

The ecology and biology of *Coleophora boreella* Benander, 1939 (Lepidoptera: Coleophoridae)

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The ecology and biology of *Coleophora boreella* Benander, 1939 are described. In Hailuoto, northern Finland, the food plant is *Sagina nodosa* (L.) Fenzl (Caryophyllaceae). The larva mines and feeds externally on the leaves and also feeds on seeds. The larval case is described and the taxonomic status of *C. sternipennella* group is briefly discussed.

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1. Introduction

Benander (1939) described a new case-bearing moth, *Coleophora boreella* Benander, 1939, from Jämtland, Sweden. This description was based on one male and one female specimen. Hackman (1945) reported the species from Finland (*Oa*: Pörtom) based on one female specimen. Since then, it has been recorded from several locations in Finland, Sweden, Norway and Denmark, one location in Estonia and one location in Poland (Nupponen & Junnilainen 1995, Baldizzone 1996). Additionally, one male specimen was caught on the Kola Peninsula. The species seems to be quite sporadic in its occurrence. The habitats from which the species has been found vary from seashores with very rich vegetation to hot, dry, sandy areas with sparse vegetation. Based on the genitalia, *C. boreella* belongs to the *C. sternipennella* group (see Benander 1939). These species generally live on various Chenopodiaceae, eating especially seeds (Benander 1939, Hackman 1945). Therefore, *Chenopodium* and *Atriplex* have also been suspected to be the food plants of *C. boreella*. Bengtsson (1989), how-

ever, assumed *C. boreella* to live either on *Gnaphalium sylvaticum* or *G. norvegicum* (Asteraceae), because no *Chenopodium* or *Atriplex* species were recorded in the habitat.

In this paper we describe the biology and larval case of *C. boreella* based on observations made in northern Finland. We follow the current taxonomy of *C. boreella* here, though the taxonomic status of different *C. boreella* populations may change in the future (unpublished work of B.W. and others).

2. Ecology of the adult moth

The author B.W. found a single male specimen of *C. boreella* in *Oba*: Hailuoto, the largest island of the northernmost part of the Gulf of Bothnia in the beginning of July 1996. The specimen was captured close to the seashore on a hot and dry sandy roadside bank. The photograph of the habitat is presented in Fig. 1. In 1997, he searched during the first days of July for the species in the same habitat and found adults swarming abun-



Fig. 1. The habitat of *Coleophora boreella* in Hailuoto. (Photo Bo Wikström)

dantly on a sunny afternoon. The specimens were swept by the net from and above the sparse vegetation. The time of swarming depends on the weather conditions and takes place during the daytime or in the night (summer nights are light at that latitude). The adult, especially female, is somewhat reluctant to fly. The males swarm low down and keep tightly inside the habitat patches. Such behaviour is typical to species living in open, windy habitats. Based on the experiences during 1997–2000 in Hailuoto, the average flight period lasts from the last week in June to the first (second?) week in July. The habitat is typical sandy terrain, with such dominating plant species as *Empertrum nigrum*, *Salix repens*, *Silene maritima* and *Juncus gerardi*, all of which occur abundantly on the coasts of the Bothnian Bay.

3. Larval case and biology

The larvae make a straight silken case covered by leaves or the leaf epidermis of the food plant and very fine sand particles. Frequently also slightly larger sand grains are found on the surface of the case. Typically, there are darker longitudinal stripes caused by the varying plant material and the silky parts (Fig. 2). The case ending is trivalved and the angle of mouth opening is 35°–45°. The length of the fully-grown case varies from 4.4 to 5.8 mm.

The larva feeds externally and mines the leaves of *Sagina nodosa*, which forms a tight rosette close

to the ground. It also eats the seeds. In general, the cases are not easy to find. The young case is buried deep into the leaf rosette. Due to the small size of the leaves and the fact that the larva normally feeds externally on the leaves, it is hard to see. When fully grown in August–September, the larva leaves the food plant and attaches the case to ground particles. The larva does not continue feeding in the spring. *Sagina nodosa* is distributed along the coasts of Finland. Some inland occurrences are known as well (Hämet-Ahti *et al.* 1984).

When we searched a similar habitat at *Om:* Siikajoki (grid 27°E 719:39) in 1999, we saw larvae there on *S. nodosa* also. Since they occurred in similar sandy habitat as in Hailuoto and in a similar way, we considered them to belong to *C. boreella*, although we did not ensure the species by rearing them to adult moths.

4. Taxonomic remarks

The author B.W. has studied the taxonomic status of *C. boreella* populations by examining the genitalia of a number of specimens collected from different localities in Finland, Sweden, Norway and Estonia. He has discovered differences in the structure of the genitalia. One must, however, bear in mind that the variation in genitalia may be extensive both locally and geographically (e.g. Itämies & Tabell 1997) and that minor differences

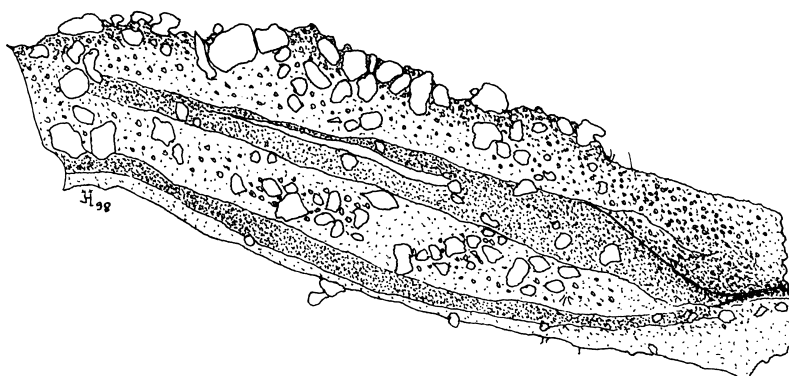


Fig. 2. The larval case of *Coleophora boreella* (Lepidoptera: Coleophoridae).

between geographically separate (allopatric) populations do not mean that they belong to different species in the sense of the biological species concept. The outer appearance and the size of the specimens also show remarkable variation. For instance, Benander (1939) states in his description that “helle Linien fehlen ganz, ebenso dunklere Schuppen” [light lines are missing like dark scales], while in the specimens from Hailuoto the forewings are quite abundantly covered by dark scales, forming a darker “stripe” in the fold. Benander also writes that the antennae are dark brown, and that it is possible to recognise some lighter spots in special illumination. The antennae of the specimens from Hailuoto are clearly white-ringed from the base to the apex.

The genitalia of the *C. sternipennella* group are very similar and difficult to separate from each other, particularly the female genitalia. Due to the fact that *C. boreella* is usually caught in low numbers in its localities and many of the specimens are worn, it is difficult to determine whether the differences in the genitalia and the outer appearance represent variation within the species, or whether *C. boreella* is actually composed of several closely related species. The poor quality of the genitalia preparates of the type specimens of *C. boreella* does not help to solve this problem. Therefore we strongly recommend that the larval cases and food plants should be investigated in

any location where *C. boreella* is found, not restricting the search only to *Sagina nodosa*. In any case, new records of larvae would help to define the taxonomic status of the different *C. boreella* populations.

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