

The genus *Macrohynnis* Förster in N. Europe, especially Finland (Hymenoptera: Diapriidae: Belytinae)

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New records of *Macrohynnis lepidus* Mayr and *M. fragilis* (Nixon) are presented from Finland and Sweden, the former as new to Sweden and the latter as new to Finland. The taxonomic characters of the species are treated in detail and a key is presented for the European species. The male of *M. fragilis* is described for the first time.

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1. Introduction

The genus *Macrohynnis* was described by Förster (1856) without any included species. The first included species or the type species of the genus, *M. lepidus*, was described by Mayr (1904) from Förster's collection. Two other species have been described from Europe: *M. rufiventer* Kieffer, 1908 and *M. fragilis* (Nixon, 1957) as *Cinelaptus fragilis*. The Holarctic species were revised by Macek (1997). He synonymized *M. rufiventer* with *M. lepidus* and gave the world distribution of *M. lepidus*: Europe, Japan, Taiwan, Canada and USA. He described a new Holarctic species *M. ferrugineus* Macek from the Czech Republic, Austria, Canada (most records) and USA. *Macrohynnis fragilis* is very rare and according to Nixon (1957) and Macek (1997) altogether five females have been reported from Austria, Slovakia and Ireland. The three European species are rare and seldom collected. For instance, when Wolter Hellén (1964) treated the Finnish belytine fauna

on the basis of 4500 specimens, he did not find the genus *Macrohynnis* from Finland. Two species have been reported from N. Europe: *M. fragilis* from Sweden (Landin 1971) and *M. lepidus* from Finland (Macek 1997). Author VV found the first specimen of *M. fragilis* in 1963 from eastern Finland. In this paper we treat the distinguishing taxonomic characters of the species and summarize what is known about the species of the genus in Finland and North Europe.

2. Material and methods

The Finnish specimens of *Macrohynnis* were swept from the lower vegetation in woods or near woods, often near deciduous trees or bushes. The sweeping period lasted from April to October, in some years beginning already in March and ending in November. To aid in collecting small wasps, we have used an aspirator. During a period of more than forty years we have swept 19 specimens of *Macrohynnis* in Finland, always singly. We have not used Malaise traps or yellow bowls. One specimen was captured with a trunk-

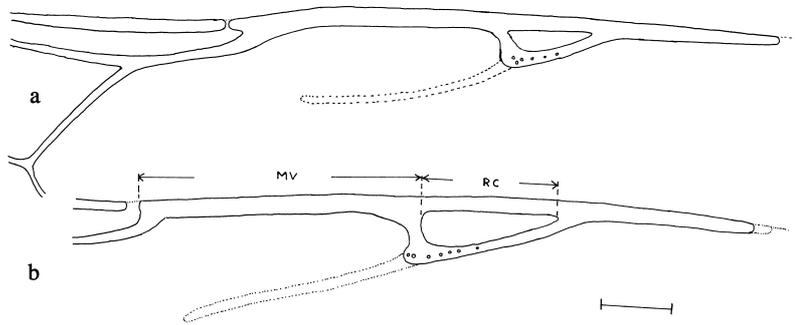


Fig. 1. Part of right fore wing from above. MV = Marginal vein length, RC = Radial cell length. — a. Male paralectotype of *Macrohynnis lepidus* Mayr. — b. Female paratype of *M. fragilis* (Nixon). Scale 0.1 mm.

window trap on dead aspen by Petri Martikainen.

For comparison three male syntypes of *Macrohynnis lepidus* Mayr (no locality but according to Mayr (1904) Germany, near Aachen, A. Förster leg.) were borrowed from coll. G. Mayr in Naturhistorisches Museum, Vienna (Dr. M. Fischer). The female lectotype (possibly holotype) of *M. rufiventer* Kieffer (Italy, Trieste, Graeffe leg.) from coll. Kieffer in the National History Museum of Paris (Mme Claire Villemant) and one female paratype of *Cinelaptus fragilis* Nixon (Ireland, Lucan Co., Du[blin], A. W. S[telfox], 7.7.1943) from coll. A. W. Stelfox in United States National Museum, Washington, D. C. (Dr. D. Smith) were also borrowed for study. Macek (1997) has designated a female lectotype and two female paralectotypes of *M. lepidus*, therefore the remaining male syntypes became paralectotypes according to the International Code of Zoological Nomenclature Article 74.1.3 and were labelled accordingly.

