

## ***Endothenia oblongana* and *E. marginana* (Lepidoptera, Tortricidae) in Finland, with description of a new subspecies**

**Erkki M. Laasonen & Leena Laasonen**

Laasonen, E. M. & Laasonen, L. 1995: *Endothenia oblongana* and *E. marginana* (Lepidoptera, Tortricidae) in Finland, with description of a new subspecies. — Entomol. Fennica 5:189–196.

The Finnish *Endothenia* sp. called *E. gentianaeana* (Hübner) for more than a hundred years is shown to be *E. oblongana* (Haworth), a species occurring also in the other Nordic countries. To our knowledge, *E. marginana* (Haworth) has a discontinuous distribution in Finland, Sweden, and East Karelia. On the basis of the distribution and differences in appearance a new subspecies *Endothenia marginana tarandina* ssp. n. is described, with data on its biology.

*Laasonen, E. M., Department of Clinical Medicine, Tampere University, P.O.Box 607, FIN-33101 Tampere, Finland*

*Laasonen, L., IVth Department of Medicine, Helsinki University Central Hospital, Unioninkatu 38, FIN-00170, Helsinki, Finland*

*Received 19 May 1993, accepted 10 February 1994*

### **1. Introduction**

Two different problems are addressed in this paper.

*Endothenia gentianaeana* (Hübner) is reported from Finland (Anonymous 1935, Varis & al. 1987), from Russian Karelia (Tengström 1869, Petri Martikainen, pers. comm 1993), and from Estonia (Martin 1991), while only *E. oblongana* (Hw.), but not *E. gentianaeana*, is reported from Sweden (Svensson & al. 1987), Norway (Opheim 1976), and Denmark (Karsholt & al. 1985). In addition, in western Europe *E. gentianaeana* seems to be a more southern species than *E. oblongana* (Bentinck & Diakonoff 1968, Bradley & al. 1979, Hannemann 1961, Lempke 1984, Razowski 1983). Could it be possible that in the east *E. gentianaeana* reaches further northwards than *E. oblongana* (Petersen 1924, Zaguljajev & al 1978), or are the Finnish specimens incorrectly determined?

*E. marginana* (Haworth) is discontinuously distributed, with a southern and a northern population in both Finland and Sweden (Kyrki 1978, Kyrki 1979, Svensson 1981, Kyrki & Tabell 1984, Svensson & al. 1987). The populations show external differences (Opheim 1970, Kyrki & Tokola 1980, Svensson 1981). The southern specimens have mainly been collected with continuous light-trapping and only a few females have been caught in Finland during the last few decades. Very few moths have been found in the north, in spite of the yearly netting efforts of active expert amateurs (Kyrki & Tokola 1984). Shortage of material has thus been the main obstacle for further studies. We succeeded, however, in rearing over 50 individuals of *E. marginana* from the north, which made a study of the differences between the two populations possible.

## 2. *Endothenia oblongana* or *E. gentianaeanana*?

### Material studied

*Endothenia* sp. from southern Finland: 1♂, 1♀ *Ta*, Nastola, coll. Helsinki University Zoological Museum (ZMUH); 30♂♂, 27♀♀ *Kl*: Parikkala and *Kb*: Kitee, Tohmajärvi, Ilomantsi, and Liperi. 4♂ and 2♀♀ with genital preparations.

*E. oblongana* from Denmark: 1♂, *SZ*: V Egesberg; 1♀ *B*: Hammeren; 5♂, 4♀ (genital preparates only).

*E. gentianaeanana* from Western Germany: 2♂♂, 5♀♀ Eifel, Rheinland, Irrel; 1♂ Harz; 2♀♀ Württemberg Markgröningen; all reared from *Dipsacus* sp.; 1♂ Germania, Staudinger leg. The last three from ZMUH. 2♂♂ and 3♀♀ with genital preparations.

The characters distinguishing *E. oblongana* in the wings (Bradley & al. 1979) (Fig. 1), as well as in the male (Opheim 1970) and female genitalia (Fig. 3), are listed in Table 1. On the basis of these characters the southern Finnish *Endothenia* appear to be *E. oblongana*, as in the other Nordic countries. Some specimens did not

possess all the typical characters. The Finnish population differs, however, in certain respects from the others. The ground colour near the termen is white in half of the moths and slightly ochreous in the other half. The Finnish *E. oblongana* seems to have grey hindwings, in 27 % of the cases with a paler base. In another 27 %, there is a slightly darker grey border in the hindwings, but a grey base. The remaining half has uniformly grey hindwings.

