

Taxonomy of the *Empria hungarica* species-group (Hymenoptera, Tenthredinidae) in Northern Europe

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In the tenthredinid hymenopteran genus *Empria*, the European species with a paired whitish patch on tergum 1 are considered tentatively as a species-group termed the *E. hungarica* group. The type materials of *Empria pumila* (Konow), *E. pumiloides* Lindqvist and *E. tricornis* Lindqvist were examined. The lectotype and paralectotypes of *E. pumila* are designated, and new diagnostic characters for *E. pumila* and *E. pumiloides* are given. A key for the Northern European species of the *E. hungarica* group is compiled. The results of a comparison of the phenology and some metrical characters of the adults of *E. pumila* and *E. pumiloides* are presented in the form of diagrams. *E. pumiloides* is recorded for the first time from Russia and Germany. The records of *E. hungarica* from Estonia (Saaremaa) are reported as the northernmost for that species. All available distributional records of *Empria hungarica* in the Palearctic are given in the text, and those localized reliably are also mapped.

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1. Introduction

Empria Lepeletier & Serville, 1828 is a Holarctic genus that includes at least 26 European species (Liston 1995). The biology, larvae and host plants of most species are unknown. The taxonomy of some species-groups in this genus is insufficiently known. The best available key for the European species of *Empria* is that of Zhelochovtsev (1988), although some species recorded in Europe are not included.

Typically, the abdomen of the adults of *Empria* is black or piceous, with pale apical margins and/or paired lateral flecks on the terga. Only a few European species also show a paired whitish patch on tergum 1. Tentatively, since the phylogenetic analysis is missing, these species are considered here as the *E. hungarica* species-group. To date only *Empria pumila* (Konow) and *E. pumiloides* Lindqvist were reported in Northern Europe. *E. hungarica* was only recently recognized from Estonia. At least 2 additional spe-

cies of that species-group, *E. granatensis* Lacourt, 1988 and *E. testaceipes* (Konow, 1896), occur in Central Europe. *E. granatensis* specimens have white flecks on tergum 1; unlike other species of that group their claws are not simple but with a small subapical tooth.

The present paper is the result of a taxonomic study of species of the *E. hungarica* group recorded in Northern Europe with special attention devoted to *E. pumila* and *E. pumiloides*. To date no keys have been available for determination of those species based on easily accessible external characters. Our morphological study revealed some structural, metrical and colour characteristics that can be used for reliable recognition of the adults.

2. Material and methods

Consulted collections

- Department of Applied Zoology, University of Helsinki (DAZUH).
- Deutsches Entomologisches Institut (DEI).
- Institute of Plant Protection, Estonian Agricultural University (EAU).
- Zoological Museum of Helsinki (ZMH).

- Zoological Museum, University of Tartu (ZMUT).

Material from the private collections of K. Elberg (Tartu), M. Heidema (Tartu), M. Nuorteva (Helsinki) and M. Viitasaari (Helsinki) was also examined. For the species *E. pumila* and *E. pumiloides*, morphometrical data were also used. Four metrical characteristics were measured, using the measuring scale of a Wild M8 stereomicroscope:

- length of flagellomere 1,
- length of flagellomere 2,
- width of the head behind the compound eyes in dorsal view,
- maximal length of the area behind the compound eyes in dorsal view.

A length of 0.015 mm was used as the measuring unit.

The specimens were not measured in groups (species after species), but alternately (*E. pumila* (n=19)) and *E. pumiloides* (n=21)), to avoid the risk of systematic measurement error.