The specimens were studied with a Leitz stereomicroscope at magnifications 50× and 100×; the illumination was the same as in Vikberg & Koponen (2001). Measurements and drawings were made using a grid of squares (50 × 50, side 0.20 mm) in one eyepiece. Body part nomenclature follows Nixon (1957) and Huber and Sharkey in Goulet and Huber (1993). The length of antennal segments was measured in inner view parallel with the longitudinal axis of the segment as in Fig. 3a. The length of the marginal vein and radial cell was measured as in Fig. 1b. The length of petiolus was measured in dorsal view along the midline and the width of petiolus as maximum width but the basal flange was ignored.

Macek (1997) redescribed the genus *Macrohynnis* and keyed the three Holarctic species. He used, among others,

the following characters to distinguish between the species: the size of the body, the length/width index of the petiolus, the length of the radial cell compared with the length of marginal vein and the length of the scape compared with the length of the flagellomere 1. We compare the same and some additional characters using the 19 Finnish specimens and the female lectotype of *M. rufiventer*, the female paratype of *M. fragilis* and partly also the male paralectotypes of *M. lepidus* (these were returned before all measurements had been undertaken). The values of *M. rufiventer* are mentioned only if they differ from Finnish females of *M. lepidus*.

Nordic specimens (8 females and 11 males) of *Macrohynnis lepidus* examined: Finland (7♀ 11♂); N: Nurmijärvi, (Grid 27°E 671:37), 21.VIII.1981 1♀ (M. Koponen leg.). St: Säskylä, 676:25, 13.VI.1982 1♂ (M. Koponen leg.). Ta: Loppi, Pilpala, 672:35, 31.VII.1993 1♀; Janakkala, Virala, 675:36, 5.IX.1998 1♀, 11.IX.1998 1♂; 675:37, Ahilammi, 1.IX.1999 1♀; Siilotie, 11.VI.1993 1♂, 2.VII.1999 1♂, 8.VII.1999 1♂, 21.VII.1999 1♂; Kalpalinna, 19.IX.1982 1♂, 26.IX.1982 1♀, 15.IX.1997 1♂, 1.IX.1998 1♂; 676:37, Kalpalinna, 6.VI.1982 1♂, Koljala, 30.VIII.1985 1♀; Tampere, 682:32, 17.VIII.1964 1♂ (V. Vikberg leg.). Sb: Savonranta, 69081:6026, window trap on dead aspen 4.IX.–2.X.1996 1♀, P. Martikainen leg. Sweden, Dir., Järna, 3.VIII.1968 1♀, A. Sundholm leg. (coll. Zoologiska Institutionen, Lund; Dr. Roy Danielsson).

Nordic specimens (2 males) of *M. fragilis* examined: Finland, Kb: Tohmajärvi, Onkamo 691:66 20.VII.1963 1♂; Liperi 6948:627 3.VII.1993 1♂ (V. Vikberg leg.).

Data on Nordic specimens not examined by ourselves: 1) Macek (1997) reported *Macrohynnis lepidus* from Finland. No locality in Finland was given. According to the new information given in a letter by Dr. Jan Macek, the

Table 1. Length of body and fore wing of *Macrohynnis* specimens (in mm): mean, *S.D.*, range.