The Finnish *E. oblongana* have been reared from *Knautia arvensis* (L.) Coulter. *Dipsacus fullonum* L., the host plant of *E. gentianaeanana* (Bradley & al. 1979) — or any other *Dipsacus* spp. — do not grow wild in Finland (Hämet-Ahti & al. 1986).

## 3. *Endothenia marginana* and its subspecies

### Material studied

*Southern material*: 23♂♂, 4♀ *Al*: Eckerö, *Ab*: Hiittinen, *N*: Tammisaari, Helsinki, and Porvoo, *Ka*: Kymi and Virolahti; 1♂ Sweden, *Öl*: Resmo; 1♂ Estonia, Pölvä, Veski; 1♂ Russian Karelia,

Table 1: Characters on the wings (Bradley & al. 1979), on male genitalia (Opheim 1970.) and female genitalia (our data) indicating *Endothenia oblongana* before *E. gentianaeanana*. The presence of a character is related to the number of specimens studied.

Character	<i>E. gentianaeanana</i> from Germany	<i>Endothenia</i> sp. from Finland	<i>E. oblongana</i> from Denmark
<i>Wings</i>			
The apical area more broadly suffused with fuscous	1/11	88 % (52/59)	1/2
Pale grey patch on the tornus small	2/11	85 % (50/ 59)	2/2
The subterminal fascia dilated in the upper part	2/11	76 % (45/59)	2/2
The subterminal fascia contains black dots	3/11	76 % (45/59)	1/2
White ground colour without ochreous tinge	0/11	47 % (27/59)	2/2
Hindwings pale basally	10/11	27 % (11/41)	2/2
<i>Male genitalia</i>			
Uncus rounded	0/2	4/4	5/5
Socii thin	0/2	4/4	3/5
Socii acute angular	0/2	2/4	5/5
The spiny lobe in sacculus slender	0/2	2/4	4/5
<i>Female genitalia</i>			
Antrum as long as sterigma (In <i>E. gentianaeanana</i> roughly 1:2)	0/3	2/2	4/4
Sterigma slender	1/3	2/2	3/4

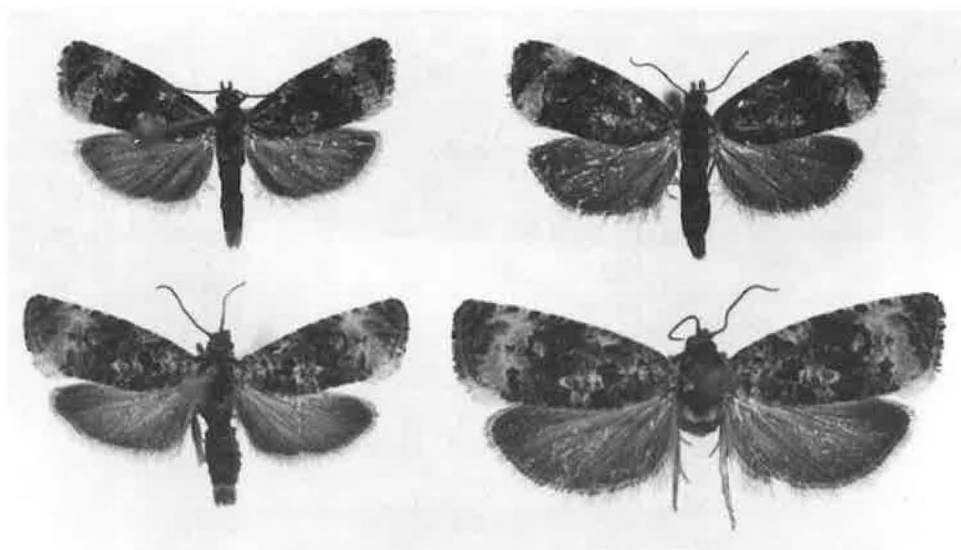


Fig. 1. Upper row, a pair of *Endothenia oblongana* (Haworth) from Finland: PK Kitee, 688:65, K. Saloranta leg. To the left a male caught 28.6. 1990 and to the right a female caught 10.7. 1990. Lower row, a pair of *E. gentianaeana* (Hübner) from West Germany. To the left a male from Harz, reared IV 1990 from *Dipsacus* sp., U. Seneca leg. and to the right a female from Eifel, Rheinland: Irrel, 27.XI 1987, Ia. Dipsacus, K. Larsen leg.

