Revision of the West Palaearctic *Euura bergmanni* and *oligospila* groups (Hymenoptera, Tenthredinidae)

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Abstract

Eight Western Palaearctic *Euura* species are here assigned to the *bergmanni* group (*bergmanni*, *brevivalvis*, *dispar*, *glutinosae*, *leptocephalus*, *respondens*, *sylvestris*, and *viridis*) and two species to the *oligospila* group (*frenalis* and *oligospila*). *Euura pallens* (Konow, 1903) (*bergmanni* group) is removed from the list of West Palaearctic taxa. *Euura pyramidalis* (Hellén, 1948) is treated as *incertae sedis* within the *bergmanni* group. Definitions of the *bergmanni* and *oligospila* groups are primarily based on genetic sequence data (mitochondrial COI and nuclear NaK and POL2). We report likely occurrence of heteroplasmy and amplification of NUMTs among some of the treated species, complicating the use of DNA barcoding in species discrimination. Based on morphological and genetic evidence, we establish that the correct name for the invasive willow sawfly in the southern hemisphere (South America, southern Africa, Australia, New Zealand), known there only in the female sex, is *Euura respondens* ( Förster, 1854). The species is probably native to the Palaearctic (or even Holarctic) where males are common: possibly as common as females (examined from Europe and Central Asia). The name *Euura oligospila* ( Förster, 1854) has been incorrectly used for the species in the southern hemisphere. The examination of type material and reliable association of males and females based on genetics revealed that females of *E. oligospila* are morphologically extremely similar to *E. respondens* (and to some other *E. bergmanni* group...
species), but male penis valves and genetics enable reliable separation of these species. Morphological separation of females of *E. oligospila* and *E. respondens* is possible, but challenging. Identification keys for males and females of the *bergmanni* and *oligospila* groups are provided. The following 15 new synonymies are proposed: *Nematus validicornis* Förster, 1854, syn. nov. with *Euura bergmanni* (Dahlbom, 1835); *Pteronidea woollatti* Lindqvist, 1971, syn. nov. and *Nematus turgiensis* Safjanov, 1977, syn. nov. with *Euura brevivalvis* (Thomson, 1871); *Pteronidea pseudodispar* Lindqvist, 1969, syn. nov. with *Euura dispar* (Zaddach, 1876); *Nematus* (*Pteronidea*) *fastosus* var. *ponojense* Hellén, 1948, syn. nov. and *N. (P.)* *fastosus* var. *punctiscuta* Hellén, 1948, syn. nov. with *Euura frenalis* (Thomson, 1888); *Nematus declaratus* Muche, 1974, syn. nov. and *N. desantisi* D.R. Smith, 1983, syn. nov. with *Euura respondens* (Förster, 1854); *Pteronidea straminea* Lindqvist, 1958, syn. nov., *P. angustiserra* Lindqvist, 1969, syn. nov., and *P. disparoides* Lindqvist, 1969, syn. nov. with *Euura sylvestris* (Cameron, 1884); *Pteronidea breviseta* Lindqvist, 1946, syn. nov., *P. breviseta* Lindqvist, 1949, syn. nov., *P. abscondita* Lindqvist, 1949, syn. nov., and *P. lauroi* Lindqvist, 1960, syn. nov. with *Euura viridis* (Stephens, 1835). Lectotypes are designated for 18 nominal taxa: *Amauronematus longicornis* Konow, 1897; *A. spurcus* Konow, 1904; *Nematus bergmanni* Dahlbom, 1835; *N. brevivalvis* Thomson, 1871; *N. curtispina* Thomson, 1871; *N. (Pteronidea) fastosus* var. *ponojense* Hellén, 1948; *N. (P.) fastosus* var. *punctiscuta* Hellén, 1948; *N. glutinosae* Cameron, 1882; *N. microcerus* Thomson, 1871; *N. polypilus* Förster, 1854; *N. prasinus* Hartig, 1837; *N. respondens* Förster, 1854; *N. salicivorus* Cameron, 1882; *N. validicornis* Förster, 1854; *N. virescens* Hartig, 1837; *Pteronidea curtispina* var. *luctuosa* Enslin, 1916; *Pteronus fastosus* Konow, 1904; and *P. pallens* Konow, 1903.

**Keywords**

DNA barcode sharing, heteroplasmy, invasive species, lectotype, mitonuclear discordance, Nanopore sequencing, NUMTs, sawflies, synonymies

**Introduction**

The genus *Euura* Newman, 1837, native to the Holarctic and Oriental regions, is the largest in the Nematinae (Tenthredinidae), containing about 650 species, or half of the subfamily (Taeger et al. 2010, 2018). The generic concept was significantly expanded in 2014 as a result of phylogenetic analyses of genetic data (Prous et al. 2014). The genus has remained taxonomically problematic due to the large number of species and high degree of morphological similarity. During 2017–2020 revisionary work on *Euura* was funded by the Swedish Taxonomy Initiative. Some of the results are presented here, focussing on a revision of the *Euura bergmanni* and *oligospila* groups in the West Palaearctic. The definition of these groups is largely based on an analysis of genetic sequence data. The decision to publish on these two groups before the main revision of *Euura*, is mainly due to the need to correct the taxonomic confusion surrounding the willow sawfly that has become invasive in the southern hemisphere (Caron et al. 2013, 2014; Malagón-Aldana et al. 2017). We provide evidence to distinguish it from closely related or distantly related but morphologically very similar species within the berigmanni and oligospila groups of *Euura*. Preparation of a revision of other European *Euura* species is in progress.
Materials and methods

Specimens examined or mentioned are deposited in the following collections:

**BIOUG** Centre for Biodiversity Genomics, University of Guelph, Canada;  
**BMNH** The Natural History Museum, London, United Kingdom;  
**CMH** Collection of Mikk Heidemaa, Tartu, Estonia;  
**CVV** Collection of Veli Vikberg, Turenki, Finland;  
**GNM** Naturhistoriska Museet, Göteborg, Sweden;  
**MNHN** Muséum National d’Histoire Naturelle, Paris, France;  
**MZH** Finnish Museum of Natural History, Helsinki, Finland;  
**MZLU** Lunds Universitet, Lund, Sweden;  
**NHRS** Naturhistoriska Riksmuseet, Stockholm, Sweden;  
**NIBIO** Norwegian Institute of Bioeconomy Research, Svanhovd, Norway;  
**SDEI** Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany;  
**SMTP** Swedish Malaise Trap Project, Station Linné, Öland, Sweden;  
**TUZ** Natural History Museum, University of Tartu, Tartu, Estonia;  
**USNM** National Museum of Natural History, Smithsonian Institution, Washington, USA;  
**UUZM** Uppsala University, Uppsala, Sweden;  
**ZIN** Russian Academy of Sciences, Zoological Institute, St. Petersburg, Russia;  
**ZMHB** Museum für Naturkunde der Humboldt-Universität, Berlin, Germany;  
**ZMUO** Zoological Museum, University of Oulu, Finland;  
**ZMUT** Zoological Museum, University of Turku, Finland;  
**ZSM** Zoologische Staatssammlung, München [= Munich], Germany.

Other abbreviations:

**BIN** barcode index number;  
**HT** holotype;  
**LT** lectotype;  
**ST** syntype or syntypes.

Specimens studied are listed in the Suppl. material 1 and in the Appendix 1. Additional specimens mentioned, but not examined morphologically, can be found in BOLD (http://www.boldsystems.org/).

Morphological methods

To photograph penis valves and lancets (valvula 1 or ventral part of the saw), genital capsules and ovipositors were separated from the specimen and macerated in KOH (10–15%) for 6–10 hours at room temperature, or treated with proteinase during DNA extraction. Temporary slide preparations of dissected lancets and penis valves in glycerine were made, and after photography, the parts were glued on a piece of cardboard, which was pinned with the corresponding specimen. In addition, relevant permanent
slide preparations borrowed from institutional or personal (Veli Vikberg, Turenki) collections were photographed. Photos were taken with a digital camera attached to a microscope. Composite images with an extended depth of field were created from stacks of images using the software CombineZP (Alan Hadley; http://www.hadleyweb.pwp.blueyonder.co.uk/, although apparently no longer available) or Helicon Focus 7.6.4. Most of the lancets were photographed in two overlapping parts and a single image was created using the program Image Composite Editor (Microsoft) or with the plugin MosaicJ (Thévenaz and Unser 2007) implemented in ImageJ (Wayne Rasband; http://imagej.nih.gov/ij/). Morphological terminology follows Viitasaari (2002).

Molecular methods

For species delimitation and to associate males and females, mitochondrial and nuclear DNA was sequenced from representatives of *Euura* belonging to the *bergmanni* and *oligospila* groups as well as other selected species. DNA was sequenced using Sanger (Prous et al. 2019) or Oxford Nanopore technologies. For Nanopore sequencing, amplicons belonging to different species or species groups were pooled and sequenced with the MinION R9.4.1 or R10.3 flow cells using a Ligation Sequencing Kit (SQK-LSK109). Most of the amplicons sequenced with MinION were amplified using different combinations of tailed forward and reverse primers (variable 4–12 bp added to the 5’-end) to confirm the identity of the final consensus sequences. The raw sequencing signal from MinION was basecalled (translated into a DNA sequence) with Guppy v4.0.11 or 4.2.3 in high accuracy mode. Using available sequences as query, corresponding single molecule Nanopore reads were identified with BLAST 2.9.0+ (https://www.ncbi.nlm.nih.gov/books/NBK279690/). A maximum of 3000 single reads were aligned with MAFFT v7.427 (Katoh and Standley 2013) and the maximum likelihood trees were built with FastTree 2.1.11 (Price et al. 2010). Based on the resulting trees, separate clusters of reads were identified and subsequently used to create consensus sequences. Based on 15–200 reads of each amplicon, MAFFT v7.427 together with EMBOSS cons v6.6.0.0 (http://emboss.open-bio.org/rel/dev/apps/cons.html) and abPOA 1.0.4 (https://github.com/yangao07/abPOA) were used to create initial consensus sequences that were further polished with Medaka 1.0.1 (https://github.com/nanoporetech/medaka). Medaka variant calling was used to separate haplotypes of nuclear genes. A more detailed protocol and data analysis workflow will be published separately. For most specimens, one mitochondrial and two nuclear genes were sequenced. The mitochondrial gene used is a part (1078–1087 bp) of cytochrome c oxidase subunit I (COI). For a small number of specimens, a longer mitochondrial fragment (including partial tRNA-Cys and complete tRNA-Tyr upstream of COI) was amplified with the primers TW-J1301 (Simon et al. 2006) and A2590 (Normark et al. 1999), resulting in COI length of 1119 bp. For other COI and nuclear primers, see Prous et al. (2019). The two nuclear markers are fragments of sodium/potassium-transporting ATPase subunit alpha (NaK, 1654 bp) and DNA dependent RNA polymerase II subunit RPB1 (POL2, 2527–2552 bp or 2700–2709 bp). The NaK fragment does
not include any introns, but POL2 has one short intron (58–84 bp) that was excluded from phylogenetic analyses. For some specimens, shorter sequences of each gene (in most cases due to lower quality of DNA) were obtained. After excluding the intron in POL2, alignment of all genes was straightforward because of the lack of insertions or deletions in the studied specimens (length differences were only due to the extent the gene regions were amplified and sequenced). Some of the analysed sequences have been published previously (GenBank accessions in the Suppl. material 1 dataset of the studied specimens). Additionally, some COI sequences were obtained from BOLD (http://www.boldsystems.org/). The newly obtained DNA sequences have been submitted to NCBI GenBank (accessions MW939671–MW939746, MW939748–MW939850, MW939852–MW939885, and MZ479384–MZ479675). To concatenate separate gene alignments, we used R (R Core Team 2019) package apex (Jombart et al. 2017). Phylogenetic analyses using maximum likelihood (ML) were done with IQ-TREE 1.6.1 or 1.6.12 (http://www.iqtree.org/) (Nguyen et al. 2015). By default, IQ-TREE runs ModelFinder (Kalyaanamoorthy et al. 2017) to find the best-fit substitution model and then reconstructs the tree using the model selected according to Bayesian information criterion (BIC). We complemented this default option with a SH-like approximate likelihood ratio (SH-aLRT) test (Guindon et al. 2010) and ultrafast bootstrap (Hoang et al. 2018) with 1000 replicates to estimate robustness of reconstructed splits. COI (658 bp barcoding region, minimum length 600 bp) and nuclear (combined NaK and POL2, minimum length 1529 bp) p-distances (proportion of nucleotide differences) were calculated in R with the package ape (Paradis and Schliep 2018). In addition, we used ape to calculate the proportion of ambiguous positions for nuclear genes (i.e. heterozygosities) to get the p-distances between the haplotypes of every female and heterozygous larva. Note that p-distances between haplotypes can be larger than maximum within-species distances calculated from the alignment. The reason is that ambiguous positions are treated as missing data in the ape function dist.dna. Alignments used for phylogenetic analyses are available as Suppl. material 2.

Results

Definition of bergmanni and oligospila groups

The bergmanni and oligospila groups of Euura are here primarily defined based on phylogenetic analyses of DNA sequence data (Fig. 1), but are supported by morphological evidence. The names of the groups are based on the oldest valid species name in that group. Living females of both groups are usually mostly green (except E. leptocephalus) (Fig. 4), but males vary from nearly completely black (E. leptocephalus) to largely pale yellowish (e.g. Figs 17C, D, 19E, F). There are other species within Euura that are green in life and could be confused with the bergmanni and oligospila groups, like Euura poecilonota (Zaddach, 1876) and Euura hypoxantha (Förster, 1854). Euura hypoxantha has a less pointed valvula 3 in lateral view (Fig. 5E) and the radix
Figure 1. Maximum likelihood tree of *Euura* based on three genes (mitochondrial COI and nuclear NaK and POL2). Numbers at branches show SH-aLRT support (%) / ultrafast bootstrap support (%) values. Support values for weakly supported branches (<90) are not shown. Letters “f” and “m” stand for “female” and “male” if known. Numbers at the end of the tip labels refer to the length of the sequence and the number of ambiguous positions (e.g., heterozygosities). The tree was arbitrarily rooted between *Euura* and other Nematini. The scale bar shows the number of estimated substitutions per nucleotide position.
and lamnium of the saw (Fig. 6D) are of similar length while in the **bergmanni** and **oligospila** groups (Figs 5F–H, 6A, B, 8–9) valvula 3 is more pointed in lateral view and the lamnium is distinctly longer than the radix. **Euura poecilonota** has a different saw (broader, with more serrulae, and different structure of basal serrulae, Fig. 6C). Based on penis valves (Figs 11A–J, 12A, B), males of the **bergmanni** and **oligospila** groups are easier to distinguish from each other and from other species of *Euura* than females. Males of *E. poecilonota* are not known for certain (likely candidate on Fig. 12C), because all previous associations have been almost certainly in error. Penis valves illustrated by Benson (1958) for *E. poecilonota* (under the name *Nematus viridescens*) belong to *E. hypoxantha* (Fig. 12D) and those by Macek et al. (2020) to *E. dispar*. The main difference between **bergmanni** (Fig. 11A–J) and **oligospila** (Fig. 12A, B) group penis valves is in the shape of the valviceps (paravalva + pseudoceps), which is basally about as broad as apically and has a weak or distinct constriction in the middle in **oligospila** group (usually broader apically and without constriction in the middle in **bergmanni** group). **Euura bergmanni** group penis valves usually also have a distinctly deeper invagination between the valvispina and paravalva than in the **oligospila** group. Identification characters of species of the **bergmanni** and **oligospila** groups are summarised in the keys given below. Within the **bergmanni** group it is worth defining the **viridis** subgroup (**brevivalvis**, **dispar**, **viridis**, and **glutinosae**) that is genetically well supported (Fig. 2) and where mitochondrial COI sequences do not allow reliable separation of species. Females of this subgroup can be recognised also morphologically by saws and tendency to have a relatively long malar space compared to most other species in the **bergmanni** and **oligospila** groups.

**Phylogeny of the **bergmanni** and **oligospila** groups**

Based on three genes (COI, NaK, POL2), the branching order at the base of *Euura* phylogeny is poorly resolved, but several strongly supported groups can be identified, such as the **bergmanni** and **oligospila** groups (Fig. 1). Both groups were strongly supported as monophyletic also by all three genes analysed separately (not shown). Females of the **bergmanni** and **oligospila** groups can be very difficult to distinguish despite being distantly related (as suggested by estimated branch lengths: Fig. 1) within *Euura*. Because the phylogenetic relationships among these and other *Euura* species groups remain unresolved based on current data, it cannot be said whether high morphological similarity between the **bergmanni** and **oligospila** groups is because of convergence, parallelism, retention of ancestral characters, or some other reason.

Because of clear conflict between mitochondrial and nuclear data within the **bergmanni** and **oligospila** groups themselves, we analysed these gene sets separately for each group. Within the **bergmanni** group, the **viridis** subgroup is the only relationship above species level that is strongly supported both by COI and nuclear genes. The other relationships are poorly supported or even strongly contradictory (Fig. 2). Species outside the **viridis** subgroup are all monophyletic based on all genes, although identification of specimens of *sylvestris*, *leptocephalus*, and *bergmanni* from North America
based on barcodes (no nuclear data available) is uncertain, as we have not examined these specimens (available photos in BOLD are at least consistent with the identities suggested by barcodes). COI barcodes do not allow species identification within the *viridis* subgroup (Fig. 2), where most specimens (containing all species) fall within a tight cluster of similar sequences (divergence less than 1.8%). A smaller number of COI sequences within the *viridis* subgroup (Fig. 2) are more divergent (up to 3.4%), although interestingly there are specimens that appear to contain two or more COI variants (differing by 0.5–2.3%) falling within the main cluster as well as outside of it (see further discussion under the section “Possible heteroplasmy and NUMTs in *Euura*”). All *viridis* subgroup species are monophyletic based on combined analysis of both nuclear genes and based on POL2 only (Fig. 2). NaK, however, does not clearly separate the *viridis* subgroup species, as these tend to be in multiple clusters

![Figure 2. Maximum likelihood trees of *Euura bergmanni* group (COI left, nuclear NaK and POL2 upper right) and *viridis* subgroup (NaK lower left, POL2 lower right). Numbers at branches show SH-aLRT support (%) / ultrafast bootstrap support (%) values. Support values for weakly supported branches (<90) are not shown. Letters “f” and “m” stand for “female” and “male” if known. Numbers at the end of the tip labels refer to the length of the sequence and the number of ambiguous positions (e.g., heterozygositites). Note the COI heteroplasmic variants for *brevivalvis* ZMUO.030869 and ZMUO.030870 (in bold).]
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In the oligospila group, there are two main clusters based on COI (excluding the possible NUMT) and nuclear genes, but specimen composition differs between the marker sets (Fig. 3). According to COI, both main clusters contain both species (frenalis and oligospila), but according to nuclear genes (combined analyses or separate) the species are monophyletic (Fig. 3). Nevertheless, unlike in the viridis subgroup, COI may still enable identification of oligospila group species, at least in most cases. At least in Europe, frenalis appears to be restricted to two COI clusters, one of which is quite distinct (minimum distance 3.65% to a cluster containing apparently only oligospila), while the other is hardly different (0.3%) from some oligospila specimens (Fig. 3). Sequences of eight specimens of oligospila in BOLD are apparently NUMTs because they include a stop codon and in some cases also indels (insertions or deletions). For another specimen (ZMUO.030844), two COI variants were co-amplified and sequenced, one of which belonged to the NUMT cluster and the other to one of the oligospila clusters (Fig. 3).

Delimitation of species

Unfortunately, mitochondrial COI data is unreliable for species delimitation as it often conflicts with morphology and nuclear data, which is a common pattern in sawflies (Linnen and Farrell 2007; Prous et al. 2017, 2020). Due to the high degree of similarity among females of the bergmanni and oligospila groups, and poor resolution of DNA barcoding, we have primarily relied on male penis valves and nuclear sequence data to delimit species. There are usable morphological characters to distinguish also females, but these tend to be less reliable than penis valve characters in males. Close congruence between morphology and two independent nuclear markers (and often also mitochondrial COI) enabled us to delimit species rather reliably (see individual species treatments for details). Nuclear sequence data is informative.
about within-species variation even without prior knowledge about species boundaries, because the number of variable sequence positions (due to heterozygosity) of heterozygous females (males are haploid) can be counted. When considering mean or maximum distances within species, either based on all specimens or counting heterozygous positions in females individually, the values are remarkably similar. In the *oligospila* group, all the females are heterozygous with mean and maximum distances between haplotypes of 0.28 and 0.53%. The same within-species distance values for all specimens of the *oligospila* group are 0.22 and 0.68%. In the *bergmanni* group, 94% of the females are heterozygous with mean and maximum distances between haplotypes of 0.29 and 0.83%. The same within-species distance values for all specimens of the *bergmanni* group are 0.11 and 1.09%. In other words, haplotypes within a single female are, on average, about as distant as two different specimens of the same species.

**Confusion about the use of names**

Due to the high degree of similarity of females in the *bergmanni* and *oligospila* groups, many of the names have confusing histories, and misinterpretations are also common in the recent literature. Here, only the more prominent or recent examples will be discussed. Particularly, there has been confusion about the identity of the invasive willow sawfly in the southern hemisphere (South America, southern Africa, Australia, New Zealand), which we here identify as *Euura respondens* (Förster, 1854). The name *Nematus oligospilus* [= *E. oligospila* (Förster, 1854)] has been incorrectly used for this sawfly in the southern hemisphere due to the high degree of similarity between females of *E. oligospila* and *E. respondens*. These two species prove to be genetically distant within *Euura* (Fig. 1) and can also be clearly separated based on penis valves (males of *E. respondens* are not known in the introduced parthenogenetic populations in the southern hemisphere). Accordingly, the nominal species *Nematus desantisi* Smith, 1983 described from Argentina, is here treated as a synonym of *E. respondens* and
not of *E. oligospila*. There are further name mix-ups involving other *bergmanni* group species. Macek et al. (2020) used the name *Nematus viridis* for a species here called *E. dispar*, and the name *N. breviseta* for *E. viridis*. In using the name *N. breviseta*, Macek et al. (2020) seem to have relied on Zhelochovtsev (1988), where the name *N. viridis* is not even used. Benson (1958) did use the name *N. viridis*, but did not recognise *E. dispar*. Confusingly, Benson’s (1958) drawing of the penis valve of *N. viridis* actually represents *E. bergmanni* (copied by Lacourt 2020). Benson apparently had not seen or recognised males of *E. viridis* and *E. dispar*.

