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Materials to the knowledge of Polish sawflies. The genus *Dolerus* Panzer, 1801 (Hymenoptera, Symphyta, Tenthredinidae, Selandriinae). Part XVIII – *Dolerus* (*Achaetoprion*) *pachycerus* Hartig, 1837 with observations on its biology and a key for identification of larvae of subgenus *Achaetoprion* Goulet, 1986

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Abstract: Information is presented on the occurrence in Poland of *Dolerus (Achaetoprion) pachycerus* Hartig, a sawfly species new to the fauna of the country. The breeded larvae fed on *Juncus compressus* Jacq., which is a new host plant record. Additionally, the flight periods of particular species of the subgenus *Achaetoprion* Goulet are discussed and graphically presented. Finally, an identification key is provided for the last feeding stages of larvae of Poland's species of the genus *Dolerus* Panz. found on rushes.

Keywords: faunistic data, bionomy, *Juncus* spp., rushes, flight period, diagnostic characters

Introduction

The genus *Dolerus* Panz. contains many species of sawflies, which are however morphologically often very similar. Most of them inhabit areas of cool and moderate climate, where host plants of the larvae are grasses (Poaceae), rushes (Juncaceae), sedges (Cyperaceae) and horsetails (Equiseataceae). Poland's fauna has been reported to include 38 species of 8 subgenera (Borowski 2017a, Borowski 2022). One of the subgenera, whose larvae all live on rushes, is *Achaetoprion* Goulet. Until now, the country's fauna included 4 species (Huflejt 1997; Skibińska & Chudzicka 2000, Borowski 2017a). This paper presents information about the occurrence of a fifth species belonging to the subgenus *Achaetoprion,* namely *D. (A.) pachycerus* Hartig, discusses phenological aspects of particular species' flight periods, and also includes a key to identify the larvae of Poland's species of the subgenus *Achaetoprion*.

Material and methods

The paper is based on the author's own material collected in various regions of Poland. However, the larger part definite majority of the material comes from the area of Rogów in central Poland. The flight periods were observed and insects caught from March to June in 2013-2022. The females caught in their natural habitat were transferred to the laboratory for oviposition and subsequent breeding of larvae. The breeding methods were described in a separate paper (Borowski 2017b). The last feeding larval stages of particular species are kept in the collections of Department of Forest Protection SGGW, in vials filled with Pampel's fluid.

Results

D. pachycerus occurs in most European countries (Taeger *et al*. 2006), however, it is rarely caught and usually only single specimens are found in its locations. It is mainly reported

from seashore belts (Taeger *et al*. 1998, Prous *et al*. 2014). This sawfly is considered halophile and *Juncus gerardi* Loisel has been shown to be a host plant of the larvae (Kontuniemi 1960). This rush occurs most numerously in Poland on the coast from Szczecin to Gdańsk Bay, and the plant itself belongs to a characteristic plant community, namely *Juncetum gerardi* from *Armerion maritimae* association. Although its host plant is known, the larva of *D. pachycerus* has still not been described.

In April 2021 one female of this species was caught in central Poland, on a moist, fertile mown meadow (*Calthion palustris* community). Below detailed information can be found about the locality where *D. (A.) pachycerus* was caught in Poland:

- Leszczyny ad Koluszki, UTM: DC 23, 19.04.2021, moist meadow, net catch, 1♀, leg. J. Borowski.

The female was transferred to a laboratory for breeding. It was placed in a container with *Juncus effusus* L., but it did not lay eggs in this species of rush. Accidentally, apart from *J. effusus,* another species happened to be in the container, i.e. *Juncus compressus* Jacquin. And it was in the young, shooting leaves of this rush that the female laid over 20 eggs. In natural conditions *J. compressus* had just only started growing and its leaves were 1 to 4 cm long. After 10 days 1st stage larvae hatched and started gnawing the rush's leaves laterally. The larvae of last but one and last stage bit the rush leaves from top down, just like other larvae of the species of the subgenus *Achaetoprion* do. After 23 days of feeding the larvae buried themselves in the ground and were transferred to an open-air carport for summer dormancy, and then to natural conditions for winter. In spring 2022 three males of this species emerged, thus confirming the identity of the sawfly species. Figure 1 depicts a penis valve obtained from one of these males.