3. Results

The diagnostic value of the characters measured in *E. pumila* and *E. pumiloides* was obtained from the pairwise combination of the characters in 2-dimensional scatterplots. In normally developed specimens the scatterplot of the length of flagellomere 1 and head width showed no overlap between the species, even if both sexes were included in the same diagram (Fig. 1). In specimens of

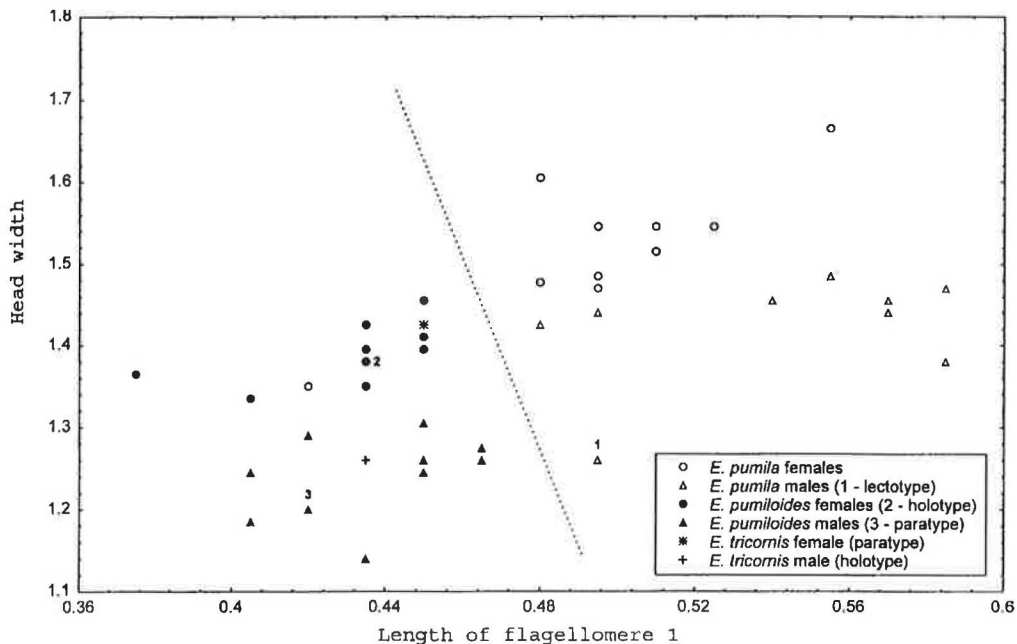


Fig. 1. Scatter diagram for distinguishing of the adults of *Empria pumiloides* Lindqvist (n=21) and *Empria pumila* (Konow)(n=19) on the basis of metrical characters.

E. pumila (n=19), the length of flagellomere 1 varied from 0.489 mm to 0.585 mm (\bar{x} =0.522, *S.D.*=0.037), while in *E. pumiloides* (n=22) it was between 0.375 mm and 0.465 mm (\bar{x} =0.434, *S.D.*=0.225). One sample of *E. pumila*, displaced in the scatter diagram, appeared to be an undergrown specimen. Fortunately, such specimens appear to be rare.

According to the characters examined we were not able to regard *E. tricornis* Lindqvist as a separate species, and thus the earlier proposed synonymy (Viitasaari 1980) with *E. pumiloides* was supported. Examination of the syntypes (2♂♂ and 1♀) of *E. pumila* revealed that 2 species were involved and the only specimen, labelled by Konow as *E. pumila*, actually belonged to *E. pumiloides*. Since the head of the female specimen was not the typical form seen in *E. pumila*, we avoided designating it as a lectotype and selected another available specimen, a male. The penis valve and other characters of that specimen accorded well with the interpretation of *E. pumila* by later authors (e.g. Lindqvist 1968, Lacourt 1988, Zhelochovtsev 1988). Preliminary comparison of the phenology based on the collecting dates of adults showed that the flight period of the adults of these species is of approximately the same duration, but that the flight of *E. pumiloides* begins and ends slightly earlier (Fig. 2).