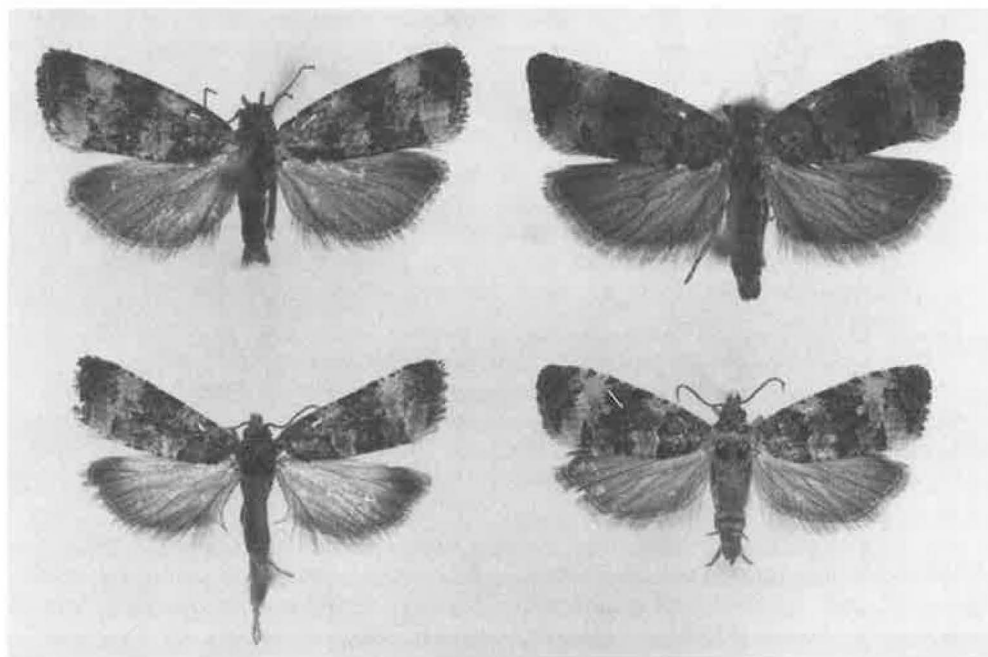


Fig. 2. Upper row, a pair of *Endothenia marginana tarandina* ssp. n. from northernmost Finland. To the left a male labelled: Fennia, Li: Inari 760:54, KJ. POHJ. ♂, 10.7.1992, E. & L. Laasonen leg (the holotype). The leaden blue colour on white areas does not reproduce very well in the black-and-white picture. There is no sexual dimorphism, either when reared specimens are compared with each other, or when moths caught on the wing are compared. Lower row, a pair of *E. marginana marginana* (Haworth) from southern Finland. To the left a male from Ka: Virolahti, 671:54 ♂, 16.–24. 7. 1973, E. M. Laasonen leg. and to the right a female from U: Tammisaari 663:30 Jussarö, 26.6.–3.7.1992, T. & K. Nupponen leg.

