Available online at www.worldscientificnews.com

World Scientific News

WSN 81(2) (2017) 311-317 EISSN 2392-2192

SHORT COMMUNICATION

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

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ABSTRACT

In the paper theoretical assumptions, necessary equipment and process of breeding species of the genus *Dolerus* Panz. are described.

***Keywords*:** Hymenoptera, Symphyta, Tenthredinidae, Selandriinae, *Dolerus*, sawflies, biology, breeding, equipment

Elements of bionomy[1]

Almost all *Dolerus* Panz. species develop in grasses, sedges, rushes and horsetails. The representatives of the genus belong to the earliest appearing sawflies: some, like *Dolerus anthracinus* (Klug) or *D. nitens* Zaddach, may start swarming already in late February, when

[1]Almost all the data in this chapter refer to the lowland, central part of Poland.

here and there still lay patches of snow (Benson 1952, Ermolenko 1975). Usually the earliest appearances begin in March, when the temperature rises to *ca.* 10-12 °C, due to the wintering of some species at the pupal stage in the surface layer of soil: *e.g.* in black swampy soils, quickly warmed in sunny spring, pupae swiftly transform into imagines and immediately start to fly. In some species, *e.g. D. anthracinus*, *D. nitens*, *D. brevicornis* Zaddach, *D. zhelochovtsevi* Heidemaa & Viitasaari, males hatch first, in others – *D. madidus* (Klug), *D. asper* Zaddach, *D. gonager* (F.) *&c*. – both sexes appear simultaneously.

In early spring the insects swarm in sunny, warm, leeward places, later on mainly the presence of host-plants is decisive. Males of most species fly very ably, low over the soil, and sit sometimes on herbs but most frequently choose dry standing (*e.g.* last year's) herbaceous shoots to rest. Having emerged from the soil, imagines take water (in captivity they readily feed on sweetened water) as well as partly rotten, infested with fungi, fragments of leaves and stalks. Without water imagines live at least twice shorter than those having access to it.

Copulation is usually dynamic, quick and difficult to observe; fecundated females – like those of many other insects – stop to eject pheromones and seem virtually unnoticeable to males. Males live on the average few days, females 10-14 days, so the time between the appearance of first males to death of last females is very short and towards the end of May many species already cannot be encountered; indeed, in case of short winter and warm early spring they can disappear (in central Poland) as early as mid-April. *Dolerus* species are rather easy to breed: as the greatest difficulty appears collecting of females – especially those of rare species.

Eggs are usually laid in places characteristic of particular species: *e.g. D. haematodes* (Schrank) puts them in upper parts of young leaves of sedges, just at the margins of side leaves, making so exposed females easy to net, whereas *D. zhelochovtsevi* oviposits near the bases of leaves, close to medial vascular bundle, therefore females of that species are much less frequently collected. Each species of *Dolerus* seems to prefer specific host-plant, although the majority are oligophagous, specialized in particular genera.

After feeding larvae dig themselves shallowly into the soil near the host-plants, only those developed *e.g.* on horsetails growing in water swim to the shore to be buried in dry ground (they can also swim to neighboring plants in case of shortage of appropriate food at the place of oviposition). Larvae of species developing on grasses at dry places (*D. anthracinus*, *D. nitens*, *D. puncticollis* Thoms.) pupate in special chambers made of conglomerated soil (Photo 1).

In early spring, in cases of mass appearance of some species, places with numerous pupae can be easily found by looking for areas ploughed by wild boars, for whom they make a favourite dainty; in Poland also lapwings can serve as phenological determinant of the appearance of the representatives of the genus *Dolerus*: in March, and maybe also later, they make one of the main components of food of these birds.

Photo 1. Soil coccolith of *Dolerus nitens* Zaddach.

