *M. dentipes* was found on Braconidae and Ichneumonidae, several Tachinidae (Aslam, 1999) and Eulophidae (Thompson, 1951).

The aim of this study was to report two hymenopteran species new to Serbia that are connected through trophic association: the host and the parasitoid.

## Materials and Methods

Locality description: the Zlatibor mountain region is a vast covered plateau in western Serbia, representing the largest serpentine massif in the country. The average elevation of Mt. Zlatibor is about 1000 m. Much of the mountain is covered with *Pinus sylvestris* and *P. nigra*. The sublocality Čavlovac, where material was collected, is located at the base of Zlatibor's peaks at about 1000 m a.s.l.: the coordinates are 43°42'14"N, 19°39'20"E. In addition to the two pine species mentioned, *P. heldreichi*, a tertiary relict and subendemic of the Balkan Peninsula, can be sporadically found here.

Collection and breeding/propagation/rearing of material: we found many brownish-golden cocoons attached to lower vegetation below the pines, such as grasses or small shrubs. They were not clustered but scattered individually. Sampling of cocoons took place on 25.06.2019. Along with cocoons, we found several mature larvae. The cocoons and larvae were individually placed in small (ø5 cm and 6 cm high) plastic pots with perforated covers. After 15-20 days we observed the adult white pine sawfly eclosion, but also the appearance of gregarious parasitoids from other cocoons. Photographs were taken of the actors in this study (Fig. 1).

## Results and Discussion

In total, we observed 10 specimens of white pine sawfly. Seven of these were found as pupae and the other three were pupated in the laboratory. *Monodontomerus dentipes* emerged gregariously from only one cocoon of *Diprion similis*. This cocoon was collected on site, so it is not known whether it was parasitized as a larva or pupa. Fourteen females and only one male parasitoid emerged from the cocoon (Fig. 1).

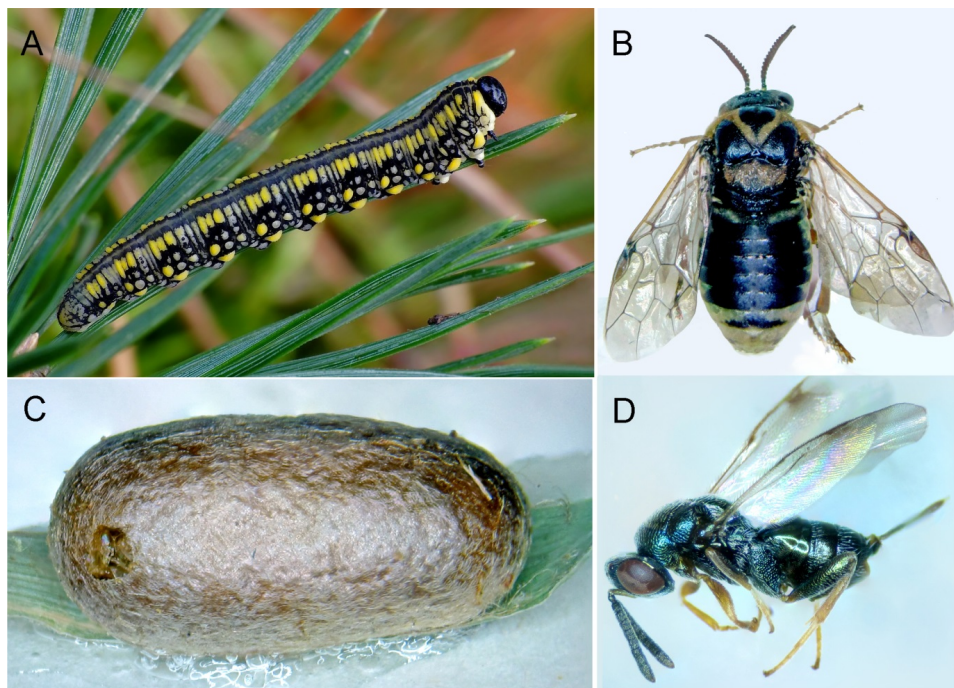


Figure 1. *Diprion similis*. A – larva, B – adult (female), C – cocoon with the exit hole of parasitoids; *Monodontomerus dentipes*: D – female.

Although *D. similis* is mentioned in the textbook “Šumarska entomologija” (Forest Entomology) (Mihajlović, 2008), it was never officially reported. In this publication there is no indication of the locality where it was found, apart from the comment that its larvae were found on *Pinus mugo* Turra (the dwarf mountain pine), which is distributed in only three localities in Serbia on high mountains.

Having in mind that the white pine sawfly has been extensively studied, especially in North America, because it is a notorious pest, as many as 40 larval or pupal enemies have been registered so far. A large majority come from the family Ichneumonidae. Other parasitic wasps from the families Pteromalidae, Eupelmidae and Torymidae were also recorded, but certainly the most significant is *M. dentipes*. There are three more torymid parasitoids from the genus *Monodontomerus* found as natural enemies of the white pine sawfly, all recorded as pupal parasitoids: *M. aeneus* (Fonscolombe, 1832), *M. minor* (Ratzeburg, 1848) and *M. strobili* Mayr, 1874. In some of the literature, *M. dentipes* was registered as a parasitoid of mature larval instars. Here we report this parasitoid as pupal because all the collected larvae of the white pine sawfly turned into pupae.

Apart from hymenopterans, there are also two tachinid parasitoids: *Drino inconspicua* (Meigen, 1830) and *Diplostichus janitrix* (Hartig, 1838), registered from mature larvae of *D. similis* (Tschorsnig, 2017). Although found in several neighboring countries (Bosnia and Herzegovina, Hungary and Romania), *M. dentipes* and its host *D. similis* have not been reported from Serbia so far.

## Acknowledgments

This investigation was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Grant No. III43001). We thank Jerzy Borowski for identifying the pine sawfly adults. The photo of the *Diprion similis* larva was taken by Kjeld Brem Sørensen from Denmark.

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## ДВА НОВА НАЛАЗА ОПНОКРИЛАЦА У СРБИЈИ: *DIPRION SIMILIS* (DIPRIONIDAE) КАО ДОМАЋИНА И ЊЕГОВОГ ПАРАЗИТОИДА *MONODONTOMERUS DENTIPES* (TORYMIDAE)

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### Извод

У овом раду пријављујемо два нова налаза опнокрилаца за фауну Србије. *Diprion similis* (Hartig 1836) из породице Diprionidae као домаћин и њен паразитоид *Monodontomerus dentipes* (Dalman 1820) из породице Torymidae. Узорци су прикупљени на планини Златибор у западној Србији, а паразитоиди су добијени одгајањем из лутки домаћина *D. similis*.

Received: 20th November 2019  
Accepted: 9th December 2019