Neomessa steusloffi (Konow, 1892) new to Italian fauna and notes on its life-history (Hymenoptera, Tenthredinidae)

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Abstract

Neomessa steusloffi (Konow, 1892) (Hymenoptera, Tenthredinidae), for more than a century one of the most enigmatic European sawflies, is first recorded for Italy. Notes on biotope, adult ethology, and life-history are given; the true host plant proved white hornbeam (*Carpinus betulus*), on which larval leaf-mines were observed, while *Prunus* sp. or *Quercus* sp., previously reported as possible host plants, are most likely only gathering sites for freshly emerged adults. Pictures of biotope, living adults and larval leaf-mines are also provided.

Key words: *Neomessa steusloffi*, Fenusini, new to Italy, host plant, Parco Ticino.

Riassunto

Neomessa steusloffi *(Konow, 1892) specie nuova per l'Italia e note sulla sua biologia*
Neomessa steusloffi (Konow, 1892) (Hymenoptera, Tenthredinidae), rimasta per oltre un secolo uno dei più enigmatici Imenotteri Sinfiti della fauna europea, viene per la prima volta segnalata d'Italia. Vengono fornite note sul biotopo, un relitto di foresta planiziale padana all'interno del Parco Lombardo della Valle del Ticino, sull'etologia degli adulti e sul ciclo di sviluppo. La pianta ospite è stata identificata nel carpino bianco (*Carpinus betulus*), sulle cui foglie sono state osservate le mine larvali, mentre le indicazioni, da parte di autori precedenti, di *Prunus* sp. e *Quercus* sp. come presunte piante ospiti non hanno trovato conferma; su *Prunus padus* non è stata osservata alcuna traccia di mine larvali, nonostante la presenza talora abbondante di adulti sul fogliame. Le specie suddette sono ritenute essere con ogni probabilità semplici siti di aggregazione. Si rileva che le piante ospiti conosciute per i generi strettamente affini, *Scolioneura* e *Fenusella*, sono esclusivamente Betulacee, cui appartiene anche *Carpinus*, e Salicacee. Vengono infine illustrati aspetti del biotopo, adulti nel loro ambiente e foglie con mine larvali.

Parole chiave: *Neomessa steusloffi*, Fenusini, nuova per l'Italia, pianta ospite, Parco Ticino.

Introduction

During field researches on the Symphyta fauna in the Parco Lombardo della Valle del Ticino, mainly in the "La Fagiana" estate (Magenta loc. Pontevecchio, province of Milano, Lombardy), one of us (M.P.) collected a series of a small, odd-looking sawfly, not matching any of the Italian known species, nor seemingly any of the European ones, and finally identified as *Neomessa steusloffi* (Konow, 1892), one of the most enigmatic European Symphyta.
Neomessa steusloffi is a very rare, or more likely very rarely found, sawfly of the tribe Fenusini, all species of which have leaf-mining larvae developing on dicotyledonous trees. For more than a century, the only record of *Neomessa steusloffi* was that of the type series from northern Germany (Neubrandenburg, in Mecklenburg-Vorpommern). Only recently it has been found in small series in south-eastern Bulgaria (Liston *et al.*, 2019). Nothing is hitherto known about its life-history. The present work deals with its discovery in northern Italy, which curiously occurred on the same day of its finding in Bulgaria, and the identification of the host plant of the larva, with notes about adults ethology.

The genus *Neomessa* Koch, 1990 and its position within the tribe Fenusini

Neomessa steusloffi was described as *Fenusa steusloffi* by Konow (1892). It was later transferred by Enslin (1914) in his previously described genus *Fenusella* Enslin, 1912, considered as closely related to, yet distinct from, the genus *Messa* Leach, 1817. Later authors did not agree with the validity of the genus *Fenusella* Enslin, and synonymized it with *Messa* Leach. The valid name of the genus, however, is currently deemed to be *Fenusella* Enslin, since *Messa* Leach is considered a "not interpretable" ("nicht deutbar") taxon, according to Taeger & Blank, 1996.
Forty-five years after Enslin, Benson (1959) transferred *Fenusella steusloffi* (Konow) to the genus *Metallus* Forbes, 1885, but his arguments for this are questionable; the species falls

into *Metallus* in Benson 1941 key, despite of "differing […] from all the previously known species of the genus in that vein M of the fore wing is almost entirely straight".
Although more closely related to *Fenusella* Enslin (at that time named *Messa* Leach) than to *Metallus* Forbes, *Fenusa steusloffi* Konow proved of uncertain taxonomic collocation, according to later authors. Koch (1990), in his revision of the Palearctic species of *Messa* Leach, finally created for *Fenusa steusloffi* Konow the new monotypic genus *Neomessa* Koch, 1990, characterized as follows (translation from original German text): "Antennae nine-jointed, a little longer than the maximum width of the head; pedicellus as long as wide; 3rd antennal joint longer than 4th; antennae not compressed. Postgenal carina missing. Front margin of clypeus truncate. Malar space about as long as the radius of an ocellus. Frontal field ill-defined. Thorax without prepectus. Tarsal claws with large basal lobes. Fore wing without 1st radiomedial transverse vein (lr-m); base of medial vein (M) [= Basalis] almost straight; radial sector (Rs) and cubitus (Rs + M) bent almost at right angle at their base; anal vein (2A + 3A) faintly bifurcate. In the hind wing radial cell wide open at the tip; without middle cells."
Still now, *Neomessa steusloffi* Konow is the only known species of *Neomessa* Koch.
Liston *et al*. (2019) pointed out that one of the distinctive features of *Neomessa* indicated by Koch, namely the vein Rs+M largely obsolete except for a small stub on Rs (in other words the almost wanting 1st radiomedial transverse vein lr-m), is a character apparently unique to *Neomessa* within the Fenusini. Also the colour pattern of the male is unusual within the tribe: the abdomen is black at the base and largely ochreous distally: i.e. the apical tergites from V or VI onwards, the sternites VIII and IX [= subgenital plate] entirely and the narrow distal margin of VII, and the visible parts of genitalia. All these features of *Neomessa steusloffi*, as well as the *valva penis*, are figured by colour photographs in Liston *et al*. (2019). Having sequenced a male specimen (combining mithocondrial COI and nuclear NaK genes), they also state that *Neomessa steusloffi* forms, within Fenusini, a strongly supported clade with *Scolioneura* Konow, 1890 and *Fenusella* Enslin, 1912.