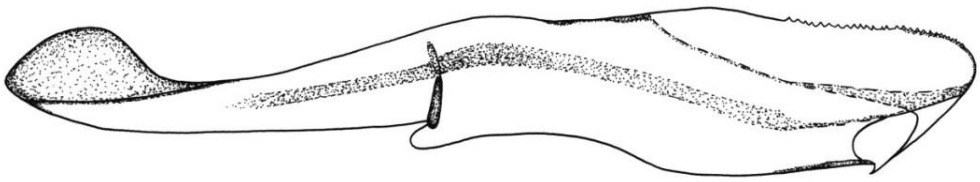

Fig. 1. *Dolerus (A.) pachycerus* Hartig, a right penis valve, ventral-outer view.

All five species of the subgenus *Achaetoprion* are species which fly early in the year. During the nearly 10-year research the flight periods of these species clearly showed a particular sequence of occurrence. Such observations were carried out in several spots in central Poland, e. g. on the meadow in Leszczyny, where *D. (A.) pachycerus* was caught. The first to appear was *D. (A.) madidus* (Klug, 1818). Depending on the length of winter it could be observed flying even at the beginning of March and the flight period ended during the first ten-day period of April. Along with *Dolerus (Poodolerus) coracinus* (Klug, 1818) (=*D. (P.) anthracinus* sensu auct.), *Acantholyda (Acantholyda) flaviceps* (Retzius, 1783) and *Cephalcia alpina* (Klug, 1808), it is one of the first four sawfly species to start flying in natural habitats. Next is *D. ferrugatus* Serville, 1823, and 1-2 weeks after that *D. uliginosus* (Klug, 1818). At the end of April *D. triplicatus* (Klug, 1818) appears; it can still be caught until the beginning of the 3rd ten-day period of May. The specimens of a given species hatch almost synchronously, but although males and females appear simultaneously, males are more often caught, because they fly more actively. At the end of the flight period almost only females can be found in the habitat. Figure 2 shows the flight

periods of particular species, based on data obtained at localities in central Poland, in 2020.

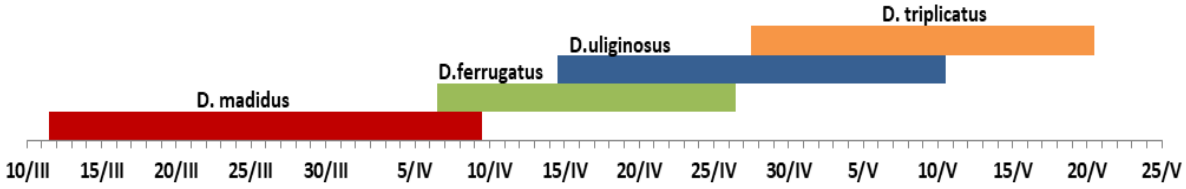

Fig. 2. Flight periods of species of subgenus *Achaetoprion* Goulet, in 2020, in central Poland; [day/month].

In recent years, warm winters have become more and more frequent in Poland. They are characterised by little snow and lack of severe frosts. On the other hand, sudden and short warm periods are more often recorded in March and April, with temperatures fluctuating between 15 and 20°C. Under such conditions the first species of *Dolerus* start flying even as early as beginning of March. The temperature threshold for first species' appearance seems to be 14°C in the shade. After the flight period has started, insects fly even in slightly lower temperatures, with the lowest limit at 10°C. Light night frosts do not affect the day activity of imagines. The described sawfly species' occurrence can be correlated with the blooming of particular plants. Below the blooming times of some plants at the peak of particular species flight periods are compared.

D. madidus – the peak flight period coincides with:

- the beginning of the blooming period of *Salix caprea* L., *Alnus glutinosa* L., *Cornus mas* L. and *Gagea lutea* (L.);
- the beginning of mass blooming of *Anemone nemorosa* L., *Tussilago farfara* L. and *Viola odorata* L.;

D. ferrugatus – the peak flight period coincides with:

- full blooming of *Prunus domestica syriaca* (Borkh.), *Acer platanoides* L. and *Betula pendula* Roth;
- the beginning of blooming of *Prunus spinosa* L. and *Taraxacum officinale* F.H. Wigg.;

D. uliginosus – the peak flight period coincides with:

- the beginning of blooming period of *Padus avium* Mill.;

D. triplicatus - the peak flight period coincides with:

- full blooming of *Padus avium* Mill.