**Possible heteroplasmasty and NUMTs in *Euura***

Remarkably, multiple mitochondrial COI variants are frequently observed within individuals of *Euura* (unpublished), including in the *bergmanni* and to a lesser extent in the *oligospila* groups. The *viridis* subgroup of the *bergmanni* group is the most problematic in this regard, where many individuals have secondary peaks in Sanger chromatograms, indicating the presence of multiple variants. Usually, the secondary peaks are rather weak, enabling the determination of the dominant variant, but sometimes different variants are represented at similar frequencies, making it necessary to code variable sequence positions with IUPAC ambiguity symbols. Some of the specimens referred to here were re-amplified and sequenced with Nanopore technology, enabling us to determine the exact variants and place them in the tree (Figs 2, 3). Nanopore sequencing even revealed more than two variants per individual in one case (ZMUO.030870), which Sanger sequencing cannot indicate reliably. The intra-individual COI variants in the *viridis* subgroup could indicate genuine heteroplasmasty rather than nuclear-encoded mitochondrial pseudogenes (NUMTs), because the variants have neither stop codons, nor frame shifting indels, and are not in any other way unusual in the *viridis* subgroup context, i.e. do not have unusual nucleotide composition or display long branches in the tree. Interestingly, clear unreliability of mitochondrial COI barcodes in indicating species identity is also restricted to the *viridis* subgroup. If the mis-match between mitochondrial and nuclear sequences with respect to species boundaries in the *viridis* subgroup is mainly due to occasional hybridisations between species (a pattern expected in theory for haplodiploid species and at least partly supported by empirical studies; Linnen and Farrell 2007; Patten et al. 2015; Prous et al. 2020), then this could also explain the presence of extensive heteroplasmy, that has been suggested to be more likely when heterospecific hybridization has occurred (Ladoukakis and Zouros 2017; Mastrantonio et al. 2019). In the *oligospila* group there appears to be a cluster of divergent NUMTs, because all of them contain the same in-frame stop codon as well as in some cases the same frame shifting indels (see the specimens listed under *E. oligospila*). These possible NUMTs can co-amplify with the genuine COI sequence (ZMUO.030844; Fig. 3) or amplify instead of the mitochondrial variant (eight specimens in BOLD).
Identification keys to *bergmanni* and *oligospila* group females and males

**Females**

Abdomen posteriorly with modified segments 8–9 forming the ovipositor and its sheath (Fig. 5A). Length 4.5–9.0 mm. With the exception of *E. leptocephalus* the species are extensively green in life (only exceptionally yellow) and yellowish when dried. Clypeus emarginate ventrally; flagellum 2.6–3.4 times as long as head width; malar space 1.1–2.2 times as long as diameter of front ocellus; claws bifid (West Palaearctic taxa); valvula 3 dorsally roughly 1.5–2.0 times as broad as a cercus, weakly tapering, and without invagination posteriorly; lancet with 16–21(22) serrulae, and long and narrow in most species.

1  
   a  Head and thorax mostly reddish (Fig. 17A, B).
   b  Abdomen dorsally mostly black (Fig. 17A).
   c  Frontal area between antennae protruding less abruptly below (Fig. 5I)
   d  Arctic species .................................................................2

   –  
      aa  Head and thorax mostly yellowish to mostly black (pale parts can be green in life) (e.g. Figs 4, 14A–D)
      bb  Abdomen completely pale to dorsally mostly black (pale parts usually green in life) (e.g. Figs 4, 14C, 20A)
      cc  Frontal area between antennae protruding more abruptly below (Fig. 5J)
      dd  Temperate and arctic species ..................................................3

2(1)  
   a  Dorsal margin of lancet angulate at about second or third serrula from apex, apical sutures distinctly inclined apically (Fig. 6B)
   b  Valvula 3 in dorsal view narrow (Fig. 5B).................................

   .................................................................*E. leptocephalus* (*bergmanni* group)

   –  
      aa  Dorsal margin of lancet not angulate at about second or third serrula from apex, apical sutures not distinctly inclined apically (Fig. 7A)
      bb  Valvula 3 in dorsal view usually broad at base (Fig. 5C, D)........

      .... *similar species* mostly in *flavescens* group (*E. reticulata, E. lienterica in part, E. pallidior*...)

3(1)  
   a  Tip of lancet rather broad and dorsally abruptly narrowing (Fig. 8A–C) or broad and round (Fig. 8D)
   b  Serrulae apically protruding and / or with large microdenticles (Fig. 8)
   c  Malar space 1.5–2.2 times as long as diameter of front ocellus (Fig. 5K, O).........................................................4

   –  
      aa  Tip of lancet usually narrower, acute, and dorsally narrowing less abruptly (Figs 6A, 9)
      bb  Serrulae apically not protruding and with small microdenticles (Figs 6A, 9)
      cc  Malar space 1.1–2.0 times as long as diameter of front ocellus (Fig. 5L–N, P).........................................................7
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4(3) a  Valvula 3 in lateral view shorter (Fig. 5F) ............................... E. brevivalvis
b  Lancet shorter and broader (Fig. 8D)
–  aa  Valvula 3 in lateral view longer (Fig. 5G)
   bb  Lancet longer and narrower (Fig. 8A–C) .............................. 5 [the following three species not definitely morphologically separable]
5(4) a  Slightly larger denticles of serrulae (uncertain) (Fig. 8A) .......... E. dispar
b  Lancet shorter and broader (Fig. 8D)
–  aa  Slightly smaller denticles of serrulae (uncertain) (Fig. 8B, C) ........... 6
6(5) a  On Betula (morphological differences uncertain) ...................... E. viridis
b  On Alnus (morphological differences unknown) ........................... E. glutinosae
7(3) a  Ventral part of 2\textsuperscript{nd} to 4\textsuperscript{th} suture of lancet oblique and more or less straight or weakly curved 
   apically (Fig. 9C)
b  Gap between serrulae relatively large (Fig. 9C)
c  Head dorsally more rounded (Fig. 5Q) ................................... E. respondens
–  aa  Ventral part of 2\textsuperscript{nd} to 4\textsuperscript{th} suture of lancet in most cases weakly or distinctly curved 
   basally (Figs 6A, 9A, B, D)
bb  Gap between serrulae large or small (Figs 6A, 9A, B, D)
cc  Head dorsally rounded or rectangular (Fig. 5R–T) .......................... 8

8(7) a  Lancet usually relatively broad (Fig. 6A)
b  Sutures of basal annulets 
   usually weakly bent (Fig. 6A)
c  Gap between serrulae small, relative to length of serrulae (Fig. 6A) ....
–  aa  Lancet narrower (Fig. 9A, B, D)
bb  Sutures of basal annulets distinctly bent (Fig. 9A, B, D)
cc  Gap between serrulae small or large, relative to length of serrulae (Fig. 9A, B, D) ................................................................. 9

9(8) a  Malar space more than 1.4 times as long as diameter of front ocellus (Fig. 5P)
b  Clypeus usually less deeply emarginate (Fig. 5P)
c  Head in dorsal view more rectangular (Fig. 5S) ............................. E. sylvestris
–  aa  Malar space less than 1.5 times as long as diameter of front ocellus (Fig. 5L)
bb  Clypeus usually more deeply emarginate (Fig. 5L)
cc  Head in dorsal view more rounded (Fig. 5T) .............................. oligospila group ........................ 10

10(9) a  Gap between serrulae smaller compared to length of serrulae (Fig. 9A)
bb  Terga 1–8 dorsally 
   usually completely black (Fig. 21E) ........ E. frenalis
–  aa  Gap between serrulae larger compared to length of serrulae (Fig. 9B)
bb  Terga 1–8 dorsally usually nearly completely pale or with narrow black 
   median line (Fig. 21A) .............................................................. E. oligospila

Males

Abdomen posteriorly with a genital capsule, ventrally covered by undivided sternum 
9 (Fig. 10A). Length 4.5–8.0 mm. From nearly completely black to mostly pale (pale 
colour yellowish to brown; not, at least in Europe, green in life). Clypeus emarginate 
ventrally; flagellum 3.6–4.3 times as long as head width; malar space 1.0–1.9 times as
long as diameter of front ocellus (Fig. 10I–L); claws bifid; tergum 8 with distinct apical projection (Fig. 10B–D); penis valves as in Figs 11, 12A, B.

1  a  Pronotum black (Fig. 17E) as well as most of body (Fig. 17C, D)  
   b  Pronotum basally with two-digit extension (Fig. 11I)..............E. leptocephalus

–  aa  Pronotum extensively pale, often also rest of body (e.g. Figs 13E, 19E)  
   bb  Paravalva basally simple (Figs 11A–H, 11J, 12A, B)..................2

2(1)  a  Pterostigma more or less uniformly pale (Figs 13G, 18C) ...............3
   –  aa  Pterostigma dark brown to black, sometimes centrally somewhat paler  
       (e.g. Figs 13E, 14E) .........................................................................11

3(2)  a  Valviceps basally as broad as apically and with weak or distinct constriction in middle (Fig. 12A, B)  
   b  Invagination between valvispina and paravalva indistinct (Fig. 12A, B)  
   c  Apical projection of tergum 8 about as broad as long or slightly longer than broad and about 0.5 times as long as tergum 8 (Fig. 10B, C)..............E. oligospila group

–  aa  Valviceps often basally narrower than apically and without distinct constriction in middle (Fig. 11)
   bb  Invagination between valvispina and paravalva distinct or indistinct (Fig. 11)
   cc  Apical projection of tergum 8 about as broad as long or distinctly longer than broad and about 0.3–0.5 times as long as tergum 8 (Fig. 10D)........5

4(3)  a  Valvispina possibly broader at base (Fig. 12A)  
   b  Mesepisternum (usually?) extensively pale (Fig. 21D)..............E. oligospila

–  aa  Valvispina possibly narrower at base (Fig. 12B)
   bb  Mesepisternum usually black (Fig. 21H)...............E. frenalis

5(3)  a  Valvispina short (Fig. 11D, E) and invagination between valvispina and paravalva shallow (Fig. 11D, E)  
   b  Head in dorsal view rectangular (Fig. 10E)  
   c  Antennae black or slightly pale ventrally (Fig. 14F)
   d  6.0–8.0 mm..................................................................................E. brevivalvis

–  aa  Penis valve with different combination of characters (Fig. 11A–C, F–H, J)
   bb  Head in dorsal view rectangular to square or round (Fig. 10F, G)
   cc  Antennae usually distinctly pale at least ventrally (e.g. Figs 18C, D, 15D)
   dd  4.5–8.0 mm.................................................................................6

6(5)  a  Pseudoceps apically with distinct filament-like constriction (Fig. 11J)
   b  Invagination between valvispina and paravalva distinct (Fig. 11I)
   c  Valvispina distinctly dorsally directed (Fig. 11J)...............E. respondens

–  aa  Pseudoceps apically without filament-like constriction (Fig. 11A, C, F–H)
   bb  Invagination between valvispina and paravalva distinct or indistinct (Fig. 11A–C, F–H)
   cc  Valvispina in most species not dorsally directed (Fig. 11A–C, F–H)....7

7(6)  a  Invagination between valvispina and paravalva indistinct (Fig. 11F–G)
Euura bergmanni and oligospila groups

b Valvispina relatively short (Fig. 11F, G)
c Paravalsa apically distinctly broader than basally (Fig. 11F, G).... *E. sylvestris*

- aa Invagination between valvispina and paravalva distinct (Fig. 11A–C, H)
  bb Valvispina relatively long (Fig. 11A–C, H)
  cc Paravalva apically distinctly broader than basally or about as broad as basally (Fig. 11A–C, H)

8(7) a Dorsal margins of valvura and pseudoceps distinctly angled (Fig. 11A)
b Valvispina somewhat directed dorsally (Fig. 11A) ............. *E. bergmanni*

- aa Dorsal margins of valvura and pseudoceps not angled (Fig. 11B, C, H)
  bb Valvispina not directed dorsally (Fig. 11B, C, H)

9(8) a Invagination between valvispina and paravalva deep (Fig. 11B)..... *E. dispar*

- aa Invagination between valvispina and paravalva shallower (Fig. 11 C, H).... *E. viridis*

10(9) a Gap between valvispina and paravalva possibly smaller (Fig. 11C)
b On *Betula* ................................................................. *E. glutinosae*

- aa Gap between valvispina and paravalva possibly larger (Fig. 11H)
  bb On *Alnus* ................................................................. *E. glutinosae*

11(2) a Valvispina long and somewhat directed dorsally (Fig. 11A)
b Malar space 1.0–1.4 times as long as diameter of front ocellus (Fig. 10J).............................................................................. *E. bergmanni*

- aa Valvispina long and not directed dorsally, or short and somewhat directed dorsally (Fig. 11B, D, E)
  bb Malar space 1.3–1.9 times as long as diameter of front ocellus (Fig. 10I)..............................................................................

12(11) a Valvispina long (Fig. 11B)
  b Invagination between valvispina and paravalva deep (Fig. 11B)
  c Antennae *usually* distinctly pale at least ventrally (Fig. 15D).... *E. dispar*

- aa Valvispina short (Fig. 11D, E)
  bb Invagination between valvispina and paravalva shallow (Fig. 11D, E)
  cc Antennae black or slightly pale ventrally (Fig. 14F) .............. *E. brevivalvis*

Taxonomy

*Euura* Newman, 1837

*Euura bergmanni* group

The group is mostly defined based on phylogenetic analyses of sequence data (Fig. 1). No clear female morphological characters distinguish it from the highly similar but distantly related *oligospila* group. Similarly, there are no clear characters in males that would uniquely define males of the *bergmanni* group, but penis valves together with external morphology enable reliable separation of the species from other *Euura*. With the possible exceptions of *E. brevivalvis* and *E. leptocephalus*, the species usually have
multiple generations per year (as far as the length of the season allows this). Known larval host plants are all Salicaceae or Betulaceae. Larvae are cryptically coloured, solitary, and at least the later instars feed mostly from the edges of leaves. The group has a natural distribution in the Holarctic.

**Euura bergmanni** (Dahlbom, 1835)
Figs 5M, N, R, 6A, 10F, J, 11A, 13, 22

*Nematus bergmanni* Dahlbom, 1835: 24–25. Type locality: Sweden, Lund area. LT designated below.

*Nematus virescens* Hartig, 1837: 217. Type locality: not stated, but presumably Germany according to the title of Hartig’s publication. LT designated below.

*Nematus pallicarpus* Hartig, 1837: 215–216. Type locality: “in hiesiger Gegend” [Germany, Berlin area]. LT designated by Haris (1997).

*Nematus validicornis* Förster, 1854a: 341–342. Type locality: Germany, Aachen area. LT designated below. Syn. nov.

*Nematus curtispina* Thomson, 1871: 152–153. Type locality: “Probably as widespread as the previous species” [translated from Swedish], which presumably refers to *N. brevivalvis* “Probably occurs throughout Scandinavia” [translated from Swedish]. LT designated below.

*Nematus varipictus* Holmgren, 1883: 147, Plate 2, Fig. 12. Type locality: Matotschkin Scharr [Russia, Novaya Zemlya, Matochkin Strait]. 2 ST females were in NHRS (Lindqvist 1944), but could not recently be found. Synonymy with *Pteronidea curtispina* by Lindqvist (1944).

*Nematus anthophilus* Zaddach, 1884 [in Brischke 1884]: 163–164. Type locality: not stated. Type material probably destroyed (Blank and Taeger 1998). Synonymy with *Pteronus curtispinis* (Thomson) by Konow (1903b).

*Amauronematus longicornis* Konow, 1897: 179. Type locality: Russia, Irkutsk. LT designated below.

*Lygaeonematus pallens* Enslin, 1916: 500–501. Type locality: Germany, Dessau. LT designated by Taeger and Blank (1998).

*Pteronidea curtispina* var. *luctuosa* Enslin, 1916: 455. Type locality: Germany, Bavaria, Fürth. LT designated below.

*Pteronidea vernalis* Lindqvist, 1937: 130–132. Type locality: southern Finland (HT). Not found in MZH. Synonymised with *Pteronidea curtispina* by Lindqvist (1941).

**Similar species.** Females are most similar to *oligospila* group, *E. respondens*, and *E. sylvestris*. Head more rectangular in dorsal view compared to *oligospila* group and *E. respondens*. Lancet usually broader and basal annular sutures usually less bent compared to *E. sylvestris* and *E. respondens*. Gap (cypsella) between serrulae small compared to *oligospila* group. Males distinguishable from other species by distinct penis valves (see key). Length of postocellar area in *E. bergmanni* is not a reliable character to distinguish
it at least from *E. sylvestris*. Females of overwintering generation are dorsally largely black, the later generations largely or nearly completely pale (pterostigma is always pale). Males of overwintering generation are largely black (except legs and abdomen ventrally to various degrees), including pterostigma; the later generations are ventrally largely or nearly completely pale (including pterostigma) but dorsally mostly black. At
least in females there tend to be distinct differences between the generations also in the length of malar space and perhaps postocellar area. In overwintering generations, the malar space tends to be distinctly shorter (Fig. 5M) than in later generations (Fig. 5N).

**Genetic data.** **COI.** Based on 13 specimens, maximum within species distance is 3.65% and the nearest neighbour, diverging by a minimum of 7.1%, is the *viridis* subgroup. Only one BIN: BOLD:AAG3539.

**Nuclear.** Based on 5 specimens, maximum within species distance is 0.19% (0.23% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 3.5%, is *viridis*.

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**Figure 6.** Lancets of *Euura*. **A** bergmanni DEI-GISHym12585 **B** leptocephalus holotype NHRS-HEVA000003974 **C** poecilonota DEI-GISHym21400 **D** hypoxantha DEI-GISHym12505.
Host plants and behaviour. Hosts: a wide variety of Salix species, including *alba*, *fragilis* (Weiffenbach 1985), *aurita*, *viminalis* (Boevé 1990), *caprea*, *pentandra*, *phylicifolia* (Kangas 1985), and *purpurea* (Benander 1966). Lindqvist (1956) recorded up to four generations per year in Finland. Lindqvist (1941) stated that adults from the overwintering generation were very much darker than the next generation, and that adults of the 3rd and 4th generations were paler still. The characteristic continuous double dorsal line of the larva makes their identification usually straightforward. This double line is usually white in early generation larvae, but pink or even red in later generations.

Distribution. Palaearctic (Tæger et al. 2006; Sundukov 2017), possibly also Nearctic (one barcoded larva in BOLD, CHU06-COL-364). Specimens studied are from Finland, Germany, Russia (Irkutsk Oblast), Sweden, Switzerland, United Kingdom.

Type material. *Nematus bergmanni* Dahlbom, 1835. Lectotype, here designated, ♀, MZLU2017334, MZLU. Dahlbom cited a publication by Bergman (1763), in which adults were mentioned, which Dahlbom considered to belong to this species. There is no trace of Torbern Bergman material in the UUZM collection (Hans Mejløn, personal communication: March 11, 2019). Following this citation, Dahlbom described a larva, evidently from his original observations: “Larva prasina linea dorsali lata livida vel purpurascence et utrinque fusco-marginata” [Larva leek green with broad blue or purplish band and dark-bordered at both sides], with the additional information [translated from Latin] “Frequently observed on willows around Lund in Scania from 26 August to 2 October”. Although a label on the lectotype bears the date “14 Aug.”, this might refer to the date of emergence of an adult reared from a larva, and therefore does not necessarily contradict Dahlbom’s statement.

*Nematus virescens* Hartig, 1837. Lectotype, here designated, ♀, GBIF-GISHym3456, ZSM. Koch (2000) mentioned this same specimen as LT, with details of its labelling, together with 2 “Paratypen”. This was not, however, a valid taxonomic act, because he omitted an explicit statement that he was designating this specimen (see ICZN 2003).
**Nematus pallicarpus** Hartig, 1837. LT, “Cotype”, “Nematus pallicarpus Htg. Th. Hartig det.”, “Pteronidea curtispina Th. E. Clément det.”, DEI-GISHym84734, ZSM. 6 female paralectotypes with similar labels to LT. Three males with similar labels cannot be syntypes: Hartig described only the female sex.

**Nematus validicornis** Förster, 1854. **Lectotype**, here designated, ♂, GBIF-GISHym3451, ZSM.

**Nematus curtispina** Thomson, 1871. **Lectotype**, here designated, ♀, MZLU2017334, MZLU [the same specimen as the LT of bergmanni Dahlbom]. Koch (2000) mentioned this same specimen as LT, with details of its labelling. This was not, however, a valid taxonomic act, because he omitted an explicit statement that he was designating this specimen (see ICZN 2003).

**Amauronematus longicornis** Konow, 1897. **Lectotype**, here designated, ♂, GBIF-GISHym3849, SDEI. Penis valve mounted on a separate slide (Symphyta Coll. Nr. 233). The lectotype designation indicated by a label by Zinovjev is unpublished. Lindqvist (1972: 71) studied this male and called it “♂-Typus”; but since he also mentioned a “♀-Typus”, which could not be found at the SDEI, his action is not a lectotype designation.