3.1. A key to species of the *E. hungarica* group from Northern Europe

1. Length of flagellomere 1 less (♂♂ rarely equal) than maximal diameter of compound eye; stigma and vein C dark (in dry samples may be more pale, but never whitish); ♂♂ antennae short, not reaching the stigma. . 2
- Length of flagellomere 1 more than (♀♀ rarely equal to) maximal diameter of compound eye; stigma and vein C whitish; ♂♂ antennae long, reaching even further than the apex of the stigma *E. hungarica*
2. Head less rectangular in dorsal view: maximal width of head behind compound eyes about twice its maximal length (Fig. 3a,b); valvifer 2 of ovipositor about equal in length to valvula 3 (Fig. 4a); pale area at base of metatibia usually wide; basal sawteeth asymmetrical (apical slope much longer) and with distinct denticles (Fig. 5a); smaller species; penis valve as in Fig. 6a *E. pumiloides*
- Head more rectangular in dorsal view: maximal width of head behind compound eyes nearly 2.5 times its length. (Fig. 3c,d); valvifer 2 of ovipositor clearly shorter than valvula 3 (Fig. 4b); pale area at base of metatibia usually narrow; basal sawteeth higher

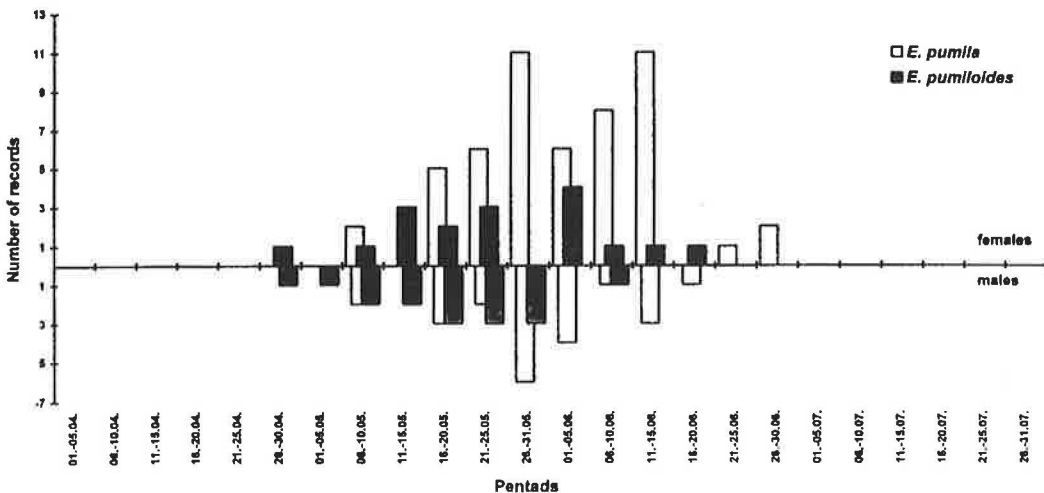


Fig. 2. Phenology diagram of the adult stage of *Empria pumiloides* Lindqvist and *Empria pumila* (Konow) based on the collecting dates of the species. Dates specified in day, month numbers.

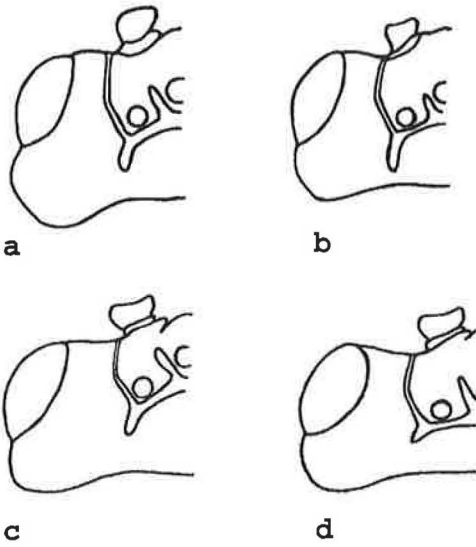


Fig. 3. Form of head in *Empria pumiloides* Lindqvist and *Empria pumila* (Konow) in dorsal view. - a: Female of *E. pumiloides*. - b: Male of *E. pumiloides*. - c: Female of *E. pumila*. - d: Male of *E. pumila*.