The larvae of species of the subgenus *Achaetoprion* feed on various rush species, with *Juncus effusus* most often named as their host plant In recent years observations on feeding larvae led to the detection of clear preferences of particular sawfly species for certain rush species. Thus *D. madidus* prefers mainly *Juncus conglomeratus* L., while its sister species *D. uliginosus* feeds mainly on *Juncus effusus*. Also *D. ferrugatus* avoids *J. conglomeratus* and feeds almost solely on *J. effusus*, choosing the thinnest, young leaves to lay eggs. The only species which inhabits various species of rushes in similar proportions is *D. triplicatus*. It can be found in various habitats: forest, meadow and synanthropic places with rushes. Due to the high morphological similarity of the larvae of different species, their characteristic morphological traits and a key to identify species are presented below.

The larvae of the species of the discussed subgenus are characterised by dark brown spots on the head capsule. According to their location, three kinds of spots can be distinguished:

- posterior occipital (Fig. 3A) - paired,

located on the sides of occipital part of the head, directly in front of the first body segment;

- anterior occipital (Fig. 3B) - paired, located above the eyes, near the border of the frontal and occipital part of the head;

- frontal (Fig. 3C) – not paired, located in the upper part of the frontal part at the level of the eyes.

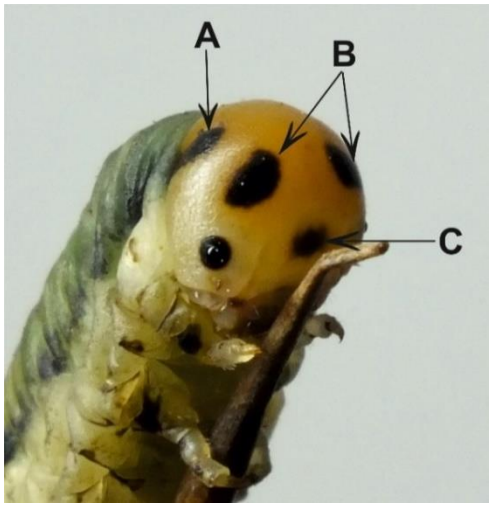

Fig. 3. A head of larva of *D. (A.) triplicatus* (Klug).
A – posterior occipital spot; B – anterior occipital spot; C – frontal spot.

The frontal and anterior occipital spots sometimes disappear or are not clear, but the posterior occipital spots are always visible. The key below can be used to identify the last feeding larval stage (the fully-coloured larvae) based on the larval material from which the imagines were obtained.

Identification key to larvae of Poland's species of the subgenus *Achaetoprion*

1.	Larva's sides with round, dark spots straight above spiracles, forming a row (Fig. 4); the head always has all three kinds of spots; the spots are clear, with well-defined outlines (Fig. 3)	***D. (A.) triplicatus* (Klug)**
1a.	Larva's sides without dark spots (Figs 5 & 7); the head with clearly visible posterior occipital spots, the other spots are unclear, with blurred outlines, and sometimes even disappear	2
2.	Anterior occipital spots present on head; the frontal spot, if it occurs, is usually wide, with blurred contours	3
2a.	No anterior occipital spots present on head; the frontal spot is small, in the form of a dark dot (Fig. 6)	***D. (A.) pachycerus* (Hartig)**
3.	Apart from the spots the head is fuscous brown; the frontal spot is dark fuscous, wide, with a blurred outline; the anterior occipital spots are poorly visible, partly merging with the surrounding darker area of this part of the head	***D. (A.) ferrugatus* Serville**
3a.	Apart from the spots the head is yellowish-dark brown; the frontal spot is fuscous brown, small and unclear; the anterior occipital spots are clearly visible, small, running transversely	4
4.	Usually no frontal spot on the head; however, if the spot does occur, it is very small, in the form of a darker dot	***D. (A.) uliginosus* (Klug)**
4a.	A frontal spot on the head, dark fuscous brown with a slightly blurred outline	***D. (A.) madidus* (Klug)**