**Lygaeonematus pallens** Enslin, 1916. LT, ♀, DEI-GISHym84733, ZSM.

**Pteronidea curtispina** var. **luctuosa** Enslin, 1916. **Lectotype**, here designated, ♂, GBIF-GISHym3339, ZSM.

**Euura brevivalvis** (Thomson, 1871)
Figs 5F, J, K, 8D, 10E, I, 11D, E, 14, 23

**Nematus brevivalvis** Thomson, 1871: 151–152. Type locality: Sweden, Dalarna alpina. LT designated below.

**Pteronus kriegeri** Konow, 1903a: 310 (key). Type locality: Germany, Saxony, Dorneichenbach..LT designated by Koch (2000).

**Amauronematus spurcus** Konow, 1904: 261. Type locality: northern Russia. LT designated below.

**Pteronidea absimilis** Lindqvist, 1949: 79–80. Type locality: Finland, Pihtipudas (HT).

**Pteronidea woollatti** Lindqvist, 1971: 11–12. Type locality: Finland, Kilpisjärvi (HT). Syn. nov.

**Nematus turgaiensis** Safjanov, 1977: 98–103. Type locality: Russia, southern Kulunda steppe (ST). Syn. nov.

**Similar species.** Most similar species are *E. viridis*, *E. dispar*, and *E. glutinosae*, from which it differs by having a shorter valvula 3 and lancet. Males distinguishable from other species by distinct penis valves.

**Genetic data. COI.** Based on 13 specimens, maximum within species distance is 3.19% and the nearest neighbour, diverging by a minimum of 0%, are *dispar, viridis*, and possibly *glutinosae*. BINs: BOLD:AEC8057, BOLD:ABZ5797, BOLD:ACF5540 (main cluster).
Euura bergmanni and oligospila groups

Nuclear. Based on 10 (only NaK) or 8 (NaK and POL2) specimens, maximum within species distance is 1.09% (only NaK) or 0.92% (NaK and POL2) and 0.12% based on haplotypes of individual females. The nearest neighbour, diverging by a minimum of 0% (only NaK) or 0.41% (NaK and POL2), is viridis. The 0% distance

Figure 8. Lancets of Euura bergmanni group. A dispar DEI-GISHym84146 B viridis DEI-GISHym21364 C glutinosae DEI-GISHym80498 D brevivalvis DEI-GISHym31135.
between *viridis* and *brevivalvis* for NaK is because one of the haplotypes of one female of *viridis* (ZMUO.030835) is identical to several *brevivalvis* specimens.

**Host plants and behaviour.** Hosts: *Betula* species, *B. pendula* (Ermolenko and Fedoryak 1988), *B. pubescens* including var. *pumila* (Kangas 1985; Lahtinen et al. 2006), *Betula nana* (this study and unpublished rearing results by V. Vikberg). In Kazakhstan and southern Siberia males are respectively very rare or scarce (Safjanov 1977; Ermolenko and Fedoryak 1988), although they are common in northern Europe (Liston et al. 2020). One generation per year (Safjanov 1977; Macek et al. 2020).

**Distribution.** Palaearctic (Ermolenko and Fedoryak 1988; Taeger et al. 2006; Sundukov 2017). Specimens studied are from Estonia, Finland, France, Germany, Norway, Russia, and Sweden.

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**Figure 9.** Lancets of *Euura oligospila* and *bergmanni* groups. A *frenalis* DEI-GISHym31132 B *oligospila* DEI-GISHym88899 C *respondens* DEI-GISHym11597 D *sylvestris* PR.574VV.
Euura bergmanni and oligospila groups

Type material. *Nematus brevivalvis* Thomson, 1871. **Lectotype**, here designated, ♀, DEI-GISHym88904, MZLU. Koch (2000) mentioned this same specimen as LT, with details of its labelling. This was not, however, a valid taxonomic act, because he omitted an explicit statement that he was designating this specimen (see ICZN 2003).

*Pteronus kriegeri* Konow, 1903a. LT, ♀, GBIF-GISHym3847, SDEI. Koch (2000) mentioned this same specimen as LT, with details of its labelling, and in his “Diskussion” (p. 134) validly designated it.

*Amauronematus spurcus* Konow, 1904. **Lectotype**, here designated, ♀, GBIF-GISHym3848, SDEI. Koch (2000) mentioned this same specimen as LT, with details of its labelling, together with a female paralectotype. This was not, however, a valid taxonomic act, because he omitted an explicit statement that he was designating this specimen (see ICZN 2003).

*Pteronidea absimilis* Lindqvist, 1949. HT, ♀, http://id.luomus.fi/GL.3465, MZH. *Pteronidea woollatti* Lindqvist, 1971. HT, ♀, http://id.luomus.fi/GL.9217, MZH. Slide preparation PR.605VV of saw by V. Vikberg. The paratype ♂ is *E. sylvestris* (http://id.luomus.fi/GL.9216; slide preparation PR.606VV of penis valve by V. Vikberg).
**Euura dispar** (Zaddach, 1876)
Figs 4, 8A, 11B, 15, 24C–E

*Nematus dispar* Zaddach, 1876: Plate II(5), 5. Type locality: Heubude (according to Brischke 1884) [Poland, now part of Gdansk] (ST). Type material probably destroyed (Blank and Taeger 1998).

*Pteronidea pseudodispar* Lindqvist, 1969: 242–245. Type locality: Finland, Helsinki, Munksnäs (HT). Syn. nov.

**Similar species.** Most similar species are *E. viridis* and *E. glutinosae*, from which it possibly differs by having slightly larger denticles of serrulae. Males distinguishable from other species by their distinctive penis valves.

**Genetic data.** *COI.* Based on 11 specimens, maximum within species distance is 1.75% and the nearest neighbours, diverging by a minimum of 0%, are *brevivalvis, glutinosae*, and *viridis*. BINs: BOLD:AEC8057, BOLD:ABZ5797, BOLD:ACF5540 (main cluster).

**Nuclear.** Based on 6 specimens, maximum within species distance is 0.25% (0.15% based on haplotypes of individual females). The nearest neighbours, diverging by a minimum of 0.63%, are *brevivalvis* and *glutinosae*.

**Host plants and behaviour.** Hosts: *Betula pendula* (Kangas 1985) and *B. pubescens* (Kontuniemi 1960). Probably two generations per year, of which larvae identified as *pseudodispar* belong to the second generation (Lindqvist 1969).

**Distribution.** Palaearctic (Taeger et al. 2006; Sundukov 2017). Specimens studied are from Finland, Germany, Italy, Portugal, Sweden, and United Kingdom.

**Type material.** *Pteronidea pseudodispar* Lindqvist, 1969. HT, ♀, http://id.luomus.fi/GL.3514, MZH.

**Euura glutinosae** (Cameron, 1882)
Figs 8C, 11H, 16, 24A, B

*Nematus glutinosae* Cameron, 1882: 193–194. Type locality: Great Britain, England, Worcestershire. LT designated below.

*Nematus viridissimus* Möller, 1882: 179. Type locality: Sweden, Skåne, Skrifvaremöllan vid Tvedörra lägerplats. LT designated by Lindqvist (1962).

**Note.** Cameron’s article was published in February 1882, according to the issue wrappers and printed in the journal itself. Möller’s article was published no earlier than mid December 1882, based on an advertisement inside front issue wrapper dated December 1882, and the proceedings of the Entomologiska Föreningen meeting on 14 December 1882 published in the same issue (pp. 195–203). The seniority of the name *glutinosae* has previously been overlooked. Loth (1913) used *Pteronus glutinosae* as the name for this taxon, and following Article 23.9 (ICZN 1999), *glutinosae* is therefore the valid species name.

**Similar species.** Most similar species are *E. dispar* and *E. viridis*. Compared to *E. dispar* it possibly has slightly smaller denticles of serrulae. Differences from *E. viridis*
Euura bergmanni and oligospila groups

Male penis valves are most similar to *E. viridis*. There is possibly a larger gap between paravalva and valvispina compared to *E. viridis*.

**Genetic data. COI.** Based on 3 specimens, maximum within species distance is 0.15% and the nearest neighbour, diverging by a minimum of 0%, is *dispar*, but possibly also *brevivalvis* and *viridis*. BINs: **BOLD:ACF5540** (main cluster), but possibly also **BOLD:AEC8057** and **BOLD:ABZ5797**.

**Nuclear.** Based on 2 specimens, maximum within species distance is 0% (0.02% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 0.63%, is *dispar*.

*Figure 11.* Penis valves of *Euura bergmanni* group. A bergmanni ZMUO.032583 B dispar DEI-GISHym88519 C viridis ZMUO.030834 D brevivalvis DEI-GISHym84227 E brevivalvis ZMUO.030870 F sylvestris DEI-GISHym83594 G sylvestris ZMUO.033416 H glutinosae DEI-GISHym84096 I leptocephalus DEI-GISHym88730 J respondens DEI-GISHym12514.
Host plants and behaviour. Hosts: *Alnus* species; *A. glutinosa* (Macek et al. 2020), *A. incana* (Kangas 1985) and *A. cordifolia* (Schedl 2010). Intriguing, but requiring confirmation, are comments by Pschorn-Walcher and Altenhofer (2000), that “*Nematus prasinus*” larvae, although they strongly preferred *Alnus* species, also accepted *Betula, Carpinus* and *Corylus* in feeding tests. Two generations per year (Weiffenbach 1985; Pschorn-Walcher and Altenhofer 2000).

Distribution. Nearly all published records are from the West Palaearctic (Europe, Georgia, Zinovjev 1978; Taeger et al. 2006), apart from a specimen from Mongolia recorded as *Nematus viridissimus* by Haris (2002). Specimens studied are from Austria, France, Germany, Russia (Moscow Oblast), Sweden, United Kingdom.

Type material. *Nematus glutinosae* Cameron, 1882. Lectotype, here designated, ♀, B.M.TYPe HYM.1.623, BMNH. “Type” “B.M.TYPe HYM.1.623” “HOLO-TYPE ♀ Nematus glutinosae Cameron det. R.B.Benson.1938” “Bred 21/9/75; the L. VIII on Alnus glutinosa. Worsh” “Cameron. 96-76. Worcester” “polyspila”, BMNH.

*Nematus viridissimus* Möller, 1882. LT, ♀ GNM-HYME000000210, GNM. Koch (2000) wrongly ascribed holotype status to this specimen. However, the discussion of the specimen as the type by Lindqvist (1962) satisfies the requirements of Article 74.6 (ICZN 1999) for the designation of a lectotype.

**Euura leptocephalus** (Thomson, 1863)

Figs 5B, I, 6B, 11I, 17

*Nematus leptocephalus* Thomson, 1863: 632. Type locality: Scandinavia, “Lapponia intermedia” (HT).

Similar species. Most similar species are *E. reticulata* and similar species in the *flavescens* group (character states in parentheses), from which it differs by having dorsal margin of lancet angulate at about second or third serrula from apex (not angulate) and apical
Euura bergmanni and oligospila groups

sutures distinctly inclined apically (not inclined). Valvula 3 is also (usually) slightly narrower compared to flavescens group. Males distinguishable from other species by distinct penis valves.

Figure 13. Euura bergmanni adults. Females ZMUO.040825 (A, B) and ZMUO.039814 (C, D), males ZMUO.035691 (E, F) and ZMUO.040823 (G, H).
Genetic data. **COI.** Based on 4 specimens, maximum within species distance is 0.76% (4.56% when including representatives from BOLD:AAG3563 and BOLD:ACY4317) and the nearest neighbour, diverging by a minimum of 6.23%, is *sylvestris*. BINs: BOLD:ADS7391 (Holarctic), possibly also Nearctic BOLD:AAG3563 and BOLD:ACY4317.

**Nuclear.** Based on 3 specimens, maximum within species distance is 0.07% (0.05% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 2.96%, is *viridis*.

**Host plants and behaviour.** Hosts: *Salix* spec. (Lindqvist 1960b); *Salix glauca* (V. Vikberg: unpublished rearing results). Probably only one generation per year.

**Distribution.** West Palaearctic and Nearctic (Sundukov 2017). Mainly in subarctic and arctic areas. Specimens studied are from Finland, Norway, and Sweden.

**Type material.** *Nematus leptocephalus*. HT, ♀, NHRS-HEVA000003974, NHRS.
Euura bergmanni and oligospila groups

Euura respondens (Förster, 1854)
Figs 5Q, 9C, 10A, G, 11J, 18, 26D–F

Nematus respondens Förster, 1854b: 427–428. Type locality: Austria. Lectotype designated below.

Nematus nitens Thomson, 1888: 1212. Type locality: Sweden, Lund. Lectotype designated by Koch (2000). Mentioned as a synonym of Nematus respondens by Zhelochovtsev and Zinovjev (1995).

Pteronus balassagloi Jakowlew, 1891: 23–24. Type locality: Uzbekistan, Tashkent. Lectotype designated by Zhelohovtsev (1976). Mentioned as a synonym of Nematus respondens by Zhelohovtsev (1976).

Nematus declaratus Muche, 1974: 105–107. Type locality: Uzbekistan, Fergana (HT). Syn. nov.

Nematus desantisi D.R. Smith, 1983: 260–262. Type locality: Argentina, Chubut, Valle del Rio Chubut (HT). Syn. nov.

Similar species. Females are most similar to oligospila group, E. bergmanni, and E. sylvestris. Head more rounded in dorsal view and lancet somewhat narrower compared to E. bergmanni. Ventral parts of 2nd to 4th suture of lancet are oblique and more or less straight or weakly curved apically in E. respondens, but weakly or distinctly curved

Figure 15. Euura dispar adults. Female ZMUO.034987 (A, B), male ZMUO.040517 (C, D). Identification of the female is uncertain.
basally in *oligospila* group and *E. sylvestris*. Males distinguishable from other species by distinct penis valves.

**Genetic data.** *COI*. Based on 10 specimens, maximum within species distance is 3.19% and the nearest neighbour, diverging by a minimum of 5.44%, is *viridis* sub-group. BIN: BOLD:ABU8945.

**Nuclear.** Based on 3 specimens, maximum within species distance is 0.18% (0.27% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 3.82%, is *viridis*.

**Host plants and behaviour.** Hosts: a large number of *Salix* species, as well as sometimes *Populus* species (Dapoto and Giganti 1994; Koch and Smith 2000). Host records from the countries where *E. respondens* has become invasive are considered to be reliable, because no similar sawflies occur there, but records from Europe should be treated with caution, because the larvae of *E. respondens* and *E. oligospila* are apparently very similar. Up to six generations per year have been recorded, in Argentina (Alderete et al. 2002).

**Distribution.** Palaearctic, Neotropics, Afrotropic, Australasian (Zhelohovcev 1976; Koch and Smith 2000; Tæger et al. 2006; Schmidt and Smith 2009; Caron et al. 2013, current data). Almost certainly also Nearctic and Oriental. Specimens studied
are from Argentina, Australia, Austria, Bulgaria, Czech Republic, Finland, Germany, Greece, Slovakia, Sweden, and Uzbekistan.

**Type material.** *Nematus respondens* Förster, 1854b. **Lectotype**, here designated, ♂, GBIF-GISHym3404, ZSM. The specimen is completely destroyed and only one badly damaged penisvalve remains. However, the shape of the penis valve of this taxon is highly characteristic.

*Nematus nitens* Thomson, 1888. LT, ♀, DEI-GISHym88903, MZLU.

*Pteronus balassagloi* Jakowlew, 1891. **Lectotype**, ♂, DEI-GISHym30223, ZIN.

*Nematus declaratus* Muche, 1974. HT, ♂, GBIF-GISHym2826, ZMHB.

**Euura sylvestris** (Cameron, 1884)
Figs 5P, S, 9D, 10K, 11F, G, 19, 25

*Nematus sylvestris* Cameron, 1884: 266. Type locality: not stated in original description (ST); according to Cameron (1885) “Cadder Wilderness” [Scotland, Glasgow area]. Lindqvist (1962) described the results of his studies of the original description, and by R. B. Benson of the “type”, and reinstated the name as valid.

*Pteronidea straminea* Lindqvist, 1958: 103. Type locality: Nurmes, Finland (HT). Syn. nov.

*Pteronidea angustiserra* Lindqvist, 1969: 241–242. Type locality: Mustasaari, Finland (HT). Syn. nov.

*Pteronidea disparoides* Lindqvist, 1969: 245. Type locality: Espoo, Finland (HT). Syn. nov.

**Similar species.** Females are most similar to *oligospila* group, *E. respondens*, and *E. bergmanni*, from which it differs usually by having a longer malar space. Lancet is usually narrower compared to *E. bergmanni*. Clypeus is usually less deeply emarginate compared to *oligospila* group. Ventral part of 2nd to 4th suture of lancet is weakly or distinctly curved basally in *E. sylvestris*, but oblique and more or less straight or weakly curved apically in *E. respondens*. Males distinguishable from other species by their relatively distinct penis valves.

**Genetic data.** **COI.** Based on 22 specimens, maximum within species distance is 3.68% (5.68% when including also Nearctic-only BINs) and the nearest neighbour, diverging by a minimum of 5.45%, is *viridis* subgroup. BINs: BOLD:AAG3515 (Holarctic), BOLD:AEH2646 (ZMUO.038944, Finland), and possibly also Nearctic BOLD:AAU8841, BOLD:ACJ5634, BOLD:ACI4984, BOLD:AAG3521, BOLD:ACN0565.

**Nuclear.** Based on 14 specimens, maximum within species distance is 0.97% (0.83% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 2.72%, is *viridis*.

**Host plants and behaviour.** Hosts: *Salix* spp. and at least occasionally *Populus tremula*. Cameron (1884) included a description of the larva of *N. sylvestris* in the
species’ description, and gave the host as *Salix caprea*. Other *Salix* species recorded as hosts are: *pentandra*, *phylicifolia* (Kangas 1985), and *myrsinifolia* (Kontuniemi 1971). We have collected or reared larvae from *S. caprea*, *S. pentandra*, *S. hegetschweileri*, *S. myrsinifolia*, and *Populus tremula*. Apparently there can be more than one generation per year (Kontuniemi 1971).

**Distribution.** Holarctic (Sundukov 2017, current data). Specimens studied are from Austria, Finland, Lithuania, and Sweden.

**Type material.** *Pteronidea straminea* Lindqvist, 1958. HT, ♀, http://id.luomus.fi/GL.3512 (saw slide PR240.AZ lost?), MZH. Lindqvist (1972) synonymised *straminea* with *Pteronus pallens* Konow, 1903 (see *Euura pallens*). Unfortunately, the saw of the holotype of *straminea* seems to be lost, but judging from the figure by Lindqvist (1958: 101, Fig. 15) the serrulae do not appear to be as prominent as in *E. pallens* (Fig. 7B) and seem to fit better with *E. sylvestris*, although synonymy with *E. respondens* cannot be excluded.

*Pteronidea angustiserra* Lindqvist, 1969. HT, ♀, http://id.luomus.fi/GL.3443, MZH.

*Pteronidea disparoides* Lindqvist, 1969. HT, ♀, http://id.luomus.fi/GL.3493, MZH.
Euura bergmanni and oligospila groups

Euura viridis (Stephens, 1835)
Figs 5G, O, 8B, 10D, 11C, 20

Nematus viridis Stephens, 1835: 30. Type locality: England, London area (HT).
Nematus prasinus Hartig, 1837: 216–217. Type locality: not stated, but presumably Germany according to the title of Hartig’s publication (ST). LT designated below.
Nematus polyspilus Förster, 1854a: 284, 286–288. Type locality: Germany, Aachen area (ST). LT designated below.
Pteronidea breviseta Lindqvist, 1946: 181. Type locality: Scandinavia, Lapland (ST).
No identifiable syntypes were located. Syn. nov.
Pteronidea breviseta Lindqvist, 1949: 75–77. Type locality: Finland, Utsjoki, Outakoski (HT). Syn. nov.
Pteronidea abscondita Lindqvist, 1949: 77. Type locality: Finland, Kuusamo (HT) [according to original description in ZMUT, but is actually in MZH]. Syn. nov.
Pteronidea lauroi Lindqvist, 1960a: 35. Type locality: Finland, Ahlainen, Rankku (HT). Syn. nov.

Similar species. Most similar species are E. dispar and E. glutinosae. Compared to E. dispar it possibly has slightly smaller denticles of serrulae. Differences from E. glutinosae are not entirely clear. Male penis valves are most similar to E. glutinosae. There is possibly a smaller
gap between paravalva and valvispina compared to *E. glutinosae*. Since differences from *E. glutinosae* are not clear, the new synonymies proposed here might not be correct. Fortunately, even if the synonymies are more accurately treated under *E. glutinosae*, it would not disrupt the usage of currently valid names. The *Pteronidea abscondita* “allotype” (not a type specimen) (http://id.luomus.fi/GL.3442) is most likely *E. flavescens* (Stephens, 1835).

**Genetic data. COI.** Based on 4 specimens, maximum within species distance is 0.46% and the nearest neighbour, diverging by a minimum of 0%, are *brevivalvis, dispar*, and possibly *glutinosae*. BINs: BOLD:AEC8057, BOLD:ABZ5797, BOLD:ACF5540 (main cluster).
Nuclear. Based on 4 specimens, maximum within species distance is 0.09% (0.55% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 0% (only NaK) or 0.41% (NaK and POL2), is brevivalvis.

Host plants and behaviour. Hosts: most host records under the name viridis and all those under breviseta refer to Betula, e.g. B. pendula (Kontuniemi 1960), B. pubescens (Kontuniemi 1960; Tenow 1963; Hanhimaki et al. 1995), and Betula utilis (Schedl 2010). However, other sources mention several additional hosts, all of which require checking, because they may involve misidentifications of the sawfly species: see also above, under E. glutinosae.

Distribution. Palaearctic (Sundukov 2017; current data). Specimens studied are from Finland, Germany, Sweden, and United Kingdom.

Type material. Nematus viridis Stephens, 1835. HT, ♀, B.M.TYPE HYM.I-697, BMNH.