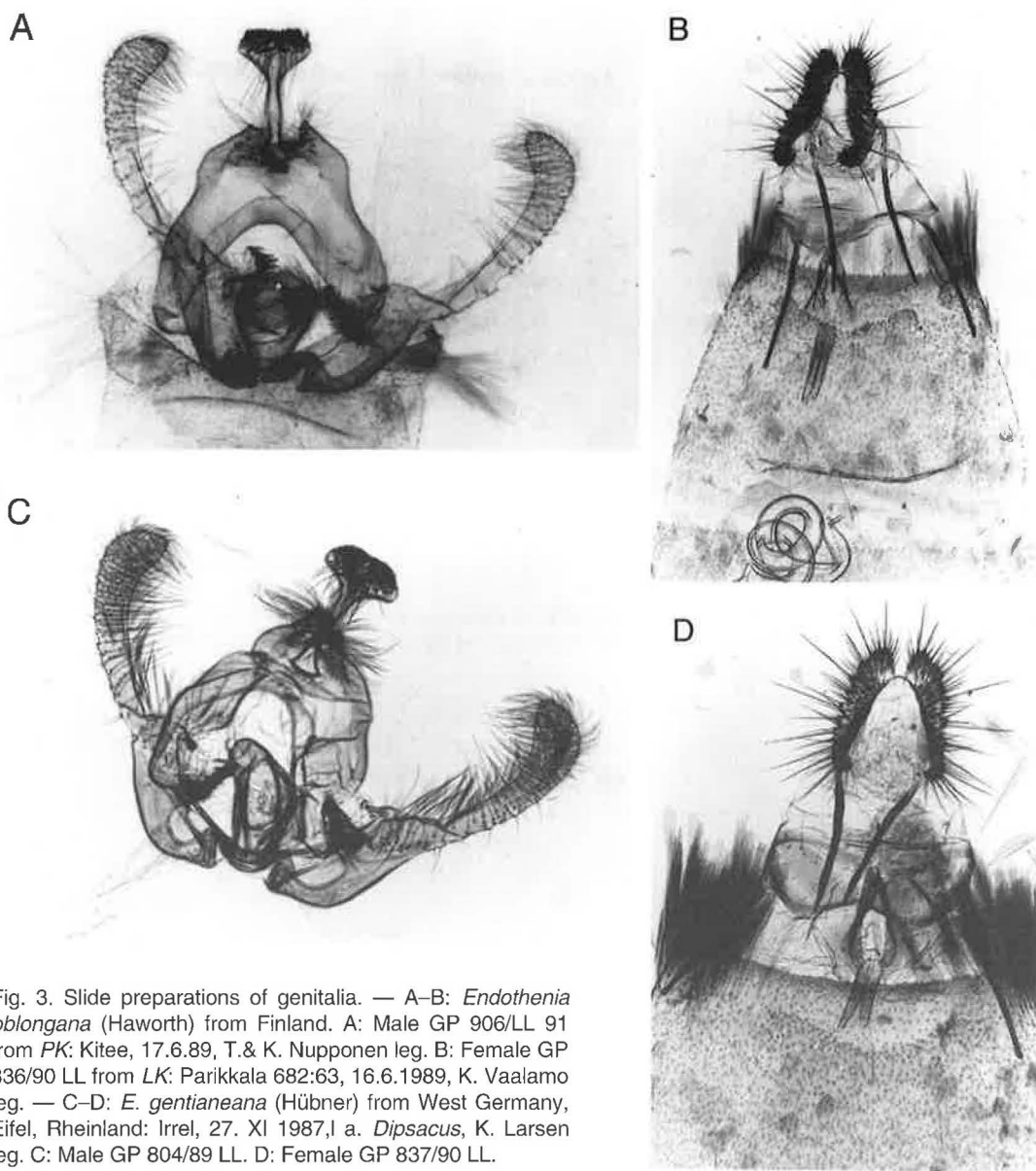


Fig. 3. Slide preparations of genitalia. — A–B: *Endothenia oblongana* (Haworth) from Finland. A: Male GP 906/LL 91 from PK: Kitee, 17.6.89, T. & K. Nupponen leg. B: Female GP 836/90 LL from LK: Parikkala 682:63, 16.6.1989, K. Vaalamo leg. — C–D: *E. gentianeana* (Hübner) from West Germany, Eifel, Rheinland: Irrel, 27. XI 1987, I a. *Dipsacus*, K. Larsen leg. C: Male GP 804/89 LL. D: Female GP 837/90 LL.

*Kl*: Käkisalmi; 1♂, 2♀♀ East Carelia, *Kol*: Vitele, Petrosawodsk, and Tjudi; 1♀ “Germ.mer.”, Staudinger leg.; 1♀ Slovakia, Kiarov; 1♀ France, Bordeaux, Pessac. 9♂♂ and 7♀♀ with genital preparations.

*Northern material*: 1♂ *Om*: Ruukki; 2♂♂, 2♀♀ *Ob*: Hailuoto, Oulunsalo, and Pudasjärvi; 2♂♂, 1♀ caught with a net, *Li*: Inari 760:54 Kattajärvi and Inari 7653:558 Suovaselkäjärvi; 38♂♂, 17♀♀ reared, *Li* Inari 760:54, Kattajärvi;

5♂♂, 2♀♀ Russia, Kola Peninsula, Apatity and Luvenga, ZMUH. 6♂♂ and 6♀♀ with genital preparations.

*Endothenia marginana tarandina* ssp. n.

Type material: Holotype male, labelled SUOMI, *Li*: Inari 760:54, KJ. POHJ. ♂, 10.7.1992, E. & L. Laasonen leg. (in Coll. ZMUH). — Paratypes 12♂♂, 11♀♀ with label FENNIA, *Li*: Inari

