

Remarks on the life history, female external appearance and conservation status of *Elachista vonschantzi* Svensson, 1976 (Lepidoptera, Elachistidae) in Fennoscandia

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Information on the life history of the moth species *Elachista vonschantzi* Svensson, 1976 is given. The larva mines the leaves of the grass species *Calamagrostis stricta*. The mine is typical of the genus. Both the mine and the pupa are figured. The reared female is photographed and its external appearance is described and compared with the earlier descriptions of the species and closely related species occurring in the same area. The conservation status of the species in Fennoscandia area is briefly discussed.

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Introduction

The description of *Elachista vonschantzi* Svensson, 1976 was based on 28 male and two female specimens collected in three seashore meadows in the provinces of Nb and Ång on the northeastern coast of Sweden (Svensson 1976a). Soon after that the species was also reported in the Finnish province of Oba (Kyrki & Tokola 1980). These findings were made on the largest island in the Gulf of Bothnia, Hailuoto (65°N, 24°E), where dozens of specimens were collected by several lepidopterists during a field meeting. Since then the species have been found fairly regularly in that locality. However, despite many attempts apparently only one new Finnish locality has been discovered since its original discovery in Finland (Oba: Oulu, in the vicinity of Hailuoto, unpublished record). Three additional localities have been found since the description of the species in Sweden (Ryrholm & Ohlson 1999, 2002,

N. Ryrholm pers. comm.). There may be several reasons for its apparent rarity. Adult moths are normally difficult to obtain which is due to their cryptic living habits and short flight period. The species seems to have strict habitat requirements as well. It is possible that the occurrence of the species is restricted to the Gulf of Bothnia coasts in the Fennoscandia area as no records have been made, for example on the south coast of Finland despite many investigations by several microl-epidopterists.

The aim of this paper is to briefly describe the hitherto unknown life history of *E. vonschantzi* as well as clarify the female external appearance. The descriptions are based on one reared female specimen and a few empty mines. Furthermore, I briefly discuss the conservation status of the species in Fennoscandia.



Figure 1. a) The mine of *Elachista vonschantzi* on *Calamagrostis stricta*. b) The pupal skin of *Elachista vonschantzi*.

a) Minan av kustgräsminerarmalen som görs i maddrör (*Calamagrostis stricta*). b) Puppskal efter kustgräsminerarmal.

Ecology and life history

The biotopes in which the imagines have been found are sandy or gravelly seashore areas (Svensson 1976a) or wet seashore meadows (Finland) with the dominant grass species being *Calamagrostis stricta* (=neglecta). Adults have been observed swarming above this plant in both Sweden (Svensson 1976a) and Finland mainly in the first part of July. Therefore *C. stricta* was postulated by Svensson (1976a, 1976b) to be the food plant of *E. vonschantzi*. The daily swarming time in Sweden has been reported to be at dusk (Svensson 1976a, 1976b) while in Finland adults have been seen on wing at dawn as well. Female specimens are difficult to obtain. In Finland they have been caught mainly by sweeping the vegetation with the net at dawn. Due to the frequent dampness of the vegetation at dawn, net sweeping is often not possible.

Early in the summer of 2000 I visited the Hailuoto locality several times in order to search for the larva of *E. vonschantzi*. A further investigative trip was carried out with the assistance of Juhani Itämies in 2001. Since adults fly approx. from the end of June to the middle of July, depending on the annual weather conditions, I assumed that the larvae continue feeding in the spring. Eventually, on the third trip as late as 12 June 2000, I succeeded in finding three mining larvae and some empty mines from the leaves of *C. stricta*. The grass was still growing being about 20-30 cm tall. Two of the larvae were parasitized by the ichneumonid wasp *Meloboris alternans* (Gravenhorst, 1929), which emerged from one of the larvae. This was somewhat surprising, because my own previous *Elachista* breedings have always yielded only braconid wasps. The third larva pupated and an adult *E. vonschantzi* female soon hatched. The pupa period lasted only about six days. The mine (Fig. 1a) is very typical of the genus. The larva starts mining near the tip of the leaf and mines downward. The mine soon widens, occupying the whole width of the leaf. The mines are about five to ten centimeters long. The frass is scattered almost evenly in the mine. Obviously the larva is nearly full-grown when it continues its feeding in the spring. Before pupating the larva leaves the mine. The pupa is dark purple with conspicuous, light longitudinal ridges (Fig. 1b) and is attached to the blade by a single girdle in a way used in most elachistids. The mines were found predominantly in the wetter part of the meadow near the sea or even on plants growing in the seawater. In natural conditions no pupae were found on the mined leaves, even on leaves of plants totally surrounded by seawater. Therefore, pupating larva seems to move away from the mined leaf and is probably able to swim or float. Every larva found was parasitized in 2001. Despite extensive searching the number of mines discovered was very low although the moth was found swarming very abundantly in exactly the same locality in the summer of 2000 (Kari Vaalamo pers. comm.). Therefore I assume the species has some alternative phenological strategy. It is possible that most larvae become full-grown already in the autumn, but this possibility was not checked in the field.



Figure 2. The reared female of *Elachista vonschantzi* (Finland, Oba: Hailuoto 721:40, ex larva 12.06.2000, M. Mutanen leg.).

Det kläckta exemplaret av kustgräsminerarmal som omtalas i texten.