Nematus prasinus Hartig, 1837. Lectotype, here designated, ♀, GBIF-GISHym3388, ZSM. Koch (2000) mentioned this same specimen as LT, with details of its labelling. This was not, however, a valid taxonomic act, because he omitted an explicit statement that he was designating this specimen (see ICZN 2003).

Nematus polyspilus Förster, 1854. Lectotype, here designated, ♀, GBIF-GISHym3386, ZSM. Koch (2000) mentioned this same specimen as LT, with details of its labelling. This was not, however, a valid taxonomic act, because he omitted an explicit statement that he was designating this specimen (see ICZN 2003).

Pteronidea breviseta Lindqvist, 1946. No identifiable syntypes found: the HT of P. breviseta Lindqvist, 1949 was collected in 1948, and so cannot be a syntype of the taxon described in 1946.

Pteronidea breviseta Lindqvist, 1949. HT, ♀, http://id.luomus.fi/GL.3461, MZH.
Pteronidea abscondita Lindqvist, 1949. HT, ♀, http://id.luomus.fi/GL.3441, MZH.
Pteronidea lauroi Lindqvist, 1960. HT, ♀, http://id.luomus.fi/GL.3506, MZH.

Euura bergmanni group species outside the West Palaearctic

Euura pallens (Konow, 1903)

Pteronus pallens Konow, 1903: 310 (key). Type locality: Irkutsk, Russia (LT).

Similar species. Most similar species are sylvestris and respondens, from which it differs by having more prominent serrulae (cf. Figs 7B, 9C, D). It is possible that pallens is a synonym of respondens (shape of the basal sutures of the lancet seem to be most similar to this species), even though the serrulae seem to be more prominent than in other specimens of bergmanni group examined so far. Lindqvist (1972) synonymised straminea, which we treat as a synonym of sylvestris, with pallens. Male unknown.

Distribution. East Palaearctic. Removed from the list of West Palaearctic taxa. Specimens studied are from Russia (Irkutsk Oblast).

Type material. Pteronus pallens Konow, 1903. LT, here designated, ♀, GBIF-GISHym3863, SDEI.
Euura bergmanni group, incertae sedis

Euura pyramidalis (Hellén, 1948)

Nematus (Pteronidea) pyramidalis Hellén, 1948: 114. Two ST ♀♀ not found in MZH. Type locality: Dudinka, Krasnoyarsk Krai, Russia.

Notes. Seems to belong to the bergmanni rather than the oligospila group, because of its long malar space according to the original description (Hellén 1948). Overall colouration, small size (5.5 mm), and high northern locality (69.42°N, 86.25°E) suggests that it could be conspecific with E. sylvestris.
**Euura oligospila group**

The group is mostly defined based on phylogenetic analyses of sequence data (Fig. 1). No clear female morphological characters distinguish it from the highly similar but distantly related *bergmanni* group. Penis valves, however, enable rather easy separation of the *oligospila* group from the *bergmanni* group and the other *Euura*. The valviceps in the *oligospila* group is basally about as broad as apically, has a weak or distinct constriction in the middle, and the invagination between valvispina and paravalva is indistinct (Fig. 12A, B). Usually multiple generations per year, except probably at high latitudes and altitudes. *Salix* species are the hosts of the two European species. Larvae are cryptically coloured, solitary, and at least the later instars feed mostly from the edges of leaves. The group has a natural distribution in the Holarctic.

**Euura frenalis** (Thomson, 1888)

Figs 5H, 9A, 10C, 12B, 21E–H

*Nematus frenalis* Thomson, 1888: 1210–1212. Type locality: Sweden, Jämtland, Åreskutan. LT designated by Koch (2000).

*Pteronus fastosus* Konow, 1904: 262–263. Type locality: northern Russia, Kanin Peninsula. LT designated below.

*Nematus (Pteronidea) fastosus* var. *ponojense* Hellén, 1948: 115. Type locality: Russia, Kola Peninsula, Ponoj (ST). Lectotype designated below. Syn. nov.

*Nematus (Pteronidea) fastosus* var. *punctiscuta* Hellén, 1948: 115. Type locality: Finland, Kilpisjärvi. LT designated below. Syn. nov.

**Similar species.** See the key couplets 10 (females) and 4 (males).

**Genetic data. COI.** Based on 11 specimens, maximum within species distance is 6.38% and the nearest neighbour, diverging by a minimum of 0.3%, is *oligospila*. BINs: BOLD:AEA7654 and BOLD:ABZ2416, but possibly also Nearctic BOLD:ACA8095 and BOLD:AAV4677.

**Nuclear.** Based on 10 specimens, maximum within species distance is 0.67% (0.53% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 0.72%, is *oligospila*.

**Host plants and behaviour.** Hosts: according to Kangas (1985) *Salix cinerea*, *myrsinifolia*, *pentandra*, and *phylicifolia*.

Two generations in southern Finland according to Lindqvist (1961).

**Distribution.** Palaearctic (Sundukov 2017, current data), but possibly also Nearctic. Mainly in the North. Specimens studied are from Finland, Norway, Russia (Murmansk Oblast, Nenets Autonomous Okrug), and Sweden.

**Type material.** *Nematus frenalis* Thomson, 1888. LT, ♀, DEI-GISHym88902, MZLU.

*Pteronus fastosus* Konow, 1904. **Lectotype**, here designated, ♀, GBIF-GISHym3851, SDEI. Koch (2000) mentioned this same specimen as LT, with details of its labelling.
This was not, however, a valid taxonomic act, because he omitted an explicit statement that he was designating this specimen (see ICZN 2003).

*Nematus (Pteronidea) fastosus* var. *ponojense* Hellén, 1948. **Lectotype**, here designated, ♀, [http://id.luomus.fi/GL.3546](http://id.luomus.fi/GL.3546), MZH.

*Nematus (Pteronidea) fastosus* var. *punctiscuta* Hellén, 1948. **Lectotype**, here designated, ♀, [http://id.luomus.fi/GL.3544](http://id.luomus.fi/GL.3544), MZH.

**Euura oligospila** ( Förster, 1854)

Figs 5A, L, T, 9B, 10B, H, L, 12A, 21A–D, 26A–C

*Nematus oligospilus* Förster, 1854a: 284–286. Type locality: Germany, Aachen area. LT designated by Koch and Smith (2000).

*Nematus mendicus* Walsh, 1866: 261–262. Type locality: not stated (ST, probably destroyed by fire: Zinovjev and Smith 2000). Synonymised with *Nematus oligospilus* by Benson (1962).

*Nematus trivittatus* Norton, 1867: 218. Type locality: Canada, Mackenzie River and Great Slave Lake; USA, Illinois (ST). Synonymy with *Pteronidea mendica* by MacGillivray (1916).

*Nematus microcercus* Thomson, 1871: 152. Type locality: Sweden, Lund. Lectotype designated below.

*Nematus dorsipectus* Cresson, 1880: 10. Type locality: USA, Nevada (ST). Synonymised with *Nematus oligospilus* by Smith (1979).

*Nematus salicivorans* Cameron, 1882: 194–195. Type locality: Great Britain, England, Worcestershire. Lectotype designated below.

*Pteronus koebelei* Marlatt, 1896: 44–46 (key), 71. Type locality: USA, California and Oregon (ST). Synonymy with *Nematus mendicus* by Ross (1951).

*Pteronidea vanduzeei* Rohwer, 1913: 280–281. Type locality: USA, Virginia, Chain Bridge (HT). Synonymy with *Nematus mendicus* by Ross (1951).

*Pteronidea elelea* MacGillivray, 1923: 162. Type locality: Canada, Alberta, Edmonton (ST). Synonymy with *Nematus mendicus* by Ross (1951).

**Similar species.** See the key couplets 10 (females) and 4 (males). Can be small, about 4.5 mm (ZMUO.038944).

**Genetic data.** *COI.* Based on 12 specimens, maximum within species distance is 5.93% and the nearest neighbour, diverging by a minimum of 0.3%, is *frenalis*. BINs: BOLD:AAV4676, BOLD:ABZ2416, BOLD:AEA6205, BOLD:ABY8224 (DEI-GISHym11390), BOLD:AEA3640 (Russian Far East), and possibly European BOLD:ADW3220 and Nearctic BOLD:ACA8095, BOLD:AAV4677. BOLD:ABW6676 is an artefact because of chimeric sequences composed of BOLD:AEA6205 and a possible NUMT cluster. Additionally, some specimens in BOLD possibly belong to a NUMT cluster because of a stop codon and in some cases also indels: ZMUO.038942, ZMUO.035716, JSLK-S0065, ZMUO.035743, ZMUO.035642,
Euura bergmanni and oligospila groups

Figure 21. Euura oligospila (A–D) and E. frenalis (Fig. E–H) adults. Female ZMUO.035711 (A, B), male ZMUO.035743 (C, D), female ZMUO.035931 (E, F), male ZMUO.034316 (G, H).
ZMUO.035689, ZMUO.031369, ZMUO.035712. Specimen ZMUO.030844 has two COI variants, one belonging to BOLD:AEA6205 and the other one in the NUMT cluster (it has a stop codon in the barcoding region and a 1 bp insertion outside the barcoding region).

**Nuclear.** Based on 10 specimens, maximum within species distance is 0.68% (0.52% based on haplotypes of individual females). The nearest neighbour, diverging by a minimum of 0.72%, is frenalis.

**Host plants and behaviour.** Hosts: Salix species (Cameron 1882 [types of N. salicivorus]; Macek et al. 2020). A large number of Salix species, and a few species of Populus, are named as hosts of oligospila (or oligospilus) in the literature, but such records from Australasia, southern Africa and South America all refer to E. respondens (see above). Because of widespread mixing up in Europe of E. respondens and E. oligospila, it is often not clear as to which species the published records refer. Lorenz and Kraus (1957) listed Ulmus as a host of oligospila, but this is probably based on Conde (1938), whose meaning is not clear, and probably only indicates that an adult had been collected from Ulmus. Probably has two generations per year in southern Sweden (Benander 1966).

**Figure 22.** Euura bergmanni larvae. A Finland 2019 Salix fragilis B, C Finland 2020 Salix sp. D Finland 2019 Salix glaucal lapponum. Larvae of the first generation (A–C) are typically with white double dorsal line, while those of the later generations (D) are usually with pink or reddish dorsal line.
Euura bergmanni and oligospila groups

Distribution. West Palaearctic (see Material studied, below), East Palaearctic (Sundukov 2017) and possibly Nearctic if the synonymies given above are correct, but mentions from southern Africa, South America, Australia, and New Zealand refer to E. respondens. Specimens studied are from Austria, Estonia, Finland, France, Germany, Russia (Primorsky Krai), Slovakia, Sweden, United Kingdom.

Type material. Nematus oligospilus Förster, 1854. LT, ♂, GBIF-GISHym3372, ZSM. Nematus microcercus Thomson, 1871. Lectotype, here designated, ♂, MZLU2017330, MZLU. Paralectotypes: 1♂, MZLU2017329. 2♀, MZLU2017327-328, det. E. oligospila; 1♀, MZLU2017326, det. E. glutinosae, MZLU.

Figure 23. Euura brevivalvis larvae. A–D Finland 2019 Betula pubescens E DEI-GISHym83698 Sweden 2017 Betula nana F DEI-GISHym83696 Sweden 2017 Betula nana.
Figure 24. *Euura glutinosae* (A, B) and possible *dispar* (C–E) larvae A, B France 2007 *Alnus glutinosa* (photos: Henri Savina) C Pyrenees 2010 *Betula* (photo: Henri Savina) D Finland 2020 swept larva E DEI-GISHym12579 Germany 2020 *Betula pendula*. The larvae with paired red dots (C, D) have earlier been considered as representing *pseudodispar* that we consider synonymous to *dispar*, but whether this type of larvae truly represent *dispar* remains unconfirmed.

Figure 25. *Euura sylvestris* larvae. A, B Finland 2018 *Salix caprea* C, D Finland 2019 *Populus tremula* E Austria 2017 *Salix begetschweileri*. Larvae of *sylvestris* found on *Populus tremula* in Finland in 2019 appear morphologically different from larvae on *Salix*, but based on genetics represent *sylvestris*. 
Euura bergmanni and oligospila groups

Nematus salicivorus Cameron, 1882. Lectotype, here designated, ♀, B.M.TYPE HYM.I.625, BMNH. “Type”, “Holotype Nematus salicivorus Cam ♀ det. R. B. Benson. 1938”, “oligospila det Benson miliaris det Cam”, “Cameron 96-76. Worcester”. On underside of card to which the specimen is gummed: “Bred 11.5.78; the larva X on Salix viminalis: Wor’sh.”

Discussion

The genus Euura has been taxonomically challenging and probably will remain so for years to come, but fortunately progress is also continuously being made. Here we revised the taxonomy of the bergmanni and oligospila groups, containing the bulk of the “green” Euura. These “green” species have been notoriously difficult to identify. In addition to very similar morphology, taxonomic oversplitting of species has further complicated identification of species in both groups. The most recent attempt to revise the “green” species was by Koch (2000), who considered only females and included fewer species than here. Unfortunately, his key (as well as all previous keys) cannot be relied upon to identify species. We hope that the keys for females and males and accompanying photographs provided here are an improvement, although identification remains difficult,

Figure 26. Euura oligospila (A–C) and possible respondens (D–F) larvae from Salix fragilis (unconfirmed). A Finland 2018 Salix caprea B, C Sweden 2018 swept larva D Finland 2020 Salix fragilis E, F Finland 2020 Salix fragilis. Larva of respondens remain unconfirmed but adults of this species occurred at exactly the same spot as the larva D
especially of females, where very few usable characters have been found and the differences are often minute, and sometimes not even definitely constant. Thanks usually to relatively clear differences in penis valves, males are easier to identify. Unfortunately, even the distinction of the males of some species is difficult (viridis and glutinosae), and potentially useful characters require confirmation by rearing or further sequencing of nuclear genes. The taxonomic decisions made here were greatly facilitated by genetic data that enabled reliable association of males and females. Although extensive rearings would have also enabled association of females and males, it can be argued that without the genetic data, the true identity of the invasive willow sawfly (E. respondens) might have remained undiscovered for a long time, because males are not known in the southern hemisphere populations. One other notable result is that E. leptocephalus, which is never green in life, belongs to the bergmanni group according to genetic data. This is also consistent with the structure of the saw and penis valve. Previously, only Lindqvist (1960b) had argued that E. leptocephalus (under the name Pteronidea leptocephala) is closely related to E. bergmanni. As in many other sawfly groups (Linnen and Farrell 2007; Prous et al. 2017, 2020; Schmidt et al. 2017), identification of species based on mitochondrial barcodes is often not reliable in the bergmanni and oligospila groups (Figs 2, 3). The most problematic in this regard is the viridis subgroup (brevivalis, dispar, viridis, glutinosae) of bergmanni group, where probably all species can have identical COI sequences (even if >1000 bp long) while at the same time divergence within species can be around 2–3% (Fig. 2). The other species in the bergmanni group (bergmanni, leptocephalus, respondens, sylvestris) are all clearly distinguishable based on barcodes: as far as currently known, each species has only one or rarely two BIN clusters in Europe. In the oligospila group, both species are split among multiple BIN clusters, but in most cases each cluster appears to contain either E. frenalis or E. oligospila, except BOLD:ABZ2416, which contains both species (Fig. 3).

One issue that still needs attention is taxonomic revision of Nearctic taxa of the oligospila and bergmanni groups, which could affect the use of names for Palaearctic species.

Although morphological differences between adults of different generations have already been observed in a few species of Tenthredinoidea, such as Pristiphora leucopus (Hellén, 1948) (Grearson and Liston 2012), a difference in the appearance of larvae of different generations of the same species is so far only recorded for Euura bergmanni and E. dispar.

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Appendix 1

List of specimens studied, available also as Suppl. material 1 excel table. The column names, separated by blank spaces, are given below. The first two fields (‘C_ex’ and ‘GBIF.Nr’) are internal specimen ID numbers in ECatSym database (https://sdei.de/ecatsym/). Data for the specimens is in the same order as the column names.

| C_ex | GBIF.Nr | catalogNumber | scientificName         | scientificNameAuthorship | lifeStage | Sex   | individualCount | country | stateProvince | locality                     | decimalLatitude | decimalLongitude | minimumElevationInMeters | maximumElevationInMeters | eventDateBegin | eventDateEnd | recordedBy | samplingProtocol | identifiedBy | identificationUncertain | typeStatus | originalCombination | emergenceDateBegin | emergenceDateEnd | associatedTaxa | institutionCode | GenBankAccessionCOI | GenBankAccessionNaK | GenBankAccessionPOL2 |
|------|---------|---------------|-------------------------|--------------------------|-----------|-------|-----------------|---------|---------------|----------------------------|----------------|-------------------|------------------------|------------------------|----------------|-------------|------------|---------------------|--------------|---------------------|-------------|-------------------|---------------------|-------------------|-----------------|----------------|---------------|
| 179082 | 83979   | DEI-GISHym83979 | *Euura abnormis* (Holmgren, 1883) | adult male 1 | Norway Finnmark Grense Jakobsevl 8 km S 69.7, 30.8 250 m | 2019-06-24 | A. Liston | & M. Prous | netting | M. Prous SDEI MZ479442 MW939716 MW939831 | 151358 | 84272 | DEI-GISHym84272 | *Euura aegra* (Konow, 1895) | adult female 1 | Finland Northern Ostrobothnia Juuma 2 km SE 66.261, 29.417 230 m | 2018-06-10 | SDEI Hym-group netting | M. Prous SDEI MZ479631 MW939742 MW939795 | 152185 | 56635 | ZMUO.030818 | *Euura ampla* (Konow, 1895) | adult male 1 | Finland Savonia australis Lappeenranta, Kuurmanpohja [6774:3593] 61.06828, 28.73181 2017-06-19 | M. Mutanen rearing | M. Prous ZMUO MZ479546 MW939727 MW939812 | 158733 | 84060 | DEI-GISHym84060 | *Euura annulata* (Gimmerthal, 1834) | adult male 1 | Germany Thueringen Ilfeld: Netzkater: Brandesbachtal 51.6, 10.81 350 m | 2019-05-30 | 23rd Symphyta Workshop netting | M. Prous SDEI MZ479527 MW939702 MW939844 | 166267 | 12212 | DEI-GISHym12212 | *Euura anomaloptera* (Foerster, 1854) | adult female 1 | Norway Finnmark Skoltebyen 3 km NW 69.697, 29.31 70 m | 2019-06-26 | A. Liston | & M. Prous netting | A. D. Liston SDEI MZ479536 MW939706 MW939830 | 158186 | 83961 | http://id.luomus.fi/GP.110174 | *Euura bergmanni* (Dahlbom, 1835) | adult male 1 | Finland Uusimaa Helsinki 60.17555, 24.93416 1964-01-01 1964-12-31 | E. O. Peltonen rearing | M. Prous *Salix pentandra* MZH | 173497 | 108142 | ZMUO.032578 | *Euura bergmanni* (Dahlbom, 1835) | adult 1 | Finland Karelia borealis: Kitee 62.0549, 30.2606 2017-05-27 | Marko Mutanen ZMUO MZ479675 | 173503 | 108146 | ZMUO.032583 | *Euura bergmanni* (Dahlbom, 1835) | adult male 1 | Finland Karelia borealis: Kitee 62.0549, 30.2606 2017-05-27 | Marko Mutanen | M. Prous ZMUO MZ479594 | 173583 | 110299 | ZMUO.034830 | *Euura bergmanni* (Dahlbom, 1835) | adult 1 | Finland Karelia borealis: Kitee: Hantrtavaara 61.9648, 30.2901 2018-06-20 | Marko Mutanen ZMUO | 173601 | 110391 | ZMUO.034928 | *Euura bergmanni* (Dahlbom, 1835) | adult 1 | Finland Karelia borealis: Kitee: Hantrtavaara 61.9648, 30.2901 2018-06-22 | Marko Mutanen ZMUO MZ479450 |
Euura bergmanni and oligospila groups

173692 110378 ZMUO.034915 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Karelia borealis: Kitee: Kattilavaara 61.9967, 30.3069 2018-06-20 Marko Mutanen ZMUO MZ479660

173838 108256 ZMUO.032698 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Karelia borealis: Kitee: Otravaara 61.8873, 30.1286 2017-06-07 Marko Mutanen ZMUO MZ479417

174482 106508 ZMUO.030898 Euura bergmanni (Dahlbom, 1835) adult female 1 Finland Karelia borealis: Kitee: Papinniemi 62.0255, 29.9707 2016-07-25 Marko Mutanen M. Prous ZMUO MZ479548

174499 106684 ZMUO.031088 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Karelia borealis: Kitee: Partasensaari 62.0446, 30.2605 Marko Mutanen ZMUO MZ479514

174604 106503 ZMUO.030893 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Karelia borealis: Kitee: Partasensaari 62.0459, 30.2597 2016-06-27 Marko Mutanen ZMUO MZ479413

174605 106502 ZMUO.030892 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Karelia borealis: Kitee: Partasensaari 62.0459, 30.2597 2016-06-27 Marko Mutanen ZMUO MZ479595

174606 106501 ZMUO.030891 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Karelia borealis: Kitee: Partasensaari 62.0459, 30.2597 2016-06-27 Marko Mutanen ZMUO MZ479452

152924 57263 ZMUO.029738 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Kiiminki 65.1098, 25.8496 2016-05-27 ZMUO MZ479517

175197 109040 ZMUO.033512 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Lapponia inarensis: Utsjoki: Ailigas 69.8773, 27.0651 2017-07-08 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479459

175211 109030 ZMUO.033501 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Lapponia inarensis: Utsjoki: Ailigas 69.8773, 27.0651 2017-07-08 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479439

175382 111139 ZMUO.035691 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Lapponia inarensis: Utsjoki: Boratbovccis 70.0641, 27.7223 2018-07-05 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479674

175568 108954 ZMUO.033423 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Lapponia inarensis: Utsjoki: Nuorgam, Isonkivenvaara 70.0634, 27.8799 2017-07-07 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479507