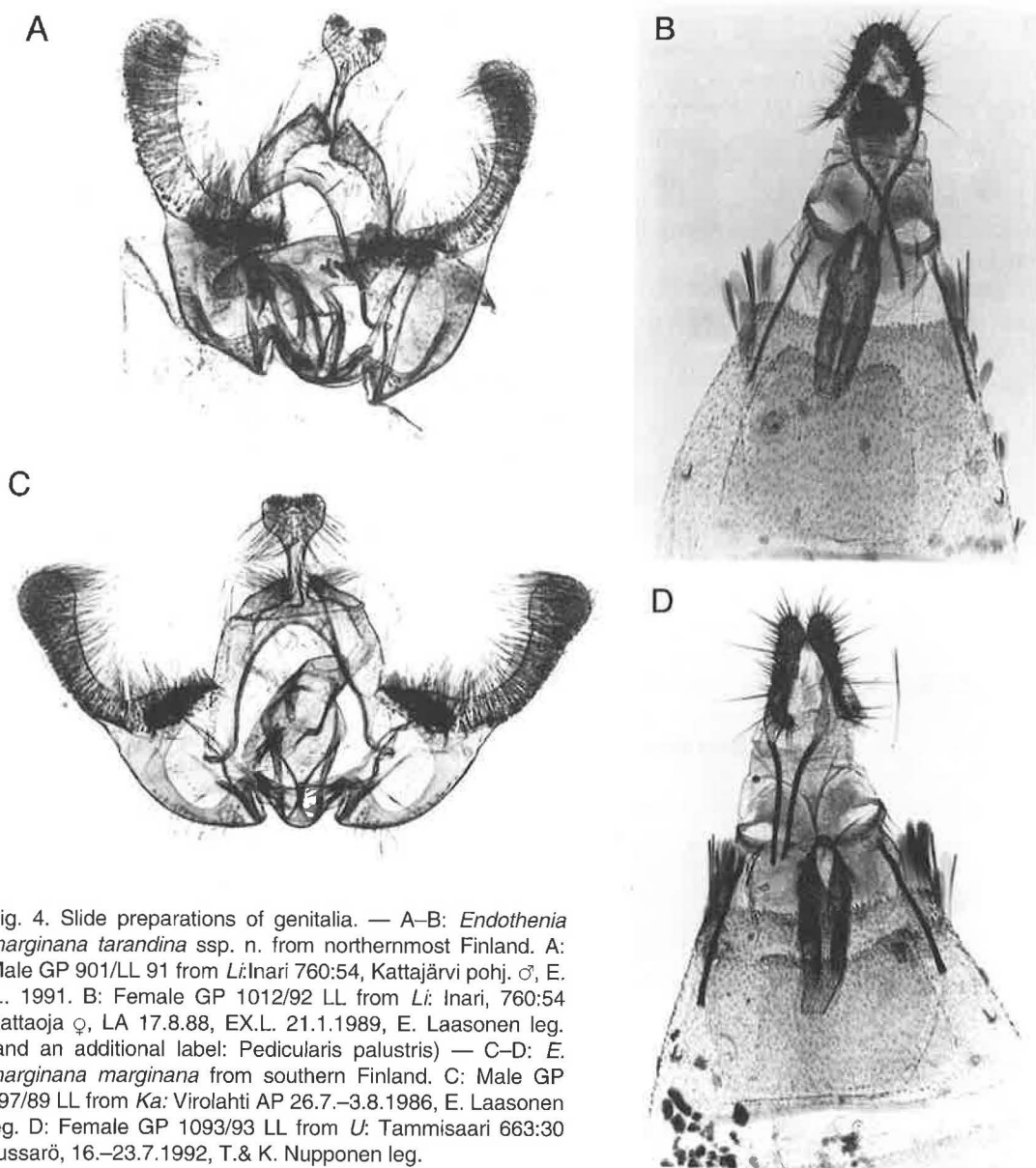


Fig. 4. Slide preparations of genitalia. — A–B: *Endothenia marginana tarandina* ssp. n. from northernmost Finland. A: Male GP 901/LL 91 from *Li*: Inari 760:54, Kattajärvi pohj. ♂, E. L. 1991. B: Female GP 1012/92 LL from *Li*: Inari, 760:54 Kattaoja ♀, LA 17.8.88, EX.L. 21.1.1989, E. Laasonen leg. (and an additional label: *Pedicularis palustris*) — C–D: *E. marginana marginana* from southern Finland. C: Male GP 797/89 LL from *Ka*: Virolahti AP 26.7.–3.8.1986, E. Laasonen leg. D: Female GP 1093/93 LL from *U*: Tammisaari 663:30 Jussarö, 16.–23.7.1992, T. & K. Nupponen leg.

760:54, K.J. Pohj., ♂ (or ♀) E.L. 1991, E. & L. Laasonen leg., five of these (2♂♂, 3♀♀) with additional label indicating genital prepapate (GP 899/91 LL, 900/91, 903/91, 904/91, or 1078/93, respectively), END.♂ (or ♀), *marginana*. All paratypes in private collections.

On open wet peat bogs the food plant of the moth, *Pedicularis palustris*, grows along paths made by reindeer (*Rangifer tarandus*), or any other area in which the thick *Carex* vegetation is

torn. From here comes the etymology of the name *tarandina*.

**Diagnosis.** The wing characters distinguishing the northern Finnish subspecies from the southern one are presented in Table 2. An overall impression of the northern specimens is larger size and darker coloration, caused by a leaden bluish-grey colour covering those areas which are white in the southern specimens (Fig. 2). The uniformly dark grey hindwings in the northern

specimens differ from those of the southern one, too. No significant differences could be found between the two subspecies in the male or female genitalia (Fig. 4), but in two out of the six male genital preparations the northern specimens had a small smooth indentation in the distal middle of the inner arc formed by the tegumen and pedunculi, a characteristic not found in the nine southern genital preparations.

*Description.* Wingspan 14.0–15.0 mm. Frons and most of labial palpi beige. Tips of palpi, neck tufts, and antennae brown. In males antennae with hairy ciliation and in females faintly downy. Anterior half of thorax dark brown, posterior part either beige, brown or dark brown. Abdomen dorsally brown, laterally and ventrally with beige rings, usually more conspicuous in females. Anal tufts brown. Legs brown with beige rings in tarsi. In addition, middle and hindlegs may have a beige anterior part of the tibiae or even totally beige tibiae — more so in females. Ground colour of forewings bluish grey. Between subbasal and medial fasciae, as well as beyond medial fascia this ground colour is darker, being a leaden bluish grey. In discocellular spots the bluish grey varies from light to relatively intense leaden bluish grey. Fasciae, other markings, and

ciliae brownish black. Hindwings dark greyish brown, sometimes with faintly paler base.

The main variations are the amount of beige colouration in posterior thorax, in the ventral abdominal rings, and in the legs; the amount of leaden blue in discocellular spots; and the occasional presence of slightly paler base of hind wings. With time specimens in collections seem to become “browned”. The blue and violet shades are replaced by dull greyish brown and the white colours gain some ochreous tinge. This is a problem which can only be overcome by comparing fresh material.

#### *Biology, habitats and distribution of the two subspecies*

We have reared *E. marginana tarandina* from *Pedicularis palustris* collected from mid August to mid September from the peat bogs around Lake Kattajärvi in Inari. The plants containing a larva were about 5 cm shorter than the others, and the upper end of their stem was slightly tortuous. This is perhaps caused by the small larva living first within the stem. The full-grown larva reveals itself by frass filling the seed capsules, which are open at the top. Several capsules

Table 2. The wing patterns of *Endothenia marginana marginana* (from Bradley & al.) and the characters by which *E. marginana tarandina* ssp. n. differs from the former.

Characters	ssp. <i>marginana</i>	ssp. <i>tarandina</i>
Wing span (own material)	12.0 - 13.5 mm	caught as imagines: 14.0, 14.0 & 15.0 mm all: 12.5 - 15.0 mm
Mean of the wing span (own material)	12.4 mm	13.5 mm
Ground colour of the forewings	white/whitish	bluish grey
Discocellular spot on outer margin	whitish	bluish grey, ± light
Narrow band beyond the median fascia	whitish	leaden bluish grey
Ground colour between subbasal and medial fasciae	violaceous grey	leaden bluish grey
Fasciae and markings	ferruginous-brown and suffused with grey	brownish black
Apical area	broadly suffused with fuscous	black, with a leaden bluish grey subterminal fascia
Cilia	ochreous white, grey and fuscous	brownish black
Hindwings	basally white	dark greybrown, ± faintly paler at base
Sexual dimorphism	female sometimes slightly darker; hind wings dark grey	none

in the same already dried plant may contain frass, and we assume — because of the slightly varying size of the frass — that the larva uses seeds in several capsules for its nourishment. It pupates in the autumn within the capsule, and the plant most often remains erect within the snow on the open bog. *Pedicularis* occurs on the open areas of the bog where *Carex* and *Eriophorum*, but no shrubs or bushes, grow. These areas are flooded with very cold water in spring and early summer. We assume that *E. marginana tarandina* has a one-year developmental cycle. It has been observed flying from 28th June to 14th July — in the Kola peninsula even up to 25th July. This flight-time corresponds best to the flight-times of the “high summer” species in the north, and naturally may vary from year to year, by up to four weeks. Of the three moths we caught with a net, one was on the wing at midnight, and the two others were disturbed from rest on a cloudy day.

*E. marginana marginana* from southern Finland flies between 19th June and 17th August. In 1980 flying moths were observed 13–19th June and 3–9th August (Ilkka Kontuniemi, pers. comm.). Evidently there was a second brood that year.