Specimens	Body	Fore wing
<i>M. lepidus</i> ♀♀ (n = 6)	2.37, 0.19, 2.17–2.7	2.25, 0.16, 2.02–2.45
<i>M. lepidus</i> ♂♂ (n = 11)	2.34, 0.16, 2.05–2.65	2.32, 0.16, 2.13–2.6
<i>M. rufiventer</i> ♀	ca. 2.8 (3.0)	2.5
<i>M. fragilis</i> ♀	2.7	2.5
<i>M. fragilis</i> ♂♂ (n = 2)	2.44, 2.38–2.5.	2.33, 2.3–2.35.

record from Finland was based on one male from Finnish Lapland, Kevo (Li), subarctic region, Malaise trap, in June 1989, H. Goulet leg. Author VV visited the Kevo station at the same time and remembers that the Malaise trap was NW of the station (69°45'N, 27°E), Grid 27°E was 774:49 and the trapping period was ca. 20–24 June. The following specimens were identified by Karl-Johan Hedqvist, Vallentuna and Dr. Lars Huggert, Dalby in their private collections from Sweden (they used Fig. 1 during the identification): *Macrohynnis lepidus*: Skåne, Åhus, 28.7.1967 1♂, K.-J. Hedqvist leg. Ångermanland, Ångersjö (approximately 20 km NW of Hörnefors), 1.–30.VII.1978 1♂, K. Müller leg. (coll. Huggert). *M. fragilis*: Uppland, Vallentuna, 18.VIII.1964 1♀, K.-J. Hedqvist leg., Uppland, Lidingö, 2.VIII.1981 1♂, K.-J. Hedqvist leg.

3. Results

3.1. Taxonomic characters used to distinguish species from each other

3.1.1. Body size

The measurements of the body length and the fore wing length (from base of costa to apex of wing) are presented in Table 1.

The length of the fore wing is usually slightly less than the length of the body, and it can be measured more accurately because the position of the head may vary and the extension of metasoma can vary (e.g. specimens treated in a critical

point drier are much larger, but no such specimens are treated in this study). The body length was in all specimens less than 3 mm, as ought to be according to Macek (1997; only in *M. ferrugineus* larger than 3 mm).

3.1.2. Length of scape and flagellomere 1.

The measurements of the scape length and the scape/flagellomere 1 length index are presented in Table 2. In both species the males have shorter scape than females. The scape of *M. fragilis* is longer than that of *M. lepidus*.

The scape/flagellomere 1 index is lowest in males of *M. lepidus* (ca. 0.7–0.9), in females of *M. lepidus* and males of *M. fragilis* about the same (ca. 1.0) and highest in female of *M. fragilis* (1.2). Thus it is important to give the sex when using this index to separate the species. The text in the key of Macek (1997) is therefore only partly correct.

3.1.3. Length of the radial cell and the marginal vein

The measurements of the radial cell length and marginal vein length/radial cell length index are presented in Table 3.

Table 2. Length of scape (in mm) and scape/flagellomere 1 index of *Macrohynnis* specimens: mean, *S.D.*, range.

Specimens	Scape	Scape/flag. 1 index
<i>M. lepidus</i> ♀♀ (<i>n</i> = 6)	0.284, 0.021, 0.253–0.306	0.98, 0.93–1.04
<i>M. lepidus</i> ♂♂ (<i>n</i> = 11)	0.245, 0.012, 0.225–0.258	0.80, 0.74–0.91
<i>M. fragilis</i> ♀	0.354	1.22
<i>M. fragilis</i> ♂♂ (<i>n</i> = 2)	0.272, 0.271–0.273	0.98, 0.94–1.03

Table 3. Length of radial cell (in mm) and marginal vein length/ radial cell length index in specimens of *Macrohynnis*: mean, *S.D.*, range.