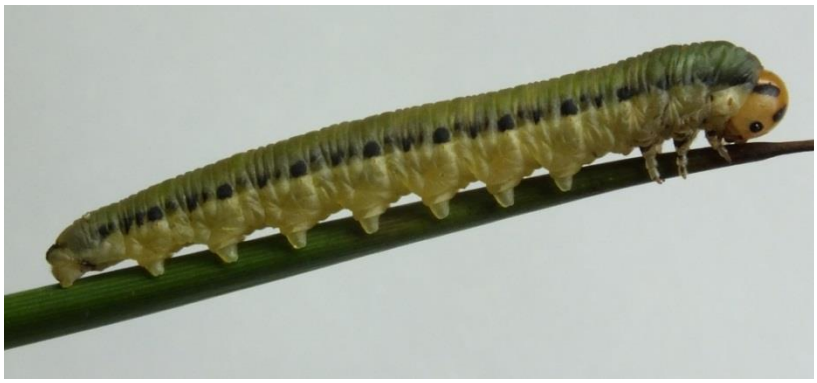

Fig. 4. Larva of *D. (A.) triplicatus* (Klug), lateral view

Fig. 5. Larva of *D. (A.) pachycerus* Hartig, lateral view.

Fig. 6. A head of larva of *D. (A.) pachycerus* Hartig, frontal view.

Fig. 7. Fig. 7. Larva of *D. (A.) madidus* (Klug), lateral view.

References

Borowski J. 2017a. Materials to the knowledge of Polish sawflies. The genus *Dolerus* Panzer, 1801 (Hymenoptera, Symphyta, Tenthredinidae, Selandriinae). Part I – an introduction and actual checklist of Polish species. *World Scientific News*, 81(2): 246–256.

Borowski J. 2017b. Materials to the knowledge of Polish sawflies. The genus *Dolerus* Panzer, 1801 (Hymenoptera, Symphyta, Tenthredinidae, Selandriinae). Part II – the

breeding of species. *World Scientific News*, 81(2): 311–317.

Borowski J. 2022. Materiały do znajomości polskich rośliniarek. Rodzaj *Dolerus* Panzer, 1801 (Hymenoptera, Symphyta, Tenthredinidae, Selandriinae). Część XVII – *Dolerus* (*Poodolerus*) *hibernicus* Lacourt, 1988, nowy gatunek rośliniarki w faunie Polski. *Wiadomości entomologiczne*, 41(3): 5–6.

Huflejt T. 1997. 24. Hymenoptera – Błonkówki. Symphyta – Rośliniarki. In: Razowski J. (ed.). Checklist of Animals of Poland, Vol. V, Part XXXII/24, Hymenoptera – Postscript, Wydawnictwo ISiEZ PAN, Kraków, pp. 7–42.

Kontuniemi T. 1960. Suomen sahapistiäistoukkien ravintokasvit. Die Futterpflanzen der Sägewespenlarven (Hymenoptera, Symphyta) Finnlands. *Animalia Fennica*, 9: 1-104.

Prous M, Blank SM, Heibo E, Lønnve OJ, Taeger A, Vårdal H, Liston A. 2014. Sawflies (Hymenoptera, Symphyta) newly recorded from Sweden. *Entomologisk Tidskrift*, 135(3): 135–146.

Skibińska E, Chudzicka E. 2004. Pilarzowate Tenthredinidae. In: Bogdanowicz W, Chudzicka E, Pilipiuk I, Skibińska E. (eds). Fauna Polski. Charakterystyka i wykaz gatunków. T. I. Muzeum i Instytut Zoologii PAN, Warszawa, pp. 276–277, 280–28.

Taeger A, Altenhofer E, Blank SM, Jansen E, Kraus M, Pschorn-Walcher H, Ritzau C. 1998. Kommentare zur Biologie, Verbreitung und Gefährdung der Pflanzenwespen Deutschlands (Hymenoptera, Symphyta). In: Taeger A, Blank SM. (eds). Pflanzenwespen Deutschlands (Hymenoptera, Symphyta). Kommentierte Bestandsaufnahme, Goecke & Evers, Keltern, pp. 49–135.

Taeger A, Blank SM, Liston AD. 2006. European Sawflies (Hymenoptera: Symphyta) – A Species Checklist for the Countries. In: Blank SM, Schmidt S, Taeger A. (eds). Recent Sawfly Research: Synthesis and Prospects, Goecke & Evers, Keltern, pp. 399-504.

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