Assumptions, conditions, equipment and methods allowing to effectively breed species of the genus *Dolerus*[2]

- ✓ because of very early appearance of some species the appropriate room and equipment for the breeding should be arranged in the preceding autumn of winter;
- ✓ in autumn the amount of the breeding must be planned and appropriate host plants gathered; grasses, sedges or rushes of particular species should be transferred with rootstocks and soil to bowls of proper size and, so prepared, transported to the breeding rooms, or close to them where they will winter outdoors; plants kept in breeding rooms need not too frequent watering and in spring we already have numerous well grown, free of weeds, plants where females can oviposit; plant material kept outdoors should be after the winter season (late February) transferred to breeding rooms and treated like those having wintered indoors;
- ✓ sedge-inhabiting species do not require perforated bottoms of plastic bowls (Photo 2), thus throughout the development and wintering of larvae high humidity of subsoil is maintained, assuring perfect growth of sedges without disturbing larvae;

[2] Assumptions, conditions, equipment and methods, presented in this chapter, concern exclusively the author's rearings of *Dolerus* species living on sedges, grasses and rushes – those feeding on horsetails and common spikebrush have not been reared.

Photo 2

Photo 3

Photos 2-3. Bowls for cultivation of sedges, rushes and grasses and breeding larvae on them; 2 – bowl for species living on sedges and rushes; 3 – bowl for species living on grasses.

- ✓ bottoms of bowls for species living on grasses should be perforated (Photo 3) to allow natural outflow of surplus water both in winter and in laboratory conditions;
- ✓ breeding species living on rush *Juncus effusus* L. – least sensitive to the shortage or surplus of water – can be done so as in case of sedges, but it should be planted with large volume of soil from its original site;
- ✓ very important is the outer diameter of the bowl: it should exactly fit the inner diameter od breeding cylinder in which it is placed (Photo 4); it is especially essential when larvae finish feeding – eonymphs should not go out from the bowl but dig themselves within;
- ✓ breeding cylinders should be transparent to enable observation of *e.g.* feeding of imagines, oviposition *&c.*; glass cylinders are usable, but those made of Perspex are more convenient, light and unbreakable; after the introduction of imagines they should be covered with bolting-cloth or other material allowing free exchange of air (Photo 5); the height of cylinders depends upon that of host plants; those used by the author measured 40, 50 and 60 cm.

Photo 4

Photo 5

Photos 4-5. Perspex cylinders for breeding of *Dolerus* larvae

- ✓ one cylinder should contain only larvae from one female (so we can be sure that hatching males and females represent the same species, and larvae will not run short of food);
- ✓ as far as possible females caught in the field should be immediately put into cylinders; it must be remembered that in high external temperature transport should not last too long, and after putting females into cylinders plants should be sprinkled with water; so females will live much longer and lay more eggs;
- ✓ for species whose host plant is unknown fragments of grasses and sedges (with soil) from the site of collecting the female should be taken, and then it should be observed whether, and on which plant, eggs are being laid; this is unquestionably the most laborious and time-demanding, not always successful part of the breeding work;
- ✓ when all the larvae have dug themselves in a given bowl we remove the cylinder, cut the plants off, cover the bowl with bolting-cloth or other material permeable to air and humidity, properly describe (Photo 7) and, so protected, place for winter assuring against predatory invertebrates, birds, mammals and unwelcome humans (Photos 6-8); from April to August we check whether some *e.g.* second generation individuals hatched and, if necessary, cut off the growing plants;

Photo 6

Photo 7

Photo 8

Photos 6-8. Wintering of eonymphs; 6 – outdoor breeding and wintering ground for sawflies enclosed with fine-mesh stainless net; 7-8 – eonymphs in bowls waiting for spring under natural conditions.

- ✓ throughout the breeding season, from putting females on the plants to hatching of imagines next year, every information with the respective dates should be noted.

References

[1] Benson R. B. 1952. Handbooks for the identification of British insects. Hymenoptera. 2. Symphyta. Section (b). Vol. VI, part 2(b), Royal Entomological Society of London, London. pp. 51-137 + III-VI.

[2] Ermolenko V. M. 1975. Rogochvosti ta pil'ščiki. *Tentredopodibni* pil'ščiki. *Argidi. Diprionidi. Tentredinidi (Selandriini, Dolerini).* Fauna Ukraini, 10(3), 377 pp.

(Received 20 July 2017; accepted 06 August 2017)