Specimens	Radial cell	Marginal vein/Radial cell index
<i>M. lepidus</i> ♀♀ (<i>n</i> = 6)	0.116, 0.007, 0.106–0.124	3.2, 2.9–3.5
<i>M. rufiventer</i> ♀	0.101	4.0
<i>M. lepidus</i> ♂♂ (<i>n</i> = 11)	0.129, 0.017, 0.106–0.157	3.2, 2.7–3.8
<i>M. fragilis</i> ♀	0.208	1.09
<i>M. fragilis</i> ♂♂ (<i>n</i> = 2)	0.194, 0.190–0.197	2.0, 1.9–2.1

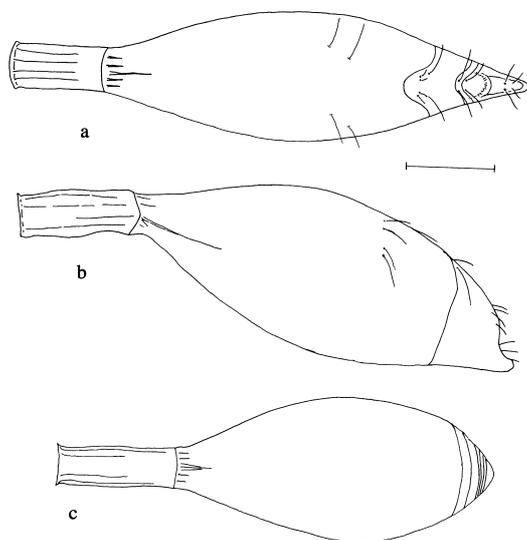


Fig. 2. Metasoma of female paratype of *Macrohynnis fragilis* (Nixon). — a. Oblique dorsal view from behind. — b. Left lateral view. — c. Metasoma of *M. fragilis* male from Liperi in dorsal view. Scale 0.25 mm.

Macrohynnis fragilis (Fig. 1b) has a clearly longer radial cell than *M. lepidus* (Fig. 1a). The marginal vein/radial cell index is 1.9–2.1 in *M. fragilis* or the radial cell is ca. 0.5 as long as the marginal vein. In *M. lepidus* the index is 2.7–4.0 or the radial cell is 0.25–0.37 as long as the marginal vein.

The marginal vein/radial cell index is a good character to separate both sexes of the two species from each other. Our values agree almost perfectly with those of Macek (1997; the index values measured from his figures are very similar to our values).

3.1.4. Petiolus and posterior metasoma

The petiolus length/width index in *M. lepidus* females and males is as follows: mean 2.6, range 2.3–2.8 ($n = 17$) and there is not a significant difference between the sexes. The index values of *M. fragilis* are 2.5–2.7 ($n = 3$) or near the mean of *M. lepidus*.

The result agrees with the text of Macek (1997) who wrote that in these two species the petiolus is less than 3 times as long as wide (and in *M. ferrugineus* more than three times as long as wide. But in his figures the situation appears reversed

and the scale has the wrong value).

The shape of the female metasoma behind the petiolus is narrow fusiform in *M. lepidus* and *M. fragilis* and distinctly broader in *M. ferrugineus* (Macek 1997). In the former two species it is in distal half laterally compressed (*M. fragilis*: Fig. 2a–b). The large tergum and terga 3–4(–5) are strongly emarginated medially and they bear long setae which are directed downward and laterad.

The shape of male metasoma in *M. lepidus* and *M. fragilis* (Fig. 2c) posterior of the petiolus is not compressed; behind the large tergum there are 5 short transverse terga (tergum 7 has spiracles) and broad triangular apical tergum which is ca. 2 times as broad as long and bears cerci. The apex of the metasoma is more or less turned downward.

3.1.5. The colour of pronotum, mesonotum and large tergum of metasoma

The pronotum of *M. fragilis* is pale, brownish yellow in all three specimens studied. The female from Ireland has a dark brown mesoscutum and a pale brown mesoscutellum and a reddish yellow large tergum. In the two males from Finland these body parts are brown.

The Finnish females of *M. lepidus* have usually a reddish brown pronotum, one has a brownish red pronotum and one has a partly infuscate pronotum. The colour of the mesoscutum is usually dark brownish black–black, two specimens have a brown mesoscutum. The large tergum is reddish yellow, in one female darker brown dorsally.