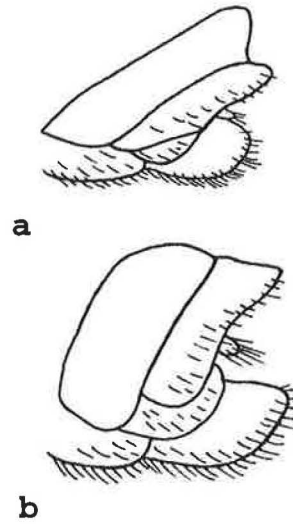


Fig. 4. Ovipositor sheath of the females of *Empria pumiloides* Lindqvist and *Empria pumila* (Konow) in lateral view. - a: *E. pumiloides*. - b: *E. pumila*.

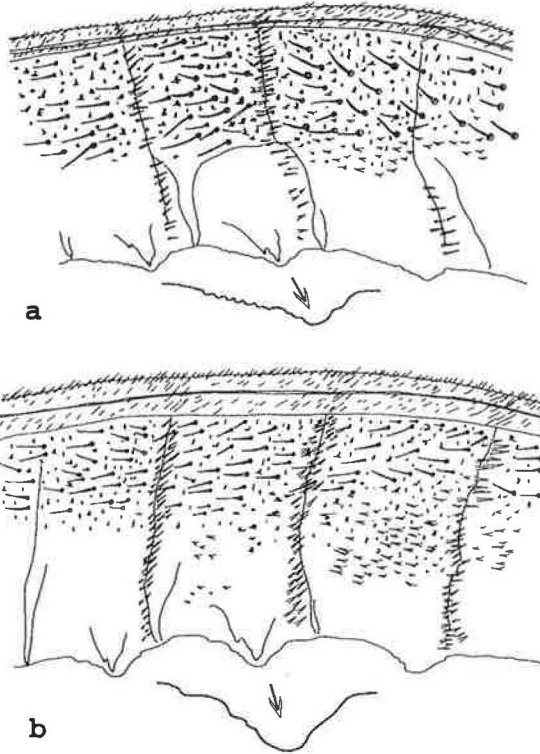


Fig. 5. Three basal segments of lancet in the females of *Empria pumiloides* Lindqvist and *Empria pumila* (Konow). - a: *E. pumiloides*. - b: *E. pumila*.

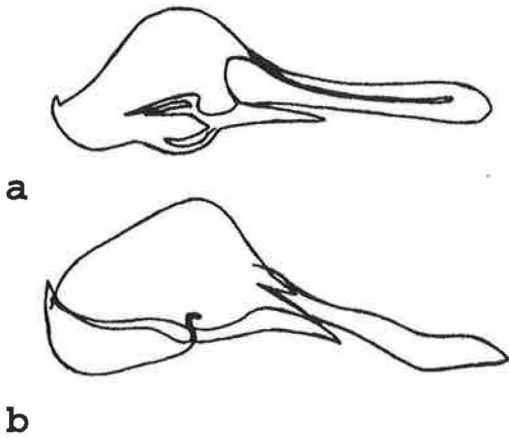


Fig. 6. Penis valves in the males of *Empria pumiloides* Lindqvist and *Empria pumila* (Konow). - a: *E. pumiloides*. - b: *E. pumila*.

and almost symmetrical without distinct denticles (Fig. 5b); larger species; penis valve as in Fig. 6b *E. pumila*

3.2. *Empria hungarica* (Konow)

Poecilosoma hungarica Konow, 1895: 51-52.

Empria zacharovi Dovnar-Zapolskij, 1929: 41. Synonym of *E. hungarica* according to Conde (1940).

This species was described after 1 female specimen from Mehádia in the Transylvanian Alps of Romania, then belonging to Hungary, by F. W. Konow (Konow 1895). The holotype was not examined. The taxonomy was adopted from Chevin (1984) and Zhelochovtsev (1988). The penis valves of the Estonian male specimens examined matched well with the drawing in Chevin (1984).