215668 12587 DEI-GISHym12587 Euura bergmanni (Dahlbom, 1835) adult female 1 Finland Lapland Leutsuvaara 68.917, 20.933 550 m 700 m 2020-06-24 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI MZ479507 MW939689 MW939799
215669 12585 DEI-GISHym12585 Euura bergmanni (Dahlbom, 1835) adult female 1 Finland Lapland Leutsuvaara 68.917, 20.933 550 m 700 m 2020-06-24 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI MZ479412 MW939688 MW939798

176874 106693 ZMUO.031097 Euura bergmanni (Dahlbom, 1835) adult female 1 Finland Ostrobotnia ultima: Tornio: Kalkkimaa 65.9015, 24.4754 M. Prous

158184 83942 http://id.luomus.fi/GP.110172 Euura bergmanni (Dahlbom, 1835) adult female 1 Finland Hame Paelkaene 61.33333, 24.26666 1959-06-01 J. Kangas rearing M. Prous Salix phylicifolia MZH

152760 57099 ZMUO.029701 Euura bergmanni (Dahlbom, 1835) adult 1 Finland Partasensaari 62.019, 30.257 2016-07-25 Marko Mutanen ZMUO MZ479499

215709 84690 DEI-GISHym84690 Euura bergmanni (Dahlbom, 1835) adult female 1 Finland Lapland Saarikoski 1 km N 68.814, 21.238 440 m 2020-06-26 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI MZ479670 MW939707 MW939883

50633 3451 DEI-GISHym3451 Euura bergmanni (Dahlbom, 1835) adult male 1 Germany Nordrhein-Westfalen Aachen 50.76666, 6.1 M. Prous lectotype Nematus validicornis Foerster, 1854 ZSM
Euura bergmanni and oligospila groups

80311 50479 BC ZSM HYM 03311 Euura bergmanni (Dahlbom, 1835) adult female
1 Germany Bayern Auwald 48.873, 11.102 400 m 2008-07-03 J. Hable M. Kraus & S. Schmidt ZSM KC975537
80312 50480 BC ZSM HYM 03312 Euura bergmanni (Dahlbom, 1835) adult male
1 Germany Bayern Auwald 48.873, 11.102 400 m 2008-07-14 J. Hable M. Kraus & S. Schmidt ZSM HQ563876
217191 84733 DEI-GISHym84733 Euura bergmanni (Dahlbom, 1835) adult female
1 Germany Sachsen-Anhalt Dessau 51.85, 12.25 60 m E. Enslin lectotype Lygaeonematus pallens Enslin, 1916 ZSM
217192 84734 DEI-GISHym84734 Euura bergmanni (Dahlbom, 1835) adult female
1 Germany Deutschland 51.5, 10.5 T. Hartig lectotype Nematus pallicarpus Hartig, 1837 ZSM
51651 3339 DEI-GISHym3339 Euura bergmanni (Dahlbom, 1835) adult male
1 Germany Bayern Fuerth (Fuerth i. B. [= in Bayern] in coll.Enslin) 48.481, 10.969 lectotype Pteronidea curtispina var. luctuosa Enslin, 1916 ZSM
49895 3456 DEI-GISHym3456 Euura bergmanni (Dahlbom, 1835) adult female
1 Germany Germany 51.5, 10.5 lectotype Nematus virescens Hartig, 1837 ZSM
80266 50434 BC ZSM HYM 03266 Euura bergmanni (Dahlbom, 1835) adult female
1 Germany Bayern Ottmaring 49.03499, 11.541 377 m 2006-06-14 J. Hable M. Kraus & S. Schmidt ZSM
50618 3849 DEI-GISHym3849 Euura bergmanni (Dahlbom, 1835) adult male
1 Russia Irkutsk 52.33333, 104.25 lectotype Amauronematus longicornis Konow, 1897 SDEI
87284 31138 DEI-GISHym31138 Euura bergmanni (Dahlbom, 1835) adult female
1 Sweden Norrbottens Laen Abisko National Park, E10 68.353, 18.815 390 m 2012-06-16 A.D. Liston, A. Taeger & S.M. Blank netting M. Prous SDEI
69490 20294 DEI-GISHym20294 Euura bergmanni (Dahlbom, 1835) adult female
1 Sweden Gotlands Laen Gotlands kommun, Roleks, border between wood and open pasture 57.53677, 18.33787 2005-06-06 2005-07-05 SMTP - Swedish Malaise Trap Project Malaise trap A. Taeger SMTP KC974677 MW939725 MW939829
85614 20606 DEI-GISHym20606 Euura bergmanni (Dahlbom, 1835) adult female
1 Sweden Kopparbergs Laen Stenis 1 km N 60.947, 14.474 180 m 2013-06-15 A.D. Liston, M. Prous & A. Taeger netting A. D. Liston SDEI MZ479458
155495 58933 MZLU2017334 Euura bergmanni (Dahlbom, 1835) adult female
1 Sweden Skane Vallby [Wallby], near Lund 55.65, 13.28333 0000-08-14 F. Koch lectotype Nematus curtispina Thomson, 1871 MZLU
81971 52139 BC ZSM HYM 10966 Euura bergmanni (Dahlbom, 1835) adult male
1 Switzerland Nidwalden Stans, Grossried 46.96699, 8.35499 443 m 2008-05-30 B. Peter M. Kraus & S. Schmidt ZSM KC975190
216379 Euura bergmanni (Dahlbom, 1835) larva
1 United Kingdom Scotland Fife, Loch Gelly, South shore, VC85, NT205923 56.11562, -3.28381 2020-07-26 B. Little photography A. D. Liston Salix spec.
Euura bergmanni_group adult female 1 Finland Haestoe-Busoe 59.8663, 23.3399 2016-07-16 ZMUO MZ479544
Euura bergmanni_group adult 1 Finland Karelia australis: Lappeenranta: Kuurmanpohja 61.0683, 28.7318 2017-05-28 Marko Mutanen ZMUO MZ479513
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee 61.988, 30.0434 2017-06-07 Marko Mutanen ZMUO MZ479418
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Kattilavaara 61.9967, 30.3069 2018-06-20 Marko Mutanen ZMUO MZ479463
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Otravaara 61.8873, 30.1286 2018-06-19 Marko Mutanen ZMUO MZ479576
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Otravaara 61.8873, 30.1286 2018-05-27 Marko Mutanen ZMUO MZ479585
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Otravaara 61.8877, 30.1096 2018-05-27 Marko Mutanen ZMUO MZ479598
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Otravaara 61.8877, 30.1096 2018-05-27 Marko Mutanen ZMUO MZ479445
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Otravaara 61.8877, 30.1096 2017-06-06 Marko Mutanen ZMUO MZ479609
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Otravaara 61.8877, 30.1096 2017-06-06 Marko Mutanen ZMUO MZ479393
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Pajarinmaeki 62.0776, 30.1912 2018-05-25 Marko Mutanen ZMUO MZ479481
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Pajarinmaeki 62.0776, 30.1912 2018-05-25 Marko Mutanen ZMUO MZ479388
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Partasensaari 62.0446, 30.2605 2017-06-20 Marko Mutanen ZMUO MZ479388
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Puhos 62.0801, 29.9378 2018-06-20 Marko Mutanen ZMUO MZ479641
Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Savikko 62.0761, 30.1796 Marko Mutanen ZMUO MZ479543
174810 106661 ZMUO.031065 Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Savikko 62.0761, 30.1796 Marko Mutanen ZMUO MZ479478
174847 110015 ZMUO.034540 Euura bergmanni_group adult 1 Finland Karelia borealis: Kitee: Vanhahovi 62.1686, 29.9742 2018-05-15 Marko Mutanen ZMUO MZ479613
157367 59063 ZMUO.033968 Euura bergmanni_group adult male 1 Finland Kitee, Otravaara [6868:3664] 61.887, 30.129 2018-06-19 M. Mutanen M. Prous ZMUO
175110 106898 ZMUO.031311 Euura bergmanni_group adult 1 Finland Lapponia enontekiensis: Enontekioe: Kilpisjäervi, Saana 69.0456, 20.8554 Marko Mutanen, Tommi Nyman ZMUO MZ479637
175142 106574 ZMUO.030964 Euura bergmanni_group adult 1 Finland Lapponia enontekiensis: Enontekioe: Saana 69.0456, 20.8554 2016-07-12 Marko Mutanen, Nestori Mutanen ZMUO MZ479557
175182 111199 ZMUO.035751 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailekas 69.8773, 27.0651 2018-07-06 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479582
175300 111006 ZMUO.035558 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4083, 25.9941 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479495
175302 110941 ZMUO.035492 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4224, 26.1081 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479390
175306 110935 ZMUO.035486 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4224, 26.1081 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479556
175307 110936 ZMUO.035487 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4224, 26.1081 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479457
175308 110937 ZMUO.035488 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4224, 26.1081 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479540
175314 110986 ZMUO.035538 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4224, 26.1081 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479596
175315 110942 ZMUO.035493 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4224, 26.1081 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479652
175342 110985 ZMUO.035537 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Ailikas 69.4224, 26.1081 2018-07-03 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479402
175478 108814 ZMUO.033272 Euura bergmanni_group adult 1 Finland Lapponia inarensis: Utsjoki: Karigasniemi, Ailigas 69.4173, 25.9937 2017-07-09 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479626
175481 108811 ZMUO.033269 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Karigasniemi, Ailigas 69.4173, 25.9937 2017-07-09 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479558
175485 108811 ZMUO.033270 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Karigasniemi, Ailigas 69.4173, 25.9937 2017-07-09 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479444
175486 108813 ZMUO.033271 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Karigasniemi, Ailigas 69.4173, 25.9937 2017-07-09 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479504
175585 108965 ZMUO.033436 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Nuorgam, Isonkivenvaara 70.0634, 27.8799 2017-07-08 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479443
175686 111123 ZMUO.035675 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479435
175691 111084 ZMUO.035636 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479586
175692 111085 ZMUO.035637 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479630
175701 111083 ZMUO.035635 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479570
175718 111098 ZMUO.035650 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479431
175722 111095 ZMUO.035647 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479520
175724 111103 ZMUO.035655 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479618
175726 111104 ZMUO.035656 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479563
175735 111633 ZMUO.036281 *Euura bergmanni* _group_ adult 1 Finland Lapponia inarensis: Utsjoki: Tenojoki 69.9583, 26.6894 ZMUO MZ479515
175802 108722 ZMUO.033175 *Euura bergmanni* _group_ adult 1 Finland Lapponia sompiensis: Sodankylæ: Ylisenvaara 68.2188, 27.2052 2017-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479573
175804 108724 ZMUO.033177 *Euura bergmanni* _group_ adult 1 Finland Lapponia sompiensis: Sodankylæ: Ylisenvaara 68.2188, 27.2052 2017-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO MZ479669
Euura bergmanni and oligospila groups

Euura bergmanni and oligospila groups
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80947 51115 BC ZSM HYM 06424 *Euura bergmanni*_group adult female 1 Poland Bialowieza 52.66666, 23.83333 2003-07-05 M. Kraus & S. Schmidt ZSM KC974944
87287 31141 DEI-GISHym31141 *Euura bergmanni*_group adult female 1 Sweden Norrbottens Laen Abisko National Park, E10 68.353, 18.815 390 m 2012-06-18 A.D. Liston, A. Taeger & S.M. Blank netting M. Prous SDEI
96685 31696 DEI-GISHym31696 *Euura bigallae* (Vikberg & Zinovjev, 2014) larva 1 Sweden Vaesterbotten, Norsjoe 5 km NNW 64.95492, 19.43269 2016-06-20 A.D. Liston photography A. D. Liston

94430 80206 DEI-GISHym80206 *Euura bohemani* (Thomson, 1871) adult male 1 Sweden Torne Lappmark Bjoerkladen 68.409, 18.639 500 m 600 m 2016-07-09 A. Liston & M. Prous netting M. Prous SDEI
151183 84190 DEI-GISHym84190 *Euura brevivalvis* (Thomson, 1871) adult female 1 Estonia Raplamaa Kastna 1 km N 58.863, 25.052 70 m 2018-05-22 M. Prous netting M. Prous SDEI

68090 11621 DEI-GISHym11621 *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Lapin Laeaeni Kevo 69.75, 27.01666 2001-06-09 2001-06-11 Kevo Subarctic Research Institute rearing A. D. Liston SDEI KC976421
68093 11624 DEI-GISHym11624 *Euura brevivalvis* (Thomson, 1871) adult male 1 Finland Lapin Laeaeni Kevo 69.75, 27.01666 2001-06-09 2001-06-11 Kevo Subarctic Research Institute rearing A. D. Liston SDEI KC976363

68809 56573 [http://id.luomus.fi/GL.9217](http://id.luomus.fi/GL.9217) *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Lapin Laeaeni Kilpisjaervi 69.05, 20.8 1968-07-09 L. H. Woollatt holotype *Pteronidea woollatti* Lindqvist, 1971 MZH
215462 84593 DEI-GISHym84593 *Euura brevivalvis* (Thomson, 1871) adult male 1 Finland Lapland Kilpisjaervi, Jehkas 69.086, 20.8 550 m 950 m 2020-06-28 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215672 84520 DEI-GISHym84520 *Euura brevivalvis* (Thomson, 1871) adult male 1 Finland Lapland Kilpisjaervi, Jehkas 69.086, 20.8 550 m 950 m 2020-06-28 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215673 *Euura brevivalvis* (Thomson, 1871) adult 17 Finland Lapland Kilpisjaervi, Jehkas 69.086, 20.8 550 m 950 m 2020-06-28 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215555 84654 DEI-GISHym84654 *Euura brevivalvis* (Thomson, 1871) adult male 1 Finland Lapland Kilpisjaervi, Malla 69.065, 20.722 500 m 850 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215679 *Euura brevivalvis* (Thomson, 1871) adult 9 Finland Lapland Kilpisjaervi, Malla 69.065, 20.722 500 m 850 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215674 *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Lapland Kilpisjaervi, Saana 69.037, 20.844 500 m 900 m 2020-06-29 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215493 84633 DEI-GISHym84633 *Euura brevivalvis* (Thomson, 1871) adult male 2 Finland Lapland Leutsuvaara 68.917, 20.933 550 m 700 m 2020-06-27 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215675 84494 DEI-GISHym84494 *Euura brevivalvis* (Thomson, 1871) adult male 1 Finland Lapland Leutsuvaara 68.917, 20.933 550 m 700 m 2020-06-27 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215676 *Euura brevivalvis* (Thomson, 1871) adult 5 Finland Lapland Leutsuvaara 68.917, 20.933 550 m 700 m 2020-06-27 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
215677 *Euura brevivalvis* (Thomson, 1871) adult 4 Finland Lapland Leutsuvaara 68.917, 20.933 550 m 700 m 2020-06-24 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
152532 56871 ZMUO.028381 *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Muonio 67.8909, 23.7503 2014-07-01 Marko Mutanen M. Prous ? ZMUO MZ479592
151400 84227 DEI-GISHym84227 *Euura brevivalvis* (Thomson, 1871) adult male 1 Finland Northern Ostrobothnia Oulanka station 5 km E 66.38, 29.426 230 m 2018-06-02 A. Liston & M. Prous netting M. Prous SDEI MZ479395 MW939741 MW939805
64908 58962 http://id.luomus.fi/GL.3465 *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Pihtipudas 63.38333, 25.56666 1946-06-08 1946-06-09 E. Lindqvist M. Prous holotype Pteronidea absimilis Lindqvist, 1949 MZH
215678 *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-27 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI
151399 84214 DEI-GISHym84214 *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Northern Ostrobothnia Pudasjaervi 18 km E 65.409, 27.371 130 m 2018-06-01 A. Liston & M. Prous netting M. Prous SDEI MZ479510 MW939679 MW939792
151295 56524 PR.586VV *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Lapin Laeani Utsjoki 69.88333 27 1960-06-08 V. Vikberg V. Vikberg CVV
151296 56525 PR.587VV *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Lapin Laeani Utsjoki 69.88333 27 1960-06-07 V. Vikberg V. Vikberg CVV
157334 59032 ZMUO.030869 *Euura brevivalvis* (Thomson, 1871) adult female 1 Finland Lapponia inarensis Utsjoki, Nuorgam, Isonkivenvaara [7776:3533] 70.06338, 27.87993 2017-07-08 M. Mutanen, N. Mutanen, A. Mutanen M. Prous ZMUO MZ479566 MW939735 MW939832
157335 59033 ZMUO.030870 Euura brevivalvis (Thomson, 1871) adult male 1 Finland Lapponia inarensis Utsjoki, Nuorgam, Isonkivenvaara [7776:3533] 70.06338, 27.87993 2017-07-08 M. Mutanen, N. Mutanen, A. Mutanen M. Prous ZMUO MZ479666 MW939736 MW939833
152507 56846 ZMUO.028316 Euura brevivalvis (Thomson, 1871) adult female 1 Finland Viiankiaapa, Kotavaara 67.5872, 26.8367 2015-06-08 M. Prous ? ZMUO MZ479401
67818 11380 DEI-GISHym11380 Euura brevivalvis (Thomson, 1871) adult female 1 France Aulus-les-Bains 42.8, 1.33333 2011-05-05 H. Savina M. Prous SDEI KC976917 MW939719 MW939819
51848 3847 DEI-GISHym3847 Euura brevivalvis (Thomson, 1871) adult female 1 Germany Saxony-Anhalt Dornreichenbach 51.36666, 12.86666 1894-05-06 G. Enderlein lectotype Pteronus kriegeri Konow, 1903 SDEI 216303 Euura brevivalvis (Thomson, 1871) adult 2 Norway Finnmark Grense Jakobselv 8 km S 69.7, 30.8 250 m 2019-06-24 A. Liston & M. Prous netting M. Prous SDEI 50628 3848 DEI-GISHym3848 Euura brevivalvis (Thomson, 1871) adult female 1 Russia Russia bor. lectotype Amauronematus spurcus Konow, 1904 SDEI 87281 31135 DEI-GISHym31135 Euura brevivalvis (Thomson, 1871) adult female 1 Sweden Norrbottens Laen Abisko 9 km E (Stordalen) 68.35, 19.035 400 m 2012-06-17 A.D. Liston, A. Täger & S.M. Blank netting M. Prous SDEI MZ479584 146782 83696 DEI-GISHym83696 Euura brevivalvis (Thomson, 1871) larva 1 Sweden Norrbottens Laen Abisko 9 km E (Stordalen) 68.35, 19.035 400 m 2017-08-05 A. Liston & M. Prous M. Prous Betula nana SDEI MZ479456 MW939674 146785 83698 DEI-GISHym83698 Euura brevivalvis (Thomson, 1871) larva 1 Sweden Norrbottens Laen Abisko 9 km E (Stordalen) 68.35, 19.035 400 m 2017-08-05 A. Liston & M. Prous M. Prous Betula nana SDEI MZ479469 MW939675 96482 21375 DEI-GISHym21375 Euura brevivalvis (Thomson, 1871) adult female 1 Sweden Torne Lappmark Abisko: Mt. Njulla 68.362, 18.73 400 m 950 m 2016-06-30 A. Liston & M. Prous netting M. Prous SDEI MZ479663 MW939750 MW939858 96486 21378 DEI-GISHym21378 Euura brevivalvis (Thomson, 1871) adult female 1 Sweden Torne Lappmark Abisko: Mt. Njulla 68.362, 18.73 400 m 950 m 2016-06-30 A. Liston & M. Prous netting M. Prous SDEI MZ479579 MW939751 MW939869 155522 88904 DEI-GISHym88904 Euura brevivalvis (Thomson, 1871) adult female 1 Sweden Kopparbergs Laen Dalarna alpina C. H. Boheman M. Prous lectotype Nematus brevivalvis Thomson, 1871 MZLU 87381 Euura brevivalvis (Thomson, 1871) adult female 1 Sweden Norrbottens Laen Kaunisvaara 2 km N 67.4, 23.345 170 m 2014-06-07 A. Liston & M. Prous netting A. D. Liston SDEI 87283 31137 DEI-GISHym31137 Euura brevivalvis (Thomson, 1871) adult female 1 Sweden Norrbottens Laen Kiruna nr. airport 67.84, 20.35 450 m 2012-06-21 A.D. Liston, A. Täger & S.M. Blank netting M. Prous SDEI MZ479622 87382 Euura brevivalvis (Thomson, 1871) adult female 2 Sweden Norrbottens Laen Muodoslompolo 10 km SW 67.894, 23.232 270 m 2014-06-13 A. Liston & M. Prous netting A. D. Liston SDEI
87378 *Euura brevivalvis* (Thomson, 1871) adult female 1 Sweden Norrbottens Laen Oeverkalix 22 km W 66.295, 22.356 140 m 2014-06-02 A. Liston & M. Prous netting A. D. Liston SDEI

87379 *Euura brevivalvis* (Thomson, 1871) adult female 2 Sweden Norrbottens Laen Oeverkalix 22 km W 66.295, 22.356 140 m 2014-06-04 A. Liston & M. Prous netting A. D. Liston SDEI

87380 *Euura brevivalvis* (Thomson, 1871) adult female 4 Sweden Norrbottens Laen Pajala 67.204, 23.409 150 m 2014-06-02 A. Liston & M. Prous netting A. D. Liston SDEI

52770 57109 ZMUO.029684 *Euura dispar* (Zaddach, 1876) adult male 1 Finland Eurajoki 61.229, 21.532 2016-06-28 M. Prous ZMUO MZ479429

152516 56855 ZMUO.028334 *Euura dispar* (Zaddach, 1876) adult male 1 Finland Kiiminki 65.1098, 25.8496 2015-07-23 Marko Mutanen, Sylvia Mutanen M. Prous ZMUO MZ479471

152517 56856 ZMUO.028336 *Euura dispar* (Zaddach, 1876) adult male 1 Finland Kiiminki 65.1098, 25.8496 2015-07-12 Marko Mutanen, Sylvia Mutanen M. Prous ZMUO MZ479409