Materials

Magenta loc. Pontevecchio (Milan province, Lombardy, Italy), Parco Lombardo della Valle del Ticino, Tenuta "La Fagiana", 45°26' N 8°50'E, 2.IV.2018, 5 ♂♂ 19 ♀♀; id., 23.III.2019, 22 ♂♂ 2 ♀♀; id., 30.III.2019, 126 ♂♂ 17 ♀♀; id., 6.IV.2019, 55 ♂♂ 12 ♀♀. The specimens are housed in the authors' collections and in those of Museo di Storia Naturale di Milano and Museo Civico di Storia Naturale di Ferrara.

The site of collecting. Location and ecological features
The biotope of *Neomessa steusloffi* at "La Fagiana" is a tall wood (fig. 1), well-preserved remnant of the extensively disappeared "foresta planiziale padana" (= Po valley plain forest), dominated by oak (*Quercus robur*), white hornbeam (*Carpinus betulus*) and other species (*Querco-Carpinetum*). The area in which the species was hitherto found is not larger than a few hundred meters, between the main entrance of the estate (few scattered specimens just outside of the boundary) and a side branch of the river Ticino, named "Ramo Delizia". No specimen was found west of the Ramo Delizia.

Fig. 1. Biotope of *Neomessa steusloffi* (Konow) at "La Fagiana" (see text).

Notes on host plant and life history
The first specimens of *Neomessa*, mainly females, were collected on 2.IV.2018 sweeping common periwinkle (*Vinca minor*) underwood, clearly not the host plant, no doubt because either fell down from the canopy or freshly emerged, in any case unable to fly away because of cold, cloudy weather. No adult specimen was subsequently found. On 25.IV.2018, mines to be ascribed to Fenusini were observed on leaves of white hornbeam, several meters high, and mostly out of reach; only a single branch, with a few larvae, could be collected (fig. 2). Within 1-2 days, the patches containing the fully grown larvae were all broken away and fallen off from the leaves; one larva was photographed inside its patch (fig. 3). Attempts to rear at least one larva to obtain an adult failed, yet little doubt exists that those larvae actually belong to *Neomessa*.
In 2019, from 23.III to 6.IV, a great number of individuals, mostly males, was observed in activity and collected. While females are of somewhat trivial appearance (fig. 4), not differing at glance from other more common, small, all-black sawflies, males in flight or in lateral view are immediately recognizable by their unique pattern, with posterior half of the abdomen bright orange in living individuals (fig. 5). Some slight variations in colour extent may occur, and will be dealt with in a subsequent paper.
Because of restrictions related to Covid-19 pandemic, in 2020 no visit was possible until summer, and in 2021 the first visit was only possible on 25.IV, when the flight period was largely over.
Adults after emergence gather in numbers on low vegetation, on low branches of white hornbeam (fig. 6) but also on

Figg. 2-6. ***Neomessa steusloffi*****. 2: larval leaf-mines on** ***Carpinus betulus*****; 3. larva photographed inside its patch fallen off from the leaf; 4: adult female on leaf of** ***Prunus padus*****; 5: adult male on leaf of** ***Carpinus betulus*****; 6: adults of both sexes on a branch of** ***Carpinus betulus*****.**

bushes and shrubs of various species growing under white hornbeam trees, seemingly without feeding. This behaviour is likely to have resulted in misinterpretations about the host plant of the species, supposedly *Prunus* sp. according to Benson (1959), or *Quercus* sp. according to Liston *et al.* (2019). These suppositions were not confirmed during our study; *Neomessa* adults were indeed observed on bird cherry (*Prunus padus*), yet only under, or very close to, white hornbeam trees, and no larval mine was ever noticed on leaves of bird cherry, nor on any species other than white hornbeam. Moreover, no mine was found at eye level or below; all were not less than several meters high, and no doubt most were out of sight because on treetops. The above recorded plants are therefore supposed to just have been situated under the real host plants, and to have become gathering sites. It is to be stressed that for closely related genera, *Scolioneura* and *Fenusella*, known host plants are only Betulaceae, the same family *Carpinus* also belongs to, and Salicaceae, namely *Betula* spp. for *Scolioneura* and *Betula* spp., *Salix* spp., *Populus* spp. for *Fenusella*.

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