The larva and host plant of *E. hungarica* are unknown (Zombori 1982, Liston 1995). According to Zombori (1982) this species shows very sporadic distribution in Hungary; it occurs mostly in hilly and mountainous regions (L. Zombori, pers. comm.).

Findings of *E. hungarica* in Estonia are probably the northernmost occurrence of this species (the UTM 10 X 10 -km grid reference follows the name of the locality): Viidumägi (EK66), May 23, 1984, hazel coppice, 1 ♀ 1 ♂, (K. Elberg); Viidumägi (EK66), May 25, 1989, dry meadow, 1 ♂, (K. Elberg); Viidumägi (EK66), June 1, 1990, dry meadow, 1 ♂, (K. Elberg); Kaugatuma (EK74), June 5, 1986, 1 ♂, (K. Elberg).

Material examined: 1 ♀, 4 ♂ ♂.

Distribution. Records (Fig. 7):

- European Russia: Moscow region, Mozhajsk, Olgino (Fedchenko 1905: 40); the districts of Voronezh, Kursk and Orel (A. Zinovjev, pers. comm.).
- southern Germany: Pfalz, Birkenheide (Zirngiebl 1954: 149),
- Czech Republic: Moravia (Mähren) (Zirngiebl 1954: 149),
- Hungary: Hármashatárhegy, Budakeszi and Simontornyán (Zombori 1982: 89),
- Romania: Arad, Caras-Severin (Scobiola-Palade 1981: 51); Mehádia (Konow 1895: 52, *locus typicus*),
- southern France: Montauroux (Chevin 1984: 307),
- Italy: Trieste ("Triest", Zirngiebl 1954: 149),
- Ukraine: (Zhelochovtsev & Zinovjev 1996: 366); Poltava, Lugansk (A. Zinovjev, pers. comm.).
- West-Ciscaucasia, Mirskaja, Kubanj-Gebiet (Dovnar-Zapolskij 1929: 41),
- northern Caucasus (A. Zinovjev, pers. comm.).
- steppe area of Kazakhstan (Zhelochovtsev 1988: 199).

3.3. *Empria pumiloides* Lindqvist (= *Empria tricornis* Lindqvist)

Empria pumiloides Lindqvist, 1968: 31-32.

HOLOTYPE female, labelled: "SUOMI [Finland], U:Helsingin pit. May 10, 1959 leg. Perkiömäki"; "Holotypus" [printed, red label with a black frame]; "Empria pumiloides Lgv. Lindqvist det. 1967"; "coll. Eitel Lindqvist" [printed, green label]; PARATYPE male with the same labelling but "Paratypus" [printed, red label with a black frame].

Empria tricornis Lindqvist, 1968: 32-33.