166360 84146 DEI-GISHym84146 *Euura dispar* (Zaddach, 1876) adult female 1 Finland Kitee, Papinniemi [6883:3656] 62.025, 29.99 2019-06-12 A.D. Liston netting E. Lindqvist E. Lindqvist holotype *Pteronidea pseudodispar* Lindqvist, 1969 MZH

152508 56847 ZMUO.028320 *Euura dispar* (Zaddach, 1876) adult male 1 Finland Præstgardnaeset 60.2276, 19.9446 2015-05-23 Marko Mutanen M. Prous ZMUO MZ479628

158337 83956 DEI-GISHym83956 *Euura dispar* (Zaddach, 1876) adult female 1 Germany Sachsen-Anhalt Blankenburg/Steinkoepfe 51.739, 10.967 420 m 2019-06-01 23rd Symphyta Workshop netting M. Prous SDEI MZ479486 MW939700 MW939815

158338 83953 DEI-GISHym83953 *Euura dispar* (Zaddach, 1876) adult female 1 Germany Sachsen-Anhalt Blankenburg/Steinkoepfe 51.739, 10.967 420 m 2019-06-01 23rd Symphyta Workshop netting M. Prous SDEI MZ479617 MW939699 MW939814

158339 *Euura dispar* (Zaddach, 1876) adult female 1 Germany Sachsen-Anhalt Blankenburg/Steinkoepfe 51.739, 10.967 420 m 2019-06-01 23rd Symphyta Workshop netting M. Prous SDEI MZ479649 MW939772 MW939863
215418 12579 DEI-GISHym12579 Euura dispar (Zaddach, 1876) larva 1 Germany Brandenburg Hoppegarten 52.518, 13.674 2020-06-01 A. Liston & M. Prous netting M. Prous ? Betula pendula SDEI
80306 50474 BC ZSM HYM 03306 Euura dispar (Zaddach, 1876) adult male 1 Germany Bayern Mittelbueg bei Nuernberg 49.48009, 11.217 316 m 1991-06-14 M. Kraus A. D. Liston ZSM HQ563875
75108 17596 DEI-GISHym17596 Euura dispar (Zaddach, 1876) adult male 1 Germany Brandenburg Noerdlich Golzow, 5.M 52.96667, 13.804 1994-06-01 DEI-Projekt S. M. Blank SDEI
80274 50442 BC ZSM HYM 03274 Euura dispar (Zaddach, 1876) adult male 1 Germany Bayern Ottmaring 49.03499, 11.541 377 m 2006-06-14 J. Hable M. Prous ? ZSM KC972701
80307 50475 BC ZSM HYM 03307 Euura dispar (Zaddach, 1876) adult male 1 Germany Bayern Ottmaring 49.03499, 11.541 377 m 2008-05-19 J. Hable M. Kraus & S. Schmidt ZSM
80308 50476 BC ZSM HYM 03308 Euura dispar (Zaddach, 1876) adult male 1 Germany Bayern Ottmaring 49.03499, 11.541 377 m 2008-06-14 J. Hable M. Kraus & S. Schmidt ZSM
67743 11328 DEI-GISHym11328 Euura dispar (Zaddach, 1876) adult female 1 Germany Mecklenburg-Vorpommern Ranzin, Oldenb. Holz 53.95114, 13.57204 2008-08-16 H.-J. Jacobs netting M. Prous ? SDEI KC976869
63245 11633 DEI-GISHym11633 Euura dispar (Zaddach, 1876) adult male 1 Italy Sicilia Etna Massif North, ca. 10 km SW Linguaglossa, Piano Provenzana 37.8, 15.03 1600 m 2010-05-16 A.D. Liston netting A. D. Liston SDEI KC972820
76419 19632 DEI-GISHym19632 Euura dispar (Zaddach, 1876) adult male 1 Portugal Viana do Castelo Monção 5 km SSE 42.04128, -8.44533 300 m 2012-05-13 Blank, Jacobs, Liston & Taeger netting M. Prous SDEI KF642642
76420 19631 DEI-GISHym19631 Euura dispar (Zaddach, 1876) adult female 1 Portugal Viana do Castelo Monção 5 km SSE 42.04128, -8.44533 300 m 2012-05-13 Blank, Jacobs, Liston & Taeger netting M. Prous SDEI KF642799
149748 21499 DEI-GISHym21499 Euura dispar (Zaddach, 1876) adult male 1 Sweden Torne Lappmark Bjoerkkliden 68.409, 18.639 500 m 600 m 2016-07-09 A. Liston & M. Prous netting SDEI MZ479419 MW939766 MW939876
131807 21388 DEI-GISHym21388 Euura dispar (Zaddach, 1876) adult male 1 Sweden Torne Lappmark Bjoerkkliden 2 km SE 68.395, 18.705 350 m 2016-07-01 A. Liston & M. Prous netting M. Prous SDEI MZ479608 MW939757 MW939856
63275 Euura dispar (Zaddach, 1876) larva 1 United Kingdom Scotland Dundreggan 57.2, -4.76666 2010-08-14 2010-08-21 G. T. Knight photography A. D. Liston Betula spec.
151389 84279 DEI-GISHym84279 Euura excisa (Thomson, 1863) adult female 1 Finland Northern Ostrobotnia Oulanka station 13 km E 66.361, 29.596 280 m 2018-06-12 A. Liston & M. Prous netting M. Prous SDEI MZ479612 MW939743 MW939801
| Collection number | Field number | Eura bergmanni and oligospila groups |
|-------------------|--------------|------------------------------------|
| DEI-GISHym83588   | 133677       | Euura bergmanni (Thomson, 1863) larva 1 Germany Brandenburg Muencheberg, Dahmsdorf 52.53333, 14.1 2017-05-28 A.D. Liston A. D. Liston | | 151185          | 84191         | Euura flavescens (Stephens, 1835) adult male 1 Estonia Raplamaa Kastna 1 km N 58.863, 25.052 70 m 2018-05-22 M. Prous netting | SDEI MZ479498 MW939678 MW939784 |
|                  | 151640       | Euura fahraei (Thomson, 1863) larva 1 Germany Brandenburg Muencheberg, Dahmsdorf 52.53333, 14.1 2017-05-28 A.D. Liston A. D. Liston | | 209                  | 611737        | Euura flavescens (Stephens, 1835) adult female 1 Finland Lapponia inarensis Inari 69 28 1967-06-28 M. Prous ? MZH 68826 | http://id.luomus.fi/GL.3442 |
|                  | 215698       | Euura frenalis (Thomson, 1888) adult female 1 Finland Lapland Kilpisjaervi 69.05, 20.8 1935-07-11 lectotype Nematus (Pteronidea) fastosus var. punctiscuta Hellen, 1948 MZH | | 215696          | 611333        | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston ? SDEI | 151404         | 84232         | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-26 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI |
|                  | 215697       | Euura frenalis (Thomson, 1888) adult female 1 Finland Lapland Kilpisjaervi 69.05, 20.8 1935-07-11 lectotype Nematus (Pteronidea) fastosus var. punctiscuta Hellen, 1948 MZH | | 215697          | 611333        | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston ? SDEI | 215697         | 611333        | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-26 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI |
|                  | 151403       | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI | | 151403          | 84220         | Euura fahraei (Thomson, 1863) larva 1 Germany Brandenburg Muencheberg, Dahmsdorf 52.53333, 14.1 2017-05-28 A.D. Liston A. D. Liston | 151405         | 84222         | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI |
|                  | 151406       | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI | | 151406          | 84219         | Euura fahraei (Thomson, 1863) larva 1 Germany Brandenburg Muencheberg, Dahmsdorf 52.53333, 14.1 2017-05-28 A.D. Liston A. D. Liston | 151406         | 84219         | Euura frenalis (Thomson, 1888) adult male 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-25 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI |
|                  | 158898       | Euura frenalis (Thomson, 1888) adult male 1 Norway Finnmark Batsfjord 33 km SW 70.47, 28.97 280 m 2019-06-27 A. Liston & M. Prous netting M. Prous SDEI | | 158898          | 12057         | Euura fahraei (Thomson, 1863) larva 1 Germany Brandenburg Muencheberg, Dahmsdorf 52.53333, 14.1 2017-05-28 A.D. Liston A. D. Liston | 158898         | 12057         | Euura fahraei (Thomson, 1863) larva 1 Germany Brandenburg Muencheberg, Dahmsdorf 52.53333, 14.1 2017-05-28 A.D. Liston A. D. Liston |
50638 3851 DEI-GISHym3851 Euura frenalis (Thomson, 1888) adult female 1 Russia Kanin, Halbinsel 68 45 B. Poppius lectotype Pteronus fastosus Konow, 1904 SDEI 68827 111964 http://id.luomus.fi/GL.3546 Euura frenalis (Thomson, 1888) adult female 1 Russia Murmanskaya Oblast Kola-Halbinsel, Ponoj 67.06666, 41.11666 1913-07-14 M. Prous lectotype Nematus (Pteronidea) fastosus var. ponojense Hellen, 1948 MZH 150441 88724 DEI-GISHym88724 Euura frenalis (Thomson, 1888) adult male 1 Sweden Torne Lappmark Abisko: Mt. Njulla 68.362, 18.73 900 m 2016-06-30 A. Liston & M. Prous netting M. Prous SDEI MZ479542 MW939769 MW939877 87275 31129 DEI-GISHym31129 Euura frenalis (Thomson, 1888) adult female 1 Sweden Norrbottens Laen Abisko: Mt. Njulla above treeline 68.362, 18.72 900 m 2012-06-29 A.D. Liston & A. Taeger netting M. Prous ? SDEI 87278 31132 DEI-GISHym31132 Euura frenalis (Thomson, 1888) adult female 1 Sweden Norrbottens Laen Abisko: Mt. Njulla above treeline 68.362, 18.72 900 m 2012-07-05 A.D. Liston & A. Taeger netting A. D. Liston SDEI MZ479394 MW939717 MW939843 155524 88902 DEI-GISHym88902 Euura frenalis (Thomson, 1888) adult female 1 Sweden Jamtlands Lan Areskutan 63.43333, 13.1 C. G. Thomson F. Koch lectotype Nematus frenalis Thomson, 1888 MZLU 158214 12026 DEI-GISHym12026 Euura frenalis (Thomson, 1888) adult male 1 Sweden Norrbottens Laen Karesuando 27 km SE 68.249, 22.879 310 m 2014-06-13 A. Liston & M. Prous netting M. Prous SDEI MZ479464 MW939745 68947 20422 DEI-GISHym20422 Euura frenalis (Thomson, 1888) adult female 1 Sweden Norrbottens Laen Kiruna kommun, Abisko nationalpark, Nuolja Kalfjaell 68.35958, 18.71927 900 m 2006-06-26 2006-07-15 SMTP - Swedish Malaise Trap Project Malaise trap M. Prous SMTP 213598 12556 DEI-GISHym12556 Euura frenalis (Thomson, 1888) adult female 1 Sweden Torne Lappmark Nikkaluokta 7 km NE 67.89, 19.138 500 m 1050 m 2016-07-08 A. Liston & M. Prous netting M. Prous ? SDEI MZ479511 MW939748 MW939818 131840 21332 DEI-GISHym21332 Euura frenalis (Thomson, 1888) adult male 1 Sweden Torne Lappmark: Rensjoen, near Kiruna 68.068, 19.022 2016-06-22 A.D. Liston netting A. D. Liston SDEI MZ479495 MW9397959 158846 83976 DEI-GISHym83976 Euura freyja (Liston, Taeger & Blank, 2009) adult female 1 Norway Finnmark Grense Jakobselv 8 km S 69.7, 30.8 250 m 2019-06-24 A. Liston & M. Prous netting A. D. Liston SDEI MZ479668 MW939746 MW939836 146879 80498 DEI-GISHym80498 Euura glutinosae Cameron, 1882 adult female 1 Austria Lower Austria Erzen 48.11666, 15.23333 2016-09-06 E. Altenhofer rearing M. Prous 2017-08-06 Alnus glutinosa SDEI MZ479569 MW939673 MW939787 67843 11403 DEI-GISHym11403 Euura glutinosae Cameron, 1882 adult female 1 France Aulus-les-Bains 42.8, 1.33333 2010-07-01 H. Savina rearing A. D. Liston Alnus spec. SDEI KC974817
Euura bergmanni and oligospila groups

62541 *Euura glutinosae* Cameron, 1882 larva 1 France Bonac-sur-Lez 42.88333, 0.96666 2008-09-01 2008-09-30 H. Savina A. D. Liston *Alnus glutinosa* FOTO 151566 84469 DEI-GISHym84469 *Euura glutinosae* Cameron, 1882 larva 1 Germany Rhineland Palatinate Schoenberg-Kuebelberg, 1 km S 49.3988, 7.3865 250 m 2018-07-14 M. Prous M. Prous ? *Alnus glutinosa* SDEI 158771 84096 DEI-GISHym84096 *Euura glutinosae* Cameron, 1882 adult male 1 Germany Sachsen-Anhalt Stolberg: Grube Luise, Bachtal 51.556, 10.976 350 m 2019-05-28 23rd Sympyta Workshop netting M. Prous SDEI MZ479415 MW939703 MW939845

216953 *Euura glutinosae* Cameron, 1882 adult female 1 Russia Moskovskaja Oblast Sergiev-Posad district, Zolotilovo village 56.275, 37.987 2019-08-24 A. Boldyrev A. Boldyrev 2020-03-20 *Alnus* spec. FOTO 216955 *Euura glutinosae* Cameron, 1882 adult female 1 Russia Moskovskaja Oblast Sergiev-Posad district, Zolotilovo village 56.275, 37.987 2019-09-01 A. Boldyrev A. Boldyrev 2020-03-14 *Alnus* spec. FOTO 151604 111986 GNM-HYME000000210 *Euura glutinosae* Cameron, 1882 adult female 1 Sweden Skane Skrifvaremoellan vid Tvedoerra lægerplats 55.68333, 13.4166 1880-06-01 1880-06-30 G. Moeller lectotype *Nematus viridissimus* Moeller, 1882 *Alnus* spec. GNM 216659 111909 B.M.TYPE HYM1.623 *Euura glutinosae* Cameron, 1882 adult female 1 United Kingdom England Worcestershire [original label], Worcester [original description] 1875-09-21 J. E. Fletcher rearing lectotype *Nematus glutinosae* Cameron, 1882 *Alnus glutinosa* BMNH 133501 80261 DEI-GISHym80261 *Euura humeralis* (Serville, 1823) adult male 1 Germany Brandenburg Strausberg 3 km E 52.566, 13.934 80 m 2017-04-09 A. Liston & M. Prous netting M. Prous SDEI MK624681 MK624769 MK624831 166674 12505 DEI-GISHym12505 *Euura hypoxantha* (Foerster, 1854) adult female 1 Austria Lower Austria Rappottenstein 48.51666, 15.06666 2002-08-07 E. Altenhofer rearing A. Taeger 2003-05-13 *Salix purpurea* SDEI 166818 *Euura hypoxantha* (Foerster, 1854) adult male 1 Estonia Dorpat 58.3661, 26.73611 1883-06-01 M. Prous SDEI 166819 *Euura hypoxantha* (Foerster, 1854) adult female 1 Estonia Dorpat 58.3661, 26.73611 1883-05-08 M. Prous SDEI 173750 110182 ZMUO.034708 *Euura hypoxantha* (Foerster, 1854) adult 1 Finland Kaarelia borealis: Kitee: Otravaara 61.8873, 30.1286 2018-05-27 Marko Mutanen ZMUO 155486 58924 ZMUO.030833 *Euura hypoxantha* (Foerster, 1854) adult female 1 Finland Lapland Kilpisjaervi, Saana [767:325] 69.04563, 20.85539 2016-06-14 M. Mutanen, T. Nyman rearing M. Prous 2017-01-01 2017-12-31 *Salix myrsinifolia* ZMUO 152804 57143 ZMUO.029689 *Euura hypoxantha* (Foerster, 1854) adult 1 Finland Linnanmaa 65.0639, 25.4807 2016-06-20 Marko Mutanen ZMUO 176717 106507 ZMUO.030897 *Euura hypoxantha* (Foerster, 1854) adult 1 Finland Ostrobotnia ouluensis: Oulu: Linnanmaa 65.0639, 25.4807 2016-06-21 Marko Mutanen ZMUO
176718 106506 ZMUO.030896 

**Euura hypoxantha** (Foerster, 1854) adult 1

Finland Ostrobotnia ouluensis: Oulu: Linnanmaa 65.0639, 25.4807 Marko Mutanen ZMUO 49889 3301 DEI-GISHym3301

**Euura hypoxantha** (Foerster, 1854) adult male 1

Germany Nordrhein-Westfalen Aachen 50.76666, 6.1 M. Prous syntype

* Nematus hypoxanthus * Foerster, 1854

80289 50457 BC ZSM

**Euura hypoxantha** (Foerster, 1854) adult male 1

Germany Bayern Guentersbuehl 49.54299, 11.22299 403 m 1992-05-22 M. Kraus & S. Schmidt ZSM JN283958

166479 83946 DEI-GISHym83946

**Euura hypoxantha** (Foerster, 1854) adult male 1

Germany Thueringen Ilfeld: Netzkater: Brandesbachatal 51.6, 10.81 350 m 2019-05-31 23rd Symphyta Workshop netting M. Prous SDEI MZ479662 MW939705 MW939842

80288 50456 BC ZSM

**Euura hypoxantha** (Foerster, 1854) adult male 1

Germany Bayern Ottmaring 49.03499, 11.541 377 m 2006-08-03 J. Hable M. Kraus & S. Schmidt ZSM

166264 12209 DEI-GISHym12209

**Euura hypoxantha** (Foerster, 1854) adult male 1

Norway Finnmark Skoltebyen 3 km NW 69.697, 29.31 70 m 2019-06-26 A. Liston & M. Prous netting M. Prous SDEI

213605 12054 DEI-GISHym12054

**Euura hypoxantha** (Foerster, 1854) adult male 1

Norway Finnmark Skoltebyen 3 km NW 69.697, 29.31 70 m 2019-06-26 A. Liston & M. Prous netting M. Prous SDEI

216301 **Euura hypoxantha** (Foerster, 1854) adult male 1

Norway Finnmark Skoltebyen 3 km NW 69.697, 29.31 70 m 2019-06-26 A. Liston & M. Prous netting M. Prous SDEI

158245 80649 DEI-GISHym80649

**Euura hypoxantha** (Foerster, 1854) adult female 1

Russia Primorskiy Kray Steklyanukha 43.349, 132.458 40 m 2019-05-07 M. Prous netting M. Prous ? SDEI

152128 86752 DEI-GISHym86752

**Euura hypoxantha** (Foerster, 1854) adult female 1

Russia Primorskiy Kray Zolotaya Dolina E 42.943, 133.161 40 m 2016-06-10 K. Kramp, M. Prous & A. Taeger netting SDEI

155485 58923 ZMUO.030832

**Euura imperfecta** (Zaddach, 1876) adult male 1

Finland Salo [6701:3286] 60.36797, 23.12948 2017-05-30 M. Mutanen, T. Mutanen rearing M. Prous SDEI

Larix spec. ZMUO MZ479591 MW939728 MW939806

66030 11928 DEI-GISHym11928

**Euura infirma** (Foerster, 1854) adult male 1

Germany Thueringen Brandesbachatal bei Netzkater N Ilfeld, Wiese, mittlere Hanglage 51.6, 10.81 350 m 2010-05-23 A. Taeger A. Taeger SDEI KC972658 MW939721 MW939821

158222 80655 DEI-GISHym80655

**Euura krausi** (Taeger & Blank, 1998) adult female 1

Russia Primorskiy Kray Gribanovka: Gribanovka 1 km N 43.126, 132.797 450 m 2019-05-08 M. Prous netting M. Prous SDEI MZ479616 MW939711 MW939839

175205 108977 ZMUO.033448

**Euura leptopechalis** (Thomson, 1863) adult female 1

Finland Lapponia inarensis: Utsjoki: Ailigas 69.8773, 27.0651 2017-07-08 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen M. Prous ZMUO MZ479530
Euura bergmanni and oligospila groups

215726 84503 DEI-GISHym84503 Euura leptocephalus (Thomson, 1863) adult female 1 Finland Lapland Leutsuvaara 68.917, 20.933 550 m 700 m 2020-06-27 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI

215725 12610 DEI-GISHym12610 Euura leptocephalus (Thomson, 1863) adult female 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-27 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI

157411 Euura leptocephalus (Thomson, 1863) adult female 1 Finland Utsjoki, Outakoski 69.6, 25.96666 1948-06-22 E. Lindqvist M. Prous SDEI

213701 12065 DEI-GISHym12065 Euura leptocephalus (Thomson, 1863) adult male 1 Norway Finnmark Batsfjord 9 km SW 70.568, 29.554 230 m 2019-06-27 A. Liston & M. Prous netting M. Prous SDEI

131804 21386 DEI-GISHym21386 Euura leptocephalus (Thomson, 1863) adult male 1 Sweden Torne Lappmark Abisko: Mt. Njulla 68.362, 18.73 400 m 950 m 2016-06-30 A. Liston & M. Prous netting M. Prous SDEI

150447 88730 DEI-GISHym88730 Euura leptocephalus (Thomson, 1863) adult male 1 Sweden Torne Lappmark Abisko: Mt. Njulla 68.362, 18.73 400 m 950 m 2016-06-30 A. Liston & M. Prous netting M. Prous SDEI

178904 12535 DEI-GISHym12535 Euura leptocephalus (Thomson, 1863) adult female 1 Sweden Torne Lappmark Nikkaluokta 7 km NE 67.89, 19.138 500 m 1050 m 2016-07-08 A. Liston & M. Prous netting M. Prous SDEI