The Finnish males of *M. lepidus* have a reddish brown (4), reddish brown and partly infuscate (5) or black (2) pronotum. The mesoscutum is black (7), dark brown (2) or brown (2). The large tergum is darker than in the female, laterally reddish brown, in one male reddish yellow and in another yellowish brown, 8 specimens are dorsally brown–dark brown.

3.1.6. The pronotal neck

Macrohynnis fragilis has strong, long carinae and large foveae (Fig. 3d). *M. lepidus* has shorter and weaker carinae, and foveae are short, transverse

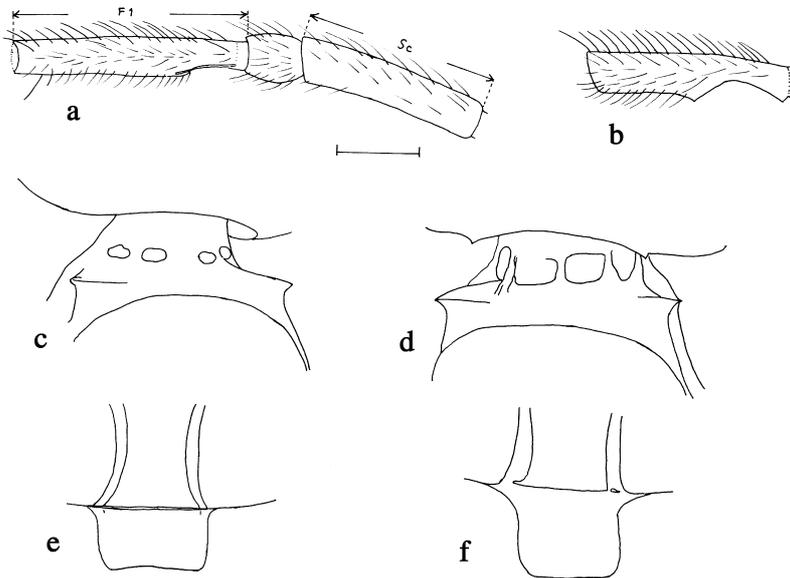


Fig. 3. *Macrohynnis* species. — a. *M. lepidus* Mayr, male paralectotype, inner side of scape, pedicel and flagellomere 1. Sc = Scape length, F1= Flagellomere 1 length. — b. *M. fragilis* (Nixon), male from Liperi, flagellomere 1. — c. *M. lepidus* (female type of *M. rufiventer* Kieffer), pronotum in dorsal view. — d. *M. fragilis*, female paratype, pronotum in dorsal view. — e. *M. lepidus*, female from Janakkala, posterior part of notauli and scutellar fovea. — f. *M. fragilis*, female paratype, posterior part of notauli and scutellar fovea. Scale 0.25 mm.

(Fig. 3c), sometimes very small. This character is not always easy to see because of the position of the head.

3.1.7. The caudal part of notauli

The posterior parts of notauli diverge slightly in *M. fragilis* (Fig. 3f), in *M. lepidus* most specimens have strongly diverging notauli (Fig. 3e).

3.1.8. The emargination of male flagellomere 1

Macrohynnis lepidus has shallow emargination at the base of flagellomere 1 in all Finnish males (11) and in three males from Germany (Fig. 3a). Two Finnish males of *M. fragilis* have strong excision (Fig. 3b).

3.1.9. A key to European species of *Macrohynnis*

The most important distinguishing characters are

presented in the form of a key to European species of *Macrohynnis*. *M. ferrugineus* does not occur or it has not been found yet in N. Europe; its characters have been taken from Macek (1997).