External appearance of the female

The female of *E. vonschantzi* can be identified by the presence of many brown scales on forewing and thorax. The reared female differs slightly from descriptions by Svensson (1976a, 1976b) and Traugott-Olsen & Schmidt Nielsen (1977) (Fig. 2), but is in relatively good accordance with an other female specimen (B. Å. Bentsson leg.). The differences may be due to the slight discoloration or phenotypic variation. The later possibility cannot properly be evaluated, because the total number of females is very low. In the reared female individual the costal and tornal spots are not confluent, like in female specimen described in Traugott-Olsen & Schmidt Nielsen (1977). The inner fascia clearly bends outward in the middle, resembling that of *E. pomerana* Frey, 1870. It is, however, much darker, almost black, and also smaller than *E. vonschantzi*. The *E. vonschantzi* female is relatively large; the wingspan of the reared female individual is about 9 mm. Other black and white elachistids present in the same area are *E. eskoi* Kyrki & Karvonen 1985, *E. krogeri* Svensson, 1976 and *E. serricornis* Stainton, 1854, which, however, are confined to the meadow strips near the water where sedge is growing. In Finnish localities (incl. Hailuoto near the *E. vonschantzi* locality) *E. krogeri* is very tightly confined to *Carex aquatilis* stands. These three species can be distinguished from *E. vonschantzi* on the basis of their different wing patterns and genitalia (see Traugott-Olsen & Schmidt Nielsen 1977).

Conservation status in Fennoscandia

E. vonschantzi is considered an endangered species (EN) in Finland (Rassi *et al.* 2001) but not in Sweden (Gärdenfors 2000). This is surprising considering the low number of known populations and its current status as an endemic species restricted to the coast of Gulf of Bothnia. As the species is cryptic in its living habits and is thus probably overlooked, the actual number of populations is undoubtedly much larger than the number of presently known localities. However, although there still are many suitable meadows for the species, the amount seashore meadows have strongly decreased in Finland and presumably also Sweden. This is due to the dying traditions of seashore pasturing and grass mowing as well as overall eutrophication of the Gulf of Bothnia, which altogether have caused the reed (*Phragmites australis*) to invade species-rich coastal meadows. Apparently all observations on the species are confined to *C. stricta*, so the species is probably monophagous on this plant species.

Discussion

The food plant of *E. vonschantzi* is spread along the coast of Gulf of Bothnia, but is rare and often scarce inland in Finland. The food plant is widespread in northeastern Europe, and ranges through northern Siberia and northern parts of North America (Hultén & Fries 1986). As the plant prefers sea coasts and as no findings are known in southern Fennoscandia and Finland inland, I presume that *E. vonschantzi* belongs to the certain group of animals and plants that occur along the coasts of the Gulf of Bothnia as relict species from the late Ice Age, when there was a sea connection with the White Sea. Therefore the main distribution area of *E. vonschantzi* may be situated along the coasts of the Arctic Ocean and/or Northern Russia. No records have been made there, but the fauna of the northern Russia is still relatively poorly known. In any case, further investigations are required to shed light on its actual distribution.

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Sammanfattning

Elachista vonshantzi – kustgräsminerarmalen – har bara påträffats på några få lokaler i hela världen, alla runt Bottenviken i Sverige och Finland. Artens utvecklingshistoria har tidigare varit okänd. Larverna minerar bladen av madrör (*Calamagrostis stricta*) i början av juni och troligen även redan under hösten. Minan och puppan är typiska för släktet. Artens habitat utgörs av havsstrandängar och den är svår att hitta. Honans vingteckning avviker något från vad som angivits tidigare. Arten anses vara hotad i Finland men inte i Sverige. Detta är förvånande mot bakgrund av artens endemiska status och den snabba minskningen av öppna havsstrandängar i Bottenviksområdet.

Amiralen - en flyttfjäril

Under de första varma dagarna på försommaren brukar man kunna få se de första amiralerna och tistelfjärilarna för säsongen. De migrerar hit från södern genom att följa med varma luftströmmar. Att så sker har varit känt rätt länge. Man har dock haft svårt att förklara varför dessa (och en del andra) fjärilar betar sig så här. Eftersom man inte har kunnat observera någon återflyttning borde evolutionen ha selekterat bort ett sådant beteende som inte ger någon avkomma.

I en alldeles färsk uppsats (Mikkola 2003) visar det sig dock att amiralerna migrerar söderut också. I Finland har bl.a. ornitologer under 1990-talet systematiskt observerat migrerande fjärilar samtidigt som man spanat efter fågel. Främst har man stått på Finlands SV spets, på Porkkala och iakttagit. Man har även observerat fjärilarna på meteorologernas radar.

Även på vägen söderut tar fjärilarna hjälp av lämpliga vindar, dvs vindar från norr. I stort sett

varje år sedan 1994 har man sett från några hundra till tusentals amiraler lämna iväg över havet söderut. Rekordet är från den 20 september 1998 då ett Atlantiskt högtryck vuxit upp över Fennoskandien och tillsammans med ett lågtryck över Ryssland gett stabila nordvindar i soligt väder. Man uppskattar att ca 100 000 amiraler gav sig iväg. Många av dem flög på hög höjd, upp till 2000m, vilket man dels såg då man spanade efter högflygande tranor i teleskop dels såg på radarn.

Amiralen tycks alltså vara en flyttfjäril, såsom monarkerna i nordamerika.

Litteratur

- Mikkola, K. 2003. Red admirals *Vanessa atalanta* (Lepidoptera:Nymphalidae) select northern wind on southward migration. – Ent. Fenn. 14: 15-24.

Mats Jonsell