151423 84256 DEI-GISHym84256 Euura richtwardti (Konow, 1903) adult male 1 Finland Northern Ostrobothnia Oulanka station 18 km SE 66.283, 29.653 150 m 2018-06-08 SDEI Hym-group netting M. Prous SDEI

179080 12072 DEI-GISHym12072 Euura longicauda (Hellen, 1948) adult male 1 Norway Finnmark Batsfjord 2 km SW 70.624, 29.672 70 m 2019-06-27 A. Liston & M. Prous netting M. Prous SDEI

151424 56546 ZMUO.030814 Euura longiserra (Thomson, 1863) adult female 1 Finland Northern Ostrobithnia Oulu, kasviiputarha [7219:3427] 65.06365, 25.45948 2017-06-08 R. Jarkko M. Prous ZMUO MZ479505 MW939770 MW939878 69796 59083 NHRS-HEVA000003974 Euura leptocephalus (Thomson, 1863) adult female 1 Sweden Lapponia intermedia 66 19 C. H. Boheman M. Prous holotype Nematus leptocephalus Thomson, 1863 NHRS
89412 31247 DEI-GISHym31247 *Euura myosotidis* (Fabricius, 1804) adult male 1
Estonia Laanemaa Virtsu 2 km E 58.574, 23.543 5 m 2015-06-06 A.D. Liston, M.
Prous & A. Taeger netting A. D. Liston SDEI KY698137 KY698263 MK624827
150903 84182 DEI-GISHym84182 *Euura nigricornis* (Serville, 1823) adult female 1
Germany Brandenburg Trebnitz 52.53333, 14.21666 2017-05-21 A.D. Liston netting
A. D. Liston SDEI MK624674 MK624763 MK624816
148321 88516 DEI-GISHym88516 *Euura obducta* (Hartig, 1837) adult female 1
Germany Brandenburg Eberswalde, Waldstrasse 19: Garten mit Waldrand 52.8264,
13.84136 2017-05-18 2017-05-25 A. Taeger Malaise trap SDEI MZ479490
MW939773 MW939862
67481 17065 DEI-GISHym17065 *Euura oligospila* (Foerster, 1854) adult female 1
Austria Salzburg Alpendorf Dachstein-West 47.514, 13.451 950 m 2010-07-25 A.D.
Liston & A. Taeger A. Taeger SDEI KC974914 MW939724 MW939824
89414 31226 DEI-GISHym31226 *Euura oligospila* (Foerster, 1854) adult female 1
Estonia Ida-Virumaa Onitka, 1.5 km NE 59.443, 27.315 50 m 2015-06-03 A.D.
Liston, M. Prous & A. Taeger netting A. D. Liston SDEI MZ479423
MW939755 MW939786
149738 31239 DEI-GISHym31239 *Euura oligospila* (Foerster, 1854) adult male 1
Estonia Parnumaa Riisa 1 km N 58.489, 24.982 25 m 2015-06-05 A.D. Liston, M.
Prous & A. Taeger netting M. Prous SDEI MZ479588 MW939752 MW939870
152784 57123 ZMUO.029686 *Euura oligospila* (Foerster, 1854) adult male 1 Finland
Enontekioe 69.0577, 20.8143 2016-07-09 Marko Mutanen ZMUO
151657 56562 Prep.122.OR *Euura oligospila* (Foerster, 1854) adult female 1 Finland
Uusimaa Helsinki 60.17555, 24.93416 1962-06-12 CVV
151671 56577 Prep.104.OR *Euura oligospila* (Foerster, 1854) adult female 1 Finland
Uusimaa Helsinki, Villinki 60.15861, 25.11361 1961-08-05 CVV
152767 57106 ZMUO.029674 *Euura oligospila* (Foerster, 1854) adult female 1 Finland
Kiiminki 65.1098, 25.8496 2016-08-05 M. Prous ZMUO MZ479420
155601 58983 ZMUO.030844 *Euura oligospila* (Foerster, 1854) adult female 1 Finland
Lapland Kilpisjaervi, Saana [767:325] 69.04563, 20.85539 2016-08-14 M. Mutanen, T.
Nyman rearing M. Prous *Salix phylicifolia* ZMUO MZ479440 MW939731 MW939811
175081 106948 ZMUO.031369 *Euura oligospila* (Foerster, 1854) adult female 1 Finland
Lapponia enontekiensis: Enontekioe: Kilpisjaervi, Saana 69.0456, 20.8554 2016-
08-14 Marko Mutanen, Tommi Nyman M. Prous ? *Salix phylicifolia* ZMUO
175384 111137 ZMUO.035689 *Euura oligospila* (Foerster, 1854) adult male 1 Finland
Lapponia inarensis: Utsjoki: Boratbovcis 70.0641, 27.7223 2018-07-05 Marko
Mutanen, Nestori Mutanen, Anttoni Mutanen M. Prous ? ZMUO
175437 111191 ZMUO.035743 *Euura oligospila* (Foerster, 1854) adult male 1 Finland
Lapponia inarensis: Utsjoki: Garegassuolu 69.3894, 25.8423 2018-07-06 Marko
Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO
175714 111090 ZMUO.035642 *Euura oligospila* (Foerster, 1854) adult female 1 Finland
Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko
Mutanen, Nestori Mutanen, Anttoni Mutanen M. Prous ? ZMUO
**Euura bergmanni and oligospila groups**

175756 111164 ZMUO.035716 *Euura oligospila* (Foerster, 1854) adult female 1 Finland Lapponia inarensis: Utsjoki: Vetsijokisu 69.9667, 27.3007 2018-07-05 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen M. Prous ? ZMUO
175760 111160 ZMUO.035712 *Euura oligospila* (Foerster, 1854) adult female 1 Finland Lapponia inarensis: Utsjoki: Vetsijokisu 69.9667, 27.3007 2018-07-05 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen ZMUO

67828 11390 DEI-GISHym11390 *Euura oligospila* (Foerster, 1854) adult female 1 France Bethmale 42.86666, 1.08333 2010-07-04 H. Savina A. D. Liston SDEI KC973945
68227 17894 DEI-GISHym17894 *Euura oligospila* (Foerster, 1854) adult male 1 France Bethmale 42.86666, 1.08333 2009-09-01 2009-09-30 H. Savina A. D. Liston 2010-05-20 Salix spec. SDEI KC973597
49891 3372 DEI-GISHym3372 *Euura oligospila* (Foerster, 1854) adult female 1 Germany Nordrhein-Westfalen Aachen Umgebung 50.76666, 6.1 lectotype Nematus oligospilus Foerster, 1854 ZSM
215748 *Euura oligospila* (Foerster, 1854) adult 7 Germany Brandenburg Muencheberg, Seelower Str. 52.50167, 14.15334 2013-05-17 A.D. Liston M. Prous SDEI
215749 84695 DEI-GISHym84695 *Euura oligospila* (Foerster, 1854) adult male 1 Germany Brandenburg Muencheberg, Seelower Str. 52.50167, 14.15334 2013-05-17 A.D. Liston M. Prous SDEI
217266 84738 DEI-GISHym84738 *Euura oligospila* (Foerster, 1854) adult female 1 Germany Brandenburg Muencheberg, Seelower Str. 52.50167, 14.15334 2013-05-17 A.D. Liston M. Prous SDEI
67908 11482 DEI-GISHym11482 *Euura oligospila* (Foerster, 1854) adult female 1 Germany Brandenburg Praedikow 52.63333, 14.01666 2011-05-01 A.D. Liston netting A. D. Liston SDEI KC976992
152122 86305 DEI-GISHym86305 *Euura oligospila* (Foerster, 1854) adult female 1 Russia Primorsky Krai Arsenyev, Ski-Base Bodrost 44.122, 133.27 200 m 2016-05-26 K. Kramp, M. Prous & A. Taeger netting M. Prous SDEI MZ479625
166478 80721 DEI-GISHym80721 *Euura oligospila* (Foerster, 1854) adult female 1 Russia Primorsky Krai Gornotajozhnoe, 2 km W 43.694, 132.135 80 m 2019-05-14 M. Prous netting M. Prous SDEI MZ479487 MW939704 MW939841
166745 80754 DEI-GISHym80754 *Euura oligospila* (Foerster, 1854) adult female 1 Russia Primorsky Krai Gornotajozhnoe, 2 km W 43.694, 132.135 2019-05-16 M. Prous & S. Tuerk netting M. Prous SDEI
67907 11481 DEI-GISHym11481 *Euura oligospila* (Foerster, 1854) adult female 1 Slovakia Liptovsky Hradok ESE 10 km, Svarinska valley, Svarin S 49.00916, 19.853 695 m 730 m 2005-06-19 A.D. Liston netting A. D. Liston SDEI KC976992
149740 21410 DEI-GISHym21410 *Euura oligospila* (Foerster, 1854) adult female 1 Sweden Torne Lappmark Abisko 6 km E 68.348, 18.969 400 m 2016-07-04 A. Liston & M. Prous netting M. Prous SDEI MZ479611 MW939765 MW939875
149739 21395 DEI-GISHym21395 *Euura oligospila* (Foerster, 1854) adult male 1 Sweden Torne Lappmark Abisko 6 km W 68.342, 18.691 650 m 900 m 2016-07-02 A. Liston & M. Prous netting M. Prous SDEI MZ479476 MW939767 MW939788
152057 83843 DEI-GISHym83843 *Euura oligospila* (Foerster, 1854) larva 1 Sweden Torne Lappmark Abisko National Park, Abisko Oestra 68.35088, 18.83086 400 m 2018-08-29 A.D. Liston netting M. Prous SDEI MZ479565 MW939734 MW939817 155494 88899 DEI-GISHym88899 *Euura oligospila* (Foerster, 1854) adult female 1 Sweden Skane Igelosa 55.763, 13.274 1835-08-16 rearing M. Prous MZLU 217184 111959 MZLU2017330 *Euura oligospila* (Foerster, 1854) adult male 1 Sweden Malmoehus Laen Lund 55.7, 13.18333 lectotype *Nematus microcercus* Thomson, 1871 MZLU 96476 21367 DEI-GISHym21367 *Euura oligospila* (Foerster, 1854) adult female 1 Sweden Torne Lappmark: Abisko: lowest 3 km of Abisko River 68.356, 18.769 350 m 2016-06-28 A.D. Liston netting M. Prous SDEI MZ479441 MW939753 216660 111910 M.Z.TYPE HYM.1.625 *Euura oligospila* (Foerster, 1854) adult female 1 United Kingdom England Worcestershire [original label], Worcester [original description] 1877-10-01 1877-10-31 R. B. Benson *Nematus salicivorus* Cameron, 1882 *Salix viminalis* 50662 3863 DEI-GISHym3863 *Euura pallens* (Konow, 1903) adult female 1 Russia Irkutsk 52.33333, 104.25 lectotype *Pteronus pallens* Konow, 1903 SDEI 50663 3864 DEI-GISHym3864 *Euura pallens* (Konow, 1903) adult female 1 Russia Irkutsk 52.33333, 104.25 paralectotype *Pteronus pallens* Konow, 1903 SDEI 94847 84966 DEI-GISHym84966 *Euura papillosa* (Retzius, 1783) adult male 1 Japan Nagano Yamanouchi, Road 471/502 36.744, 138.524 1600 m 2016-07-17 A. Taeger netting M. Prous SDEI MZ479449 MW939780 MW939857 93919 80108 DEI-GISHym80108 *Euura parvilabris* (Thomson, 1863) adult male 1 Sweden Torne Lappmark Bjoerkliden 68.409, 18.639 500 m 2016-07-01 A. Liston & M. Prous netting M. Prous SDEI MZ479465 MW939779 MW939853 89415 31242 DEI-GISHym31242 *Euura poecilonota* (Zaddach, 1876) adult female 1 Estonia Viljandimaa Sandra 58.453, 25.037 25 m 2015-06-05 A.D. Liston, M. Prous & A. Taeger netting M. Prous SDEI 90029 31243 DEI-GISHym31243 *Euura poecilonota* (Zaddach, 1876) adult female 1 Estonia Viljandimaa Sandra 58.453, 25.037 25 m 2015-06-05 A.D. Liston, M. Prous & A. Taeger netting M. Prous SDEI 90031 *Euura poecilonota* (Zaddach, 1876) adult female 1 Estonia Viljandimaa Sandra 58.453, 25.037 25 m 2015-06-05 A.D. Liston, M. Prous & A. Taeger netting M. Prous SDEI 173133 106442 ZMUO.029739.1 *Euura poecilonota* (Zaddach, 1876) adult 1 Finland Karelia australis: Kotka: Salminlahti 60.5495, 27.0082 2016-05-29 M. Prous ZMUO 75131 17620 DEI-GISHym17620 *Euura poecilonota* (Zaddach, 1876) adult female 1 Finland Lapin Laeeni Kevo 69.75, 27.01666 2001-06-03 2001-06-07 Kevo Subarctic Research Institute rearing A. Taeger *Betula pubescens* SDEI 178869 12527 DEI-GISHym12527 *Euura poecilonota* (Zaddach, 1876) adult male 1 Finland Lapin Laeeni Kevo Subarctic Research Institute 69.75, 27.01659 240 m 2001-06-09 2001-06-11 Kevo Subarctic Research Institute M. Prous ? 2001-06-16 *Betula pubescens* SDEI
Euura bergmanni and oligospila groups

151401 84462 DEI-GISHym84462 Euura poecilonota (Zaddach, 1876) adult female 1 Finland Northern Ostrobothnia Oulanka station 18 km SE 66.283, 29.653 150 m 2018-06-13 A. Liston & M. Prous netting M. Prous SDEI

215755 Euura poecilonota (Zaddach, 1876) adult female 1 Finland Lapland Pousu 68.847, 21.161 450 m 2020-06-27 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI

75154 17640 DEI-GISHym17640 Euura poecilonota (Zaddach, 1876) adult female 1 Germany Bayern Dirnberg bei Boebrach Muehle 49.05, 13.05 S. M. Blank M. Prous SDEI

80279 50447 BC ZSM HYM 03279 Euura poecilonota (Zaddach, 1876) adult female 1 Germany Bayern Guenthersbuehl 49.54299, 11.22299 403 m 1992-05-22 M. Kraus & S. Schmidt ZSM KC974682

80280 50448 BC ZSM HYM 03280 Euura poecilonota (Zaddach, 1876) adult female 1 Germany Bayern Guenthersbuehl 49.54299, 11.22299 403 m 1992-06-06 M. Kraus & S. Schmidt ZSM KC974794

1166 17621 DEI-GISHym17621 Euura poecilonota (Zaddach, 1876) adult female 1 Germany Brandenburg Noerdlich Britz, 6.M 52.91667, 13.804 1993-05-11 1993-05-13 DEI-Projekt Malaise trap A. Taeger SDEI

152113 86351 DEI-GISHym86351 Euura poecilonota (Zaddach, 1876) adult female 1 Russia Primorsky Krai Arsenyev, Ski-Base Bodrost 44.122, 133.27 200 m 2016-05-30 K. Kramp, M. Prous & A. Taeger netting M. Prous ? SDEI

152119 86176 DEI-GISHym86176 Euura poecilonota (Zaddach, 1876) adult female 1 Russia Primorskiy Kray Gornotajozhnoe, 1 km E 43.694, 132.168 150 m 2016-05-22 K. Kramp, M. Prous & A. Taeger netting M. Prous ? SDEI MZ479489 MW939710 MW939794

152114 86727 DEI-GISHym86727 Euura poecilonota (Zaddach, 1876) adult female 1 Russia Primorsky Krai Nakhodka 10 km ESE: Beregovoj 42.788, 133.03 30 m 2016-06-07 K. Kramp, M. Prous & A. Taeger netting M. Prous ? SDEI

152115 86753 DEI-GISHym86753 Euura poecilonota (Zaddach, 1876) adult female 1 Russia Primorsky Krai Nikolayevka 5 km NNE 43.137, 133.249 140 m 2016-06-11 K. Kramp, M. Prous & A. Taeger netting M. Prous ? SDEI

149750 21400 DEI-GISHym21400 Euura poecilonota (Zaddach, 1876) adult female 1 Sweden Norrbottens Laen Abisko 9 km E (Stordalen) 68.35, 19.035 400 m 2016-07-04 A. Liston & M. Prous netting M. Prous SDEI MZ479537 MW939754 MW939859

87286 31140 DEI-GISHym31140 Euura poecilonota (Zaddach, 1876) adult female 1 Sweden Norrbottens Laen Abisko National Park, E10 68.353, 18.815 390 m 2012-06-19 A.D. Liston netting M. Prous SDEI

87291 31145 DEI-GISHym31145 Euura poecilonota (Zaddach, 1876) adult female 1 Sweden Norrbottens Laen Abisko National Park, E10 68.353, 18.815 390 m 2012-06-23 A.D. Liston & A. Taeger netting M. Prous SDEI

210680 Euura poecilonota (Zaddach, 1876) adult female 1 Sweden Torne Lappmark Bjoerkliden 68.409, 18.639 500 m 850 m 2016-07-01 A. Liston & M. Prous netting M. Prous SDEI
210678 *Euura poecilonota* (Zaddach, 1876) adult female 1 Sweden Torne Lappmark: Abisko, Mt Njulla 68.365, 18.72 600 m 900 m 2016-06-23 A.D. Liston netting M. Prous SDEI

210679 *Euura poecilonota* (Zaddach, 1876) adult female 1 Sweden Torne Lappmark: Bjoerkliden 2 km SE 68.395, 18.705 500 m 800 m 2016-06-27 A.D. Liston netting M. Prous SDEI

155571 58973 ZMUO.030839 *Euura pumilio* (Konow, 1903) adult male 1 Finland Karelia borealis Otravaara [61.8877, 30.1096] 61.8877, 30.1096 2017-05-26 M. Mutanen M. Prous ZMUO MZ479389 MW939691 MW939809

151402 84261 DEI-GISHym84261 *Euura punctifrons* (Malaise, 1921) adult male 1 Finland Northern Ostrobothnia Oulanka station 8 km E 66.367, 29.503 270 m 2018-06-08 SDEI Hym-group netting M. Prous SDEI MZ479531 MW939686 MW939803 89193 31253 DEI-GISHym31253 *Euura punicosa* (Christ, 1791) adult female 1 Estonia Laanemaa Karuse 1 km S 58.608, 23.695 25 m 2015-06-06 A.D. Liston, M. Prous & A. Taeger netting A. D. Liston SDEI MZ479516 MW939683 MW939789 63749 *Euura respondens* (Foerster, 1854) adult female 1 Argentina Argentinien (Staat) 2003-11-15 S. M. Blank & C. Kutzscher S. M. Blank SDEI

68083 11613 DEI-GISHym11613 *Euura respondens* (Foerster, 1854) adult female 1 Argentina Rio Negro El Condor near Viedma -40.8, -63 2001-12-05 2001-12-14 C. Kutzscher netting S. M. Blank SDEI

53155 *Euura respondens* (Foerster, 1854) adult female 1 Argentina Jujuy Tilcara N 1 km -23.5605, -65.39166 2003-10-29 S. M. Blank S. M. Blank *Salix babylonica* SDEI

68070 11597 DEI-GISHym11597 *Euura respondens* (Foerster, 1854) adult female 1 Argentina Jujuy Tilcara N 1 km -23.5605, -65.39166 2003-10-29 S. M. Blank S. M. Blank *Salix babylonica* SDEI KC973924

157315 19889 DEI-GISHym19889 *Euura respondens* (Foerster, 1854) adult female 1 Argentina Jujuy Tilcara N 1 km -23.5605, -65.39166 2530 m 2003-10-29 S. M. Blank & C. Kutzscher A. D. Liston SDEI

68077 11605 DEI-GISHym11605 *Euura respondens* (Foerster, 1854) adult female 1 Australia Australian Capital Territory (ACT) Campbell -35.28809, 149.15415 2005-01-11 J. LaSalle S. M. Blank SDEI KC974368

68097 11629 DEI-GISHym11629 *Euura respondens* (Foerster, 1854) adult female 1 Australia Australian Capital Territory (ACT) Campbell -35.28809, 149.15415 2005-01-11 J. LaSalle S. M. Blank SDEI KC975344

79967 50135 BC ZSM HYM 01521 *Euura respondens* (Foerster, 1854) adult female 1 Australia Australian Capital Territory (ACT) Campbell -35.28809, 149.15415 2005-01-11 J. LaSalle A. Taeger ZSM KC975243

49893 3404 DEI-GISHym3404 *Euura respondens* (Foerster, 1854) adult male 1 Austria Austria 47.33333, 13.33333 syntype *Nematus respondens* Foerster, 1854 ZSM 150436 84169 DEI-GISHym84169 *Euura respondens* (Foerster, 1854) adult female 1 Bulgaria Varna Goren Chiflik 43.014, 27.626 30 m 2018-04-13 A. Liston & M. Prous netting M. Prous SDEI MZ479654 MW939775 MW939866
Euura bergmanni and oligospila groups

| Accession | Species          | Repository | Country    | Location                        | Date     | Collectors | Remarks                        |
|-----------|------------------|------------|------------|---------------------------------|----------|------------|--------------------------------|
| 216266    | Euura respondens | DEI-GISHym | Czech Republic | Kralovehradecky kraj Bedrichovka | 2009-06-09 | M. Prous   | Salix fragilis SDEI           |
| 216268    | Euura respondens | (Foerster, 1854) | Czech Republic | Bil, Karpaty CHKO Machova res. (potok) | 2007-05-18 | J. Macek, M. Prous | SDEI                           |
| 216265    | Euura respondens | (Foerster, 1854) | Czech Republic | Stredocesky Kraj Lazec | 2008-08-17 | J. Macek, M. Prous | SDEI                           |
| 215699    | Euura respondens | (Foerster, 1854) | Finland | Hame Janakkala 60.9, 24.58333 | 1987-08-26 | J. Kangas, M. Prous | DEI-GISHym, Salix fragilis SDEI |
| 173521    | Euura respondens | (Foerster, 1854) | Finland Karelia borealis: Kitee | 2017-07-25 | Marko Mutanen, M. Prous | ZMUO, ZMHB, MZ479494, MW939713, MW939816 |
| 216175    | Euura respondens | (Foerster, 1854) | Germany | Brandenburg Fuerstenwalde | 2009-06-12 | M. Prous | ZMHB                           |
| 152076    | Euura respondens | (Foerster, 1854) | Germany Mecklenburg-Vorpommern | Neubrandenburg | 1995-03-30 | M. Prous | SDEI                           |
| 133779    | Euura respondens | (Foerster, 1854) | Greece | Elis Kryovrysi 37.9191, 21.8041 | 2017-04-26 | M. Prous | DEI-GISHym, Salix alba SDEI    |
| 216267    | Euura respondens | (Foerster, 1854) | Slovakia | Moravsky Sv. Mikulas | 2008-07-03 | J. Macek, M. Prous | DEI-GISHym, Nematus nitens Thomson, MZLU |
| 155523    | Euura respondens | (Foerster, 1854) | Uzbekistan | Bakhmal | 1979-05-21 | W. H. Muche | SDEI                           |
| 215629    | Euura respondens | (Foerster, 1854) | Uzbekistan | Fergana Oblast Fergana | 1974-05-23 | W. H. Muche | ZMHB                           |