1. Length of body more than 3 mm. Petiolus three and half times as long as wide in dorsal view. Marginal vein about 1.6 as long as radial cell. Apical half of female metasoma less laterally compressed, broader. *ferrugineus* Macek, 1997.
- Length of body 2.1–2.8 mm, length of fore wing 2.0–2.6 mm. Petiolus 2.3–2.8 as long as wide in dorsal view. Marginal vein 1.9–4.0 as long as radial cell. Apical half of female metasoma more laterally compressed (Fig. 2a–b)..... 2
2. Marginal vein 1.9–2.1 as long as radial cell (Fig. 1b), radial cell longer (0.19–0.21 mm). Pronotum laterally pale, brownish yellow. Female: scape 1.22 as long as flagellomere 1. Male: scape 0.94–1.03 as long as flagellomere 1, this with strong emargination basally (Fig. 3b) *fragilis* Nixon, 1957
- Marginal vein 2.7–4.0 as long as radial cell (Fig. 1a), radial cell shorter (0.10–0.16 mm). Pronotum laterally darker from reddish brown to infuscate or black. Female: scape 0.93–1.04 as long as flagellomere 1. Male: scape 0.74–0.91 as long as flagellomere 1, this with weak emargination basally (Fig. 3a) *lepidus* Mayr, 1904

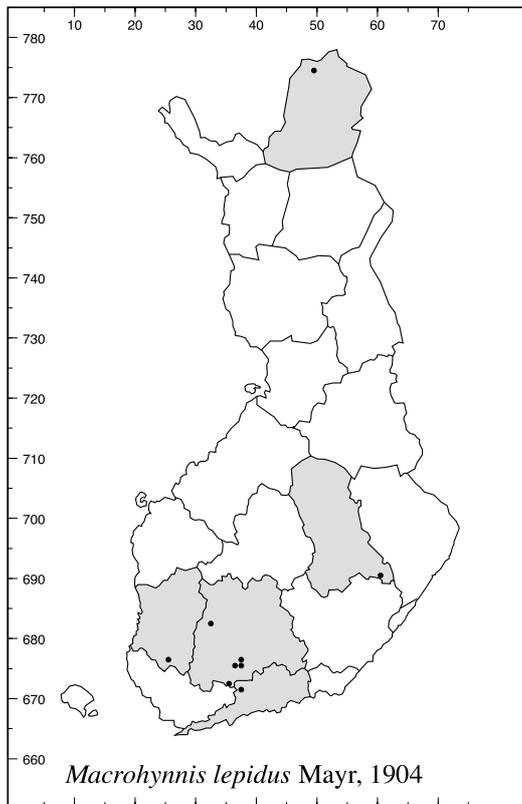


Fig. 4. Distribution of *Macrohynnis lepidus* Mayr in Finland.

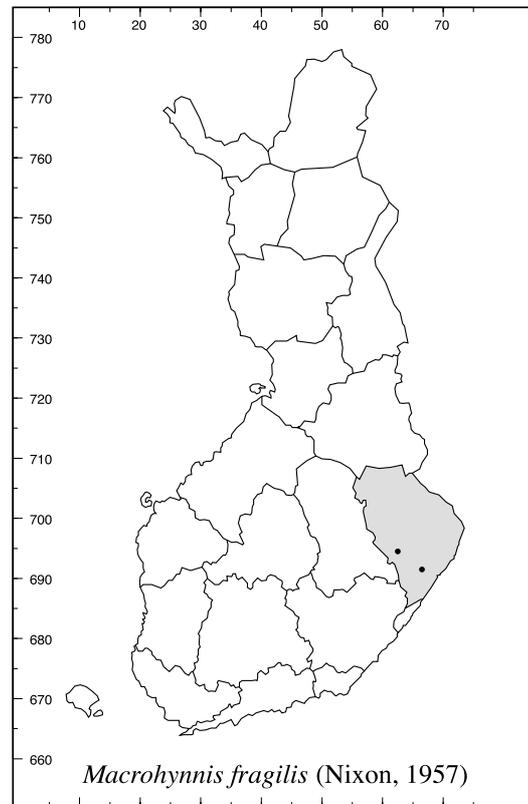


Fig. 5. Distribution of *M. fragilis* (Nixon) in Finland.