HOLOTYPE male, labelled: "SUOMI, U: Hel-

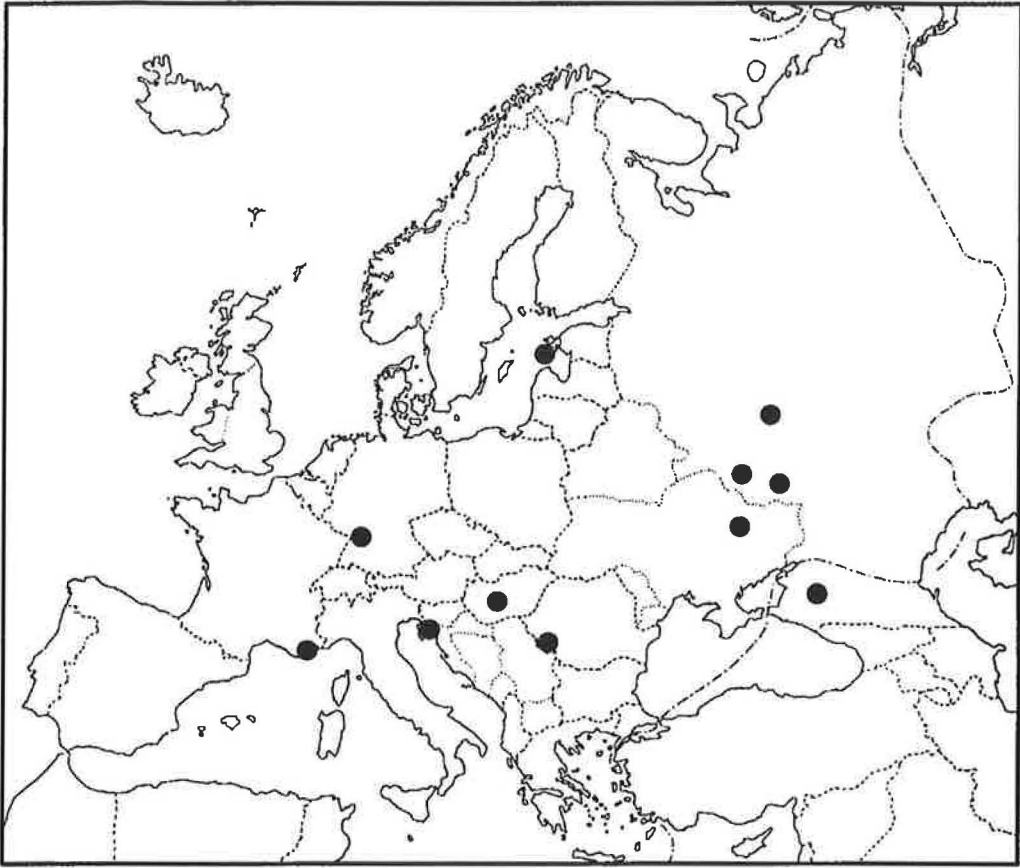


Fig.7. Mapped distributional records of *Empria hungarica* (Konow).

singin pit. May 10, 1959 leg. Perkiömäki"; "Holotypus" [printed, red label with a black frame]; "Empria tricornis Lgv. Lindqvist det. 1967"; "coll. Eitel Lindqvist" [printed, green label]. PARATYPE female with the same labelling but "Allotypus" [printed, red label with a black frame].

Material examined: 31 ♀♀ 32 ♂♂.

Distribution. DEU: 1 ♂ from Mecklenburg by F. W. Konow (paralectotype of *E. pumila*); 1 ♂ from Wallendorf, Merseburg by K. Ermisch. Not listed in Blank et al. (1998). A new species for the fauna of Germany. FIN: several localities. RUS: Vazhiny ("Vaaseni", Russian Karelia). Not listed in Zhelochovtsev & Zinovjev (1996). A new species for the fauna of Russia. SWE: One find from Resarö (R. Malaise), according to Lindqvist (1968). The species is probably much more widely

distributed, but has been overlooked. The larva and host plant of this species are unknown (Liston 1995).

3.4. *Empria pumila* (Konow)

Poecilosoma pumila Konow, 1896: 58-89.

SYNTYPES, 2 ♂♂ 1 ♀. LECTOTYPE male hereby designated, labelled: "Carvin i. P." [Carvin/Pommern, near Debica in Poland]; "Coll Konow" [printed, white label]; "Typus" [printed, red label]; "Lectotypus, Poecilosoma pumila (Konow) ♂ design. Heidema & Viitasaari 1997" [printed, red label]. In coll. Konow, DEI. The PARALECTOTYPES, 1 ♀ 1 ♂, are also designated.

Material examined: about 250 specimens.

Distribution. AUT, CHE, CZE, DEU, ENG, ESP, EST, FIN, FRA, HUN, IRL, ITA, LVA, LUX, NLD, NOR, ROM, RUS, SCO, SWE.

The larva and host plant of the species are unknown (Liston 1995).

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