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| Accession     | GenBank       | Name          | Author     | Country     | Collection      | Coordinates | Location                        | Notes                                      |
|---------------|---------------|---------------|------------|-------------|-----------------|-------------|---------------------------------|-------------------------------------------|
| 216172        | 84694         | *Euura respondens* (Foerster, 1854) | adult male | Uzbekistan  | Fergana 10 km S | 40.28, 71.8 | 1975-05-20 W. H. Muche M. Prous | SDEI                                      |
| 216173        | 84694         | *Euura respondens* (Foerster, 1854) | adult 7   | Uzbekistan  | Fergana 10 km S | 40.28, 71.8 | 1975-05-20 W. H. Muche M. Prous | ZMHB                                      |
| 150058        | 30223         | *Euura respondens* (Foerster, 1854) | adult male | Uzbekistan  | Taschkent 40.28  | 71.8        | 2017-07-15 2017-07-28 A. Taeger | Malaise trap SDEI                         |
| 151299        | 56528         | *Euura reticulata* (Holmgren, 1883) | adult female | Finland    | Lapin 66.28, 24  | 1966-06-15 V. Vikberg V. Vikberg | CVV                                 |                                            |
| 148466        | 88661         | *Euura ribesii* (Scopoli, 1763) | adult male | Germany     | Brandenburg Eberswalde | 52.8264, 13.84136 | 2017-07-15 2017-07-28 A. Taeger | Malaise trap SDEI MK624714 MK624796 MK624886 MK624797 |
| 151354        | 84243         | *Euura scutellata* (Hartig, 1837) | adult female | Germany     | Brandenburg Muencheberg | 52.515, 14.115 | 2016-06-02 J. Perkioemaeki E. Lindqvist | holotype Pteronidea disparoides Lindqvist, 1969 MZH |
| 146883        | 83744         | *Euura sylvestris* (Cameron, 1884) | larva 1   | Austria     | Nordtirol Hochgurgl | 500 m N | 2017-08-17 C. Michell & A. Liston M. Prous | Salix hegetschweileri SDEI MZ479661 MW939676 |
| 158316        | 59158         | *Euura sylvestris* (Cameron, 1884) | adult female | Finland     | Uusimaa Espoo 60.21666, 24.66666 | 1964-06-02 J. Perkioemaeki E. Lindqvist | MW939676 |                                            |
| 151659        | 56564         | *Euura sylvestris* (Cameron, 1884) | adult female | Finland     | Helsinki 60.17555, 24.93416 | 1963-01-01 1963-12-31 CVV | 1964-06-02 J. Perkioemaeki E. Lindqvist | holotype Pteronidea woollatti Lindqvist, 1971 MZH |
| 151667        | 56572         | *Euura sylvestris* (Cameron, 1884) | adult male | Finland     | Lapin 69.05, 20.8 | 1968-07-09 2018-08-14 M. Mutanen, T. Nyman rearing | Pteronidea woollatti Lindqvist, 1971 MZH |
| 155573        | 58975         | *Euura sylvestris* (Cameron, 1884) | adult female | Finland     | Lapland 69.04563, 20.85539 | 2016-08-14 M. Mutanen, T. Nyman rearing | MZUO.030841 |                                            |
Euura bergmanni and oligospila groups

166247 59290 GP.97871 Euura sylvestris (Cameron, 1884) adult female 1 Finland Kumpula, Botanical garden 60.2016, 24.9607 2016-08-15 2016-08-21 J. Paukkunen Malaise trap M. Prous MZH
151292 56521 PR.574VV Euura sylvestris (Cameron, 1884) adult female 1 Finland Northern Ostrobothnia Kuusamo [736:60] 66.359, 29.342 1979-07-01 V. Vikberg V. Vikberg CVV
175156 111639 ZMUO.036289 Euura sylvestris (Cameron, 1884) adult female 1 Finland Lapponia inarensis: Karigasniemi: Suttesjohka 69.3932, 26.1166 2017-07-14 M. Prous ZMUO MZ479492
175360 111044 ZMUO.035596 Euura sylvestris (Cameron, 1884) adult female 1 Finland Lapponia inarensis: Utsjoki: Akukoski 69.5874, 25.96 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen M. Prous ZMUO MZ479650
175703 111102 ZMUO.035654 Euura sylvestris (Cameron, 1884) adult male 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen M. Prous ZMUO MZ479414
175708 111111 ZMUO.035663 Euura sylvestris (Cameron, 1884) adult male 1 Finland Lapponia inarensis: Utsjoki: Rovisuvanto 69.4703, 25.8635 2018-07-04 Marko Mutanen, Nestori Mutanen, Anttoni Mutanen M. Prous ZMUO MZ479655
152174 56629 http://id.luomus.fi/GL.3443 Euura sylvestris (Cameron, 1884) adult female 1 Finland Ostrobotnia australis Mustasaari 63.16666, 21.66666 1963-07-24 J. Perkioemaeki E. Lindqvist holotype Pteronidea angustiserra Lindqvist, 1969 MZH
64947 111965 http://id.luomus.fi/GL.3512 Euura sylvestris (Cameron, 1884) adult female 1 Finland Nurmes 63.55, 29.11666 1939-06-18 A. Saarinen M. Prous ? holotype Pteronidea straminea Lindqvist, 1958 MZH
176710 111252 ZMUO.035806 Euura sylvestris (Cameron, 1884) adult male 1 Finland Ostrobotnia ouluensis: Oulu: Limingantulli 65.0009, 25.4631 2018-06-26 Marko Mutanen M. Prous ZMUO MZ479472
176711 111253 ZMUO.035807 Euura sylvestris (Cameron, 1884) adult male 1 Finland Ostrobotnia ouluensis: Oulu: Limingantulli 65.0009, 25.4631 2018-06-26 Marko Mutanen M. Prous ZMUO MZ479610
176712 111254 ZMUO.035808 Euura sylvestris (Cameron, 1884) adult male 1 Finland Ostrobotnia ouluensis: Oulu: Limingantulli 65.0009, 25.4631 2018-06-26 Marko Mutanen M. Prous ZMUO MZ479438
217164 111940 ZMUO.041885 Euura sylvestris (Cameron, 1884) adult female 1 Finland Ostrobotnia ouluensis: Oulu: Linnanmaa, kasvipeutarha 65.0636, 25.4595 2020-07-08 M. Mutanen rearing M. Prous Salix pentandra ZMUO MZ479606 MW939696 MW939828
157558 59131 ZMUO.033783 Euura sylvestris (Cameron, 1884) adult female 1 Finland Toppila [65.045N 25.418E] 65.045, 25.418 2017-09-03 M. Mutanen rearing M. Prous Salix pentandra ZMUO MZ479590 MW939693
217165 111941 ZMUO.041872 Euura sylvestris (Cameron, 1884) adult female 1 Finland Ostrobotnia ouluensis Ulkokrunni [7255:3398] 65.379, 24.817 2019-07-25 M. Mutanen rearing M. Prous Populus tremula ZMUO MZ479488 MW939694 MW939826
Euura sylvestris (Cameron, 1884) adult female 1 Finland Ostrobotnia ouluensis Ulkokrunni [7255:3398] 65.379, 24.817 2019-07-25 M. Mutanen rearing M. Prous *Populus tremula* ZMUO MZ479600 MW939695 MW939827

158211 59151 ZMUO.033416 *Euura sylvestris* (Cameron, 1884) adult male 1 Finland Lapponia inarenris Utsjoki, Nuorgam, Isonkivenvaara [7776:3533] 70.06338, 27.87993 2017-07-07 M. Mutanen, N. Mutanen, A. Mutanen M. Prous ZMUO MZ479501 MW939692 MW939882

136171 20993 DEI-GISHym20993 *Euura sylvestris* (Cameron, 1884) adult female 1 Lithuania Panevežys Pajišmeniai 2 km S 56.094, 24.479 35 m 2015-06-08 A.D. Liston & A. Taeger netting M. Prous SDEI MZ479396

96411 21407 DEI-GISHym21407 *Euura sylvestris* (Cameron, 1884) adult female 1 Sweden Torne Lappmark Abisko 68.349, 18.839 370 m 2016-07-04 A. Liston & M. Prous netting M. Prous SDEI MZ479578 MW939718 MW939846

149746 21405 DEI-GISHym21405 *Euura sylvestris* (Cameron, 1884) adult female 1 Sweden Torne Lappmark Abisko 6 km E 68.348, 18.969 400 m 2016-07-04 A. Liston & M. Prous netting M. Prous SDEI MZ479553 MW939761 MW939879

96483 21376 DEI-GISHym21376 *Euura sylvestris* (Cameron, 1884) adult female 1 Sweden Torne Lappmark Abisko: Mt. Njulla 68.362, 18.734 400 m 950 m 2016-06-30 A. Liston & M. Prous netting M. Prous SDEI MZ479462 MW939756 MW939868

157483 12008 DEI-GISHym12008 *Euura sylvestris* (Cameron, 1884) adult female 1 Sweden Torne Lappmark Nikkaluokta 7 km NE 67.89, 19.138 500 m 1050 m 2016-07-08 A. Liston & M. Prous netting M. Prous SDEI MZ479506 MW939739

133762 83594 DEI-GISHym83594 *Euura sylvestris* (Cameron, 1884) adult male 1 Sweden Gotland Roma 57.5, 18.447 2017-06-08 A.D. Liston netting M. Prous SDEI MZ479560 MW939671 MW939783

96487 21351 DEI-GISHym21351 *Euura sylvestris* (Cameron, 1884) adult female 1 Sweden Torne Lappmark: Kiruna, near airport 67.84, 20.35 450 m 2016-06-22 A.D. Liston netting M. Prous SDEI MZ479523 MW939762 MW939873

131796 21339 DEI-GISHym21339 *Euura sylvestris* (Cameron, 1884) adult female 1 Sweden Torne Lappmark: Kiruna, near airport 67.84, 20.35 450 m 2016-06-22 A.D. Liston netting M. Prous SDEI MZ479397 MW939760 MW939871

148499 88694 DEI-GISHym88694 *Euura tibialis* (Newman, 1837) adult female 1 Germany Brandenburg Eberswalde, Waldstrasse 19: Garten mit Waldrand 52.8264, 13.84136 2017-08-27 2017-09-29 A. Taeger Malaise trap SDEI MZ479646 MW939771 MW939860

78329 15293 DEI-GISHym15293 *Euura vaga* (Fabricius, 1781) adult male 1 Canada Quebec Gatineau Park 1.8 km N Eardley, Juniperus virginiana stand 45.56667, -76.09139 60 m 80 m 2012-05-31 2012-06-07 CNC Hymenoptera Team Malaise trap A. D. Liston SDEI KF642840 MW939723 MW939823
Euura bergmanni and oligospila groups

150911 84189 DEI-GISHym84189 *Euura variator* (Ruthe, 1859) adult male 1 Sweden Torne Lappmark Björkliden 68.409, 18.639 500 m 850 m 2016-07-01 A. Liston & M. Prous netting SDEI MK624671 MK624761 MK624814

148289 88484 DEI-GISHym88484 *Euura vicina* (Serville, 1823) adult male 1 Germany Brandenburg Eberswalde, Waldstrasse 19: Garten mit Waldrand 52.8264, 13.84136 2017-05-18 2017-05-25 A. Taeger Malaise trap SDEI MZ479639 MW939774 MW939861

157550 12011 DEI-GISHym12011 *Euura viduata* (Zetterstedt, 1838) adult male 1 Germany Brandenburg Muencheberg, Gr. Schlagenthinsee 52.51979, 14.10212 2019-04-04 A. Liston & M. Prous M. Prous SDEI MZ479502 MW939737 MW939837

158696 12064 DEI-GISHym12064 *Euura villosa* (Thomson, 1863) adult female 1 Norway Finnmark Batsfjord 9 km SW 70.568, 29.554 230 m 2019-06-27 A. Liston & M. Prous netting M. Prous SDEI MZ479453 MW939744 MW939835

64984 59355 http://id.luomus.fi/GL.3506 *Euura viridis* (Stephens, 1835) adult female 1 Finland Ahlainen, Rankku 61.61666, 21.56666 1958-07-06 V. Lauro holotype Pteronidea lauroi Lindqvist, 1960 MZH

215759 84547 DEI-GISHym84547 *Euura viridis* (Stephens, 1835) adult male 1 Finland Lapland Kilpisjaervi, Saana 69.037, 20.844 500 m 900 m 2020-06-29 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI

155487 58925 ZMUO.030834 *Euura viridis* (Stephens, 1835) adult male 1 Finland Lapland Kilpisjaervi, Saana [767:325] 69.04563, 20.85539 2016-01-01 2016-12-31 M. Mutanen, T. Nyman rearing M. Prous 2017-01-01 2017-12-31 Betula pubescens ZMUO MZ479647 MW939729 MW939807

155488 58926 ZMUO.030835 *Euura viridis* (Stephens, 1835) adult female 1 Finland Lapland Kilpisjaervi, Saana [767:325] 69.04563, 20.85539 2016-01-01 2016-12-31 M. Mutanen, T. Nyman rearing M. Prous 2017-01-01 2017-12-31 Betula pubescens ZMUO MZ479549 MW939730 MW939808

46497 56552 http://id.luomus.fi/GL.3441 *Euura viridis* (Stephens, 1835) adult female 1 Finland Kuusamo 65.96666, 29.18333 J. Sahlberg M. Prous holotype Pteronidea abscondita Lindqvist, 1949 MZH

215760 12603 DEI-GISHym12603 *Euura viridis* (Stephens, 1835) adult male 1 Finland Lapland Lammasoaivi 68.778, 21.338 600 m 2020-06-26 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI

152418 56757 ZMUO.016327 *Euura viridis* (Stephens, 1835) adult female 1 Finland Muonio 67.8909, 23.7503 2014-07-06 Marko Mutanen M. Prous ? ZMUO MZ479621

152420 56759 ZMUO.016329 *Euura viridis* (Stephens, 1835) adult female 1 Finland Muonio 67.8909, 23.7503 2014-07-05 Marko Mutanen M. Prous ? ZMUO MZ479466

152528 56867 ZMUO.028371 *Euura viridis* (Stephens, 1835) adult female 1 Finland Muonio 67.8909, 23.7503 2014-07-01 Marko Mutanen M. Prous ? ZMUO MZ479521

152510 56849 ZMUO.028326 *Euura viridis* (Stephens, 1835) adult female 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-18 Marko Mutanen M. Prous ? ZMUO MZ479387
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152511 56850 ZMUO.028327 *Euura viridis* (Stephens, 1835) adult female 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479632

152512 56851 ZMUO.028328 *Euura viridis* (Stephens, 1835) adult male 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479635

215666 111829 http://id.luomus.fi/GL.3461 *Euura viridis* (Stephens, 1835) adult female 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479632

152511 56850 ZMUO.028327 *Euura viridis* (Stephens, 1835) adult female 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479632

152512 56851 ZMUO.028328 *Euura viridis* (Stephens, 1835) adult male 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479635

215666 111829 http://id.luomus.fi/GL.3461 *Euura viridis* (Stephens, 1835) adult female 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479632

152511 56850 ZMUO.028327 *Euura viridis* (Stephens, 1835) adult female 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479632

152512 56851 ZMUO.028328 *Euura viridis* (Stephens, 1835) adult male 1 Finland Poeyrisjaervi 68.6743, 23.8834 2015-07-17 Marko Mutanen M. Prous ? ZMUO MZ479635

49892 3388 DEI-GISHym3388 *Euura viridis* (Stephens, 1835) adult female 1 Germany Germany 51.5, 10.5 lectotype *Nematus polybispilus* Foerster, 1854 ZSM

158841 12150 DEI-GISHym12150 *Euura viridis* (Stephens, 1835) adult male 1 Germany Thuringen Ilfeld: Netzkater: Brandesbachtal 51.6, 10.81 350 m 400 m 2019-05-28 23rd Symphyta Workshop netting M. Prous ? SDEI

82075 50443 BC ZSM HYM 03275 *Euura viridis* (Stephens, 1835) adult male 1 Germany Bayern Otmaring 49.03499, 11.541 377 m 2006-06-14 J. Hable M. Prous ZSM 149747 21406 DEI-GISHym21406 *Euura viridis* (Stephens, 1835) adult male 1 Sweden Torne Lappmark Abisko 6 km E 68.348, 18.969 400 m 2016-07-04 A. Liston & M. Prous netting M. Prous SDEI MZ479580 MW939764 MW939874

87277 31131 DEI-GISHym31131 *Euura viridis* (Stephens, 1835) adult female 1 Sweden Norrbottens Laen Abisko National Park 68.342, 18.755 410 m 2012-06-27 A.D. Liston & A. Taeger netting M. Prous SDEI

87288 31142 DEI-GISHym31142 *Euura viridis* (Stephens, 1835) adult female 1 Sweden Norrbottens Laen Abisko National Park, E10 68.353, 18.815 390 m 2012-06-25 A.D. Liston & A. Taeger netting M. Prous ? SDEI

96499 21364 DEI-GISHym21364 *Euura viridis* (Stephens, 1835) adult female 1 Sweden Torne Lappmark: Bjoerkliden 2 km SE 68.395, 18.705 500 m 800 m 2016-06-27 A.D. Liston netting M. Prous SDEI MZ479564 MW939778 MW939867

216658 111908 B.M.TYPE HYM1.697 *Euura viridis* (Stephens, 1835) adult female 1 United Kingdom England London, in the vicinity of Stephens, J. F. holotype *Nematus viridis* Stephens, 1835 BMNH

150434 84172 DEI-GISHym84172 *Euura vittata* (Serville, 1823) adult male 1 Bulgaria Sliven Ichera 3 km SW 42.749, 26.421 730 m 2018-04-14 A. Liston & M. Prous netting M. Prous SDEI MZ479528 MW939768 MW939880

131794 21330 DEI-GISHym21330 *Euura weiffenbachiella* Liston & Vikberg, 2017 larva 1 Sweden Skane Sandhammeren [N55.387 E14.191] 55.387, 14.191 2016-06-14 A.D. Liston photography A. D. Liston *Salix repens* SDEI MK624680 MK624768 MK624830 149240 83827 DEI-GISHym83827 *Megadineura grandis* (Andre, 1882) adult male 1 Japan Nagano Suzaka 10 km SSW 36.538, 138.295 1350 m 2017-05-30 A. Taeger netting M. Prous SDEI MZ479658 MW939781 MW939854
Euura bergmanni and oligospila groups

88820 80015 DEI-GISHym80015 Mesoneura opaca (Fabricius, 1775) adult female 1 Morocco Meknes-Tafilalet Region Ifrane 7 km NW 33.552, -5.175 1590 m 2015-04-20 A. Liston & M. Prous netting M. Prous SDEI KY698134 KY698258 MK624823 KY698259 DEI-GISHym86259 Nematus adult male 1 Russia Primorsky Krai Arsenyev, Ski-Base Bodrost 44.122, 133.27 200 m 2016-05-25 K. Kramp, M. Prous & A. Tæger netting M. Prous SDEI KY698141 KY698261 MK624832

155310 58866 TUZ109010 Nematus alniiastri (Scharfenberg, 1805) adult female 1 Estonia Saaremaa Abruka [58.159N 22.501E] 58.159, 22.501 2017-07-25 V. Soon A. D. Liston TUZ MK624747 MK624805 MK624870

133692 80332 DEI-GISHym80332 Nematus lucidus (Panzer, 1801) adult male 1 Greece Achaia Achaiko Chorio S 38.1371, 22.061 1150 m 2017-04-25 SDEI Hymgroup netting M. Prous SDEI MK624685 MK624770 MK624835

89023 31229 DEI-GISHym31229 Nematus princeps Zaddach, 1876 adult male 1 Estonia Ida-Virumaa Vasavere 1.5 km E 59.296, 27.543 50 m 2015-06-04 H. Vardal netting M. Prous NHRS KK602591 KY698262 MK624833

215573 84672 DEI-GISHym84672 Nematus tulunensis Vikberg, 1972 larva 1 Finland Northern Ostrobothnia Oulu, kasvipuutarha [7219:3427] 65.06365, 25.45948 2020-06-30 M. Mutanen, M. Prous, A. Liston M. Prous & A. Liston SDEI MZ479567 MW939709 MW939885

87921 31044 DEI-GISHym31044 Nematus umbratus Thomson, 1871 adult female 1 Sweden Norrbottens Laen Pajala 67.204, 23.409 150 m 2014-06-05 A. Liston & M. Prous netting A. D. Liston SDEI MK624710 MK624792 MK624857

216201 84540 DEI-GISHym84540 Pristiphora astragali Vikberg, 1978 adult female 1 Finland Lapland Kilpisjaervi, Jehkas 69