3.2. *Macrohynnis lepidus* Mayr in N. Europe

At present 7 females and 12 males are known from Finland, the Finnish localities are mapped in Fig. 4. The distribution extends from Nylandia, Satakunta and South Häme in southern Finland to North Savo and Inari Lapland in the very North but large areas have no finds. Males have been captured from 6 June to 19 September, females 31 July to 26 September. The biotopes are different kind of woods (mixed wood, spruce wood with *Betula*, birch wood) and partly moist and shady meadows with deciduous bushes. Host unknown.

Three specimens are known from Sweden from Skåne, Dalarne and Ångermanland.

3.3. *Macrohynnis fragilis* (Nixon) in N. Europe

Two males have been captured in North Karelia,

Finland between 3–20 July. The localities in Finland are mapped in Fig. 5. The characters of the male are described in 3.1.1–3.1.9 for the first time. No female is known from Finland at present.

One male and one female are known from Uppland, Sweden. They were collected between 2–18 August.

Because the male was unknown before, its important characters are summarized below. Length of body 2.4–2.5 mm, of fore wing 2.3–2.35 mm. Scape is a little longer than in male of *M. lepidus*: 0.27 mm contra 0.22–0.26. Scape/flagellomere 1 index is a little longer than in male of *M. lepidus*: 0.94–1.03 contra 0.74–0.91. Flagellomere 1 with strong incision basally (Fig. 3b).

Pronotum laterally pale brownish yellow as in the female. Pronotal neck as in female (Fig. 3d). The shape of the metasoma in dorsal view is shown in Fig. 2c.

4. Discussion

Since the time of Wolter Hellén there have been few collectors of small parasitoid wasps in Finland, with perhaps the authors being the only ones who have regularly collected them. Therefore our knowledge on the species of *Macrohynniss* is limited and obviously the distribution we record here is only a small part of their real distribution. In comparison, Macek (1997) mentioned 10 new specimens from Europe, thus our result (20 specimens from Finland) looks very satisfactory.

Species of *Macrohynniss* have not been reported from most other countries of N. Europe; they are unknown from the European part of Russia and the Baltic states (Kozlov 1978; Russian Karelia: Andrej Humala, pers. comm.), Norway (Lars-Ove Hansen, pers. comm.) and Denmark (Buhl 1994). *Macrohynniss fragilis* was reported from Sweden without any locality by Landin (1971) as *Cinelaptus fragilis*. Records of Proctotrupeoidea s. lat. were given to Landin (1971) by Arne Sundholm (Karl-Johan Hedqvist, pers. comm.). Because Landin's field fauna lacks the genus *Macrohynniss* Förster and the only specimen collected by Arne Sundholm we could trace is a specimen of *Macrohynniss lepidus*, it is unclear which species was actually at hand: *M. lepidus* or *M. fragilis*. Both species are now known from Sweden.

Macek (1997) wrote the following about the relationships of the genus *Macrohynniss*: "by its general appearance it resembles genera *Cinetus* Jurine and/or *Miota* Förster, but this resemblance is only apparent. The straight nebulous poststigmatalis suggests its unambiguous ranking into tribe Belytini, because *Cinetini* have tubular, circumflex poststigmatalis". However, many species of *Cinetus* or *Miota* have a nebulous poststigmatalis which in some species is rather straight. Nixon (1957) placed *Cinelaptus* between *Cinetus* and *Miota* (as *Leptorhaptus* auct.) and Muesebeck 1979 between *Scorpioteleia* Ashmead and *Aclista* Förster (= *Anectata* Förster, *Xenotoma* Förster, *Acoretus* Haliday). We feel that the relationships of *Macrohynniss* require further study.

Acknowledgements. Our thanks are due to the curators of the entomological collections mentioned in Material and Methods for the loan of the types of three species of *Macrohynniss*, Roy Danielsson for loaning one Swedish specimen of *M. lepidus* and Jan Macek for informing the details of the earlier record from Finland. Karl-Johan Hedqvist and Lars Huggert kindly informed us about the specimens of *Macrohynniss* in their private collections. Anders Albrecht helped us in making the distribution maps of the species in Finland. Two anonymous referees commented on the manuscript and suggested several improvements to it.

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