*E. marginana tarandina* lives in the north in two types of habitats. Our observations are from the moistest areas of open, wet peat bogs, with only *Carex* spp. and *Eriophorum* spp. These bogs were not associated with big water bodies. In Finland such a habitat occurs in the biogeographical provinces *Ks* and *InL*, as well as in *Apatity* on the Kola Peninsula. We assume that in Sweden such a biotope occurs in the provinces *Hr*, *Jä*, *Nb*: *Pajala*, and *To* (Opheim 1970, Svensson 1981). *E. marginana tarandina* also lives around the northern end of the Gulf of Bothnia: in Finland in the provinces *Om*, *Oba*, and *Obb*; as well as on the Kola Peninsula at *Luvenga*, on the coast of the White Sea. In Sweden the provinces *Ån* and *Vb* possibly represent this type of habitat (Svensson & al. 1987).

This second habitat resembles the one of the southern subspecies *E. marginana marginana*, which in the south lives along the coasts of the Gulf of Finland, the Baltic Sea, and the Kattegatt, i.e. in the Finnish biogeographical provinces *Al*, *Ab*, *N*, and *Ka*, and in the Swedish provinces from *Sk* to *Sö*. A big lake seems to serve as well as the sea. The find from *Ab* Lohja on the shore

of Lake Lohja, as well as the finds from Karelia along the shores of Lake Ladoga (Käkisalmi and Vitele) and Lake Onega (Petrosawodsk and Tjudi), all represent this habitat.

#### 4. Discussion

Varying observations on the host plants and habitats are presented in the literature (Benander 1950, van Deurs 1956, Opheim 1970; Zaguljajev & al. 1978, Palm 1982). Our observations conform best with those presented in three recent papers (Bradley & al. 1979, Lempke 1984, Razowski 1983). The host plants of *E. gentianaeanae* are *Dipsacus* spp., and the habitat preferably moist and open places. *E. oblongana* has a multitude of host plants: Dipsacaceae, i.e. *Knautia* in Finland, Lamiaceae, Scrophulariaceae, Asteraceae, etc. The habitat is warm dry meadows, waysides and ruderate areas. The third species, *E. marginana*, lives according to the literature on Lamiaceae and especially on *Pedicularis* spp., in moist places. The host plant of the southern subspecies *E. marginana marginana* in Fennoscandia is unknown; it may have a host plant other than *Pedicularis* (Svensson, pers. comm. 1993).

Our observations on the variation of the colour of the hindwings in Finnish *E. oblongana* and in different subspecies of *E. marginana* calls for a revision of the use of this character in the keys and diagnoses for *Endothenia* (Bradley & al. 1979, Opheim 1970, Zaguljajev & al. 1978).

Many unsolved problems remain. Discontinuous distribution and differences in appearance are the main basis of the description of the new subspecies. The finds of *E. marginana* seem to be discontinuous in East Karelia, Finland, and Sweden, but further field studies are needed along the coasts, as well as in the moistest inland peat bogs, to prove the reality of this discontinuity. At least the southern leg continues far inland to the east to the Altai mountains and even further (Kuznetsov & Jalava 1988), but nothing is known about the eastward extension of the northern leg. We did not find — like many Fennoscandian experts before us — any good differences in the genitalia. Bruun (pers. comm. 1993) reports interesting differences between the two subspecies in the form and size of scales on the upper side of

the forewing. The identity of the *Endothenia* spp. in the three Baltic countries and St. Petersburg area and the northern limit of the true *E. gentianaena* there are also unknown.

*Acknowledgements.* The following persons have helped us with constructive ideas or useful entomological material: Prof. Henrik Bruun, Assoc. prof. Juhani Itämiies, Mr. Jukka Jalava, Mr. Lauri Kaila, Dr. Ole Karsholt, Mr. Ilkka Kontuniemi, Prof. Harry Krogerus, Dr. Knud Larsen, Messrs Petri Martikainen, Kari and Timo Nupponen, Osmo Peltonen, Ingvar Svensson, Reijo Teriaho, and Kari Vaalamo. Our sincere thanks to all of them.

## References

- Anon. 1935: Enumeratio Insectorum Fenniae. I. Lepidoptera. 2. Microlepidoptera (excl. Pyralidae). — Helsinki. 12 pp.
- Benander, P. 1950: Fjärilar Lepidoptera, Småfjärilar Microlepidoptera. Andra familjgruppen: Vecklare-fjärilar Tortricina. — Svensk Insektafauna 10: 1–173.
- Graaf Bentinck, G. A. & Diakonoff, A. 1968: De Nederlandse Bladrollers (Tortricidae). — Monogr. Nederl. Entomol. Ver. 3: 1–201.
- Bradley, J. D., Tremewan, W. G. & Smith, A. 1979: The British Tortricoid Moths. Tortricidae: Olethreutinae — London. 336 pp.
- van Deurs, W. 1956: Sommerfugle VIII: Viklere. — Danmarks Fauna 61: 1–292.
- Hannemann, H. — J. 1961: Kleinschmetterlinge oder Microlepidoptera I Die Wickler (s. str.) (Tortricidae) — Tierwelt Deutschlands 48: 1–233.
- Hämet-Ahti, L., Suominen, J., Ulvinen, T., Uotila, P. & Vuokko, S. 1986: Retkeilykasvio. 3rd ed. — Helsinki. 596 pp.
- Karsholt, O., Kristensen, N. P., Kaaber, S., Larsen, K., Schmidt Nielsen, E., Palm, E., Schnack, K., Skou, P. & Skule, B. 1985: Katalog over de danske Sommerfugle. — Entomol. Meddel. 52: 1–163.
- Kuznetsov, V. I. & Jalava, J. 1988: Soviet-Finnish entomological expeditions to Southern Siberia 1982–1984. 2 Tortricidae (Lepidoptera). — Nota Lepidopterol. 11: 126–138.
- Kyrki, J. 1978: Suomen pikkuperhosten levinneisyys. I. Luonnontieteellisten maakuntien lajisto (Lepidoptera: Micropterigidae – Pterophoridae) — Notulae Entomol. 58: 37–67.
- 1979: Suomen pikkuperhosten levinneisyys. II. Lisäyksiä luonnontieteellisten maakuntien lajistoon (Lepidoptera: Micropterigidae – Pterophoridae). — Notulae Entomol. 59: 125–131.
- Kyrki, J. & Tokola, P. 1980: Hailuodon perhosfauna pikkuperhoskokouksen 27.6.–1.7.1979 aikana. — Baptria 5: 17–30.
- Kyrki, J. & Tabell, J. 1984: Lisäyksiä Suomen luonnontieteellisten maakuntien pikkuperhoslajistoon (Lepidoptera: Micropterigidae — Pterophoridae). — Notulae Entomol. 64: 134–144.
- Laasonen, E. M. & Laasonen, L. 1991: *Endothenia gentianaena*? Tarvitsemme apua. — Baptria 16: 60–61.
- Lempke, B. J. 1984: *Endothenia gentianaena* (Hubner) en *E. marginana* (Haworth) in Nederland (Lepidoptera: Tortricidae). — Entomol. Berichten 44: 81–86.
- Martin, M. 1991: Catalogus Microlepidopterorum Estoniae. Eesti pisiliblikate nimestik. — Abiiks Loodus-evaatejale 91: 1–56.
- Opheim, M. 1970: The Norwegian Species of Tribus Olethreutini Obraztsov, 1946 (Lep., Tortricidae) — Entomol. Scand. 1: 241–257.
- Opheim, M. 1976: The Lepidoptera of Norway. Checklist. Part II. Tortricoida (second part) — Trondheim. 31 pp.
- Palm, E. 1982: Atlas over viklernes udbredelse i Danmark (Tortricidae & Cochylidae) — Dansk Faun. Bibliot. 2: 1–110.
- Petersen, M. 1924: Lepidopteren-Fauna von Estland (Eesti). Teil I — II. Tallinn-Reval. 590 pp.
- Razowski, J. 1983: Motyle Polski, Czesc VI. Olethreutini — Monografie Fauny Polski 13: 1–177.
- Svensson, I. 1981: Anmärkningsvärda fynd av Microlepidoptera i Sverige 1980. — Entomol. Tidskr. 102: 83–97.
- Svensson, I., Gustafsson, B., Imby, L., Elmquist, H., Hellberg, H. & Palmqvist, G. 1987: Catalogus Lepidopterorum Sueciae. — Stockholm. 186 pp.
- af Tengström, J. M. J. 1869: Catalogus Lepidopterorum Faunae Fennicae praecursorius. — Notis. Sällsk. Fauna Flora Fennica Förh. 10: 287–370.
- Varis, V., Jalava, J. & Kyrki, J. 1987: Check-list of Finnish Lepidoptera. Suomen perhosten luettelo. — Notulae Entomol. 67: 49–118.
- Zaguljajev, A. K., Kuznetsov, V. I., Stekolnikov, A. A., Sukhareva, I. L. & Falkovitsch, M. I. 1978: Opredelitelj nasekomyh evropeiskoi tsasti USSR. Tom IV: 1. Tsheshuekrilie. Pervaja tsast. — Leningrad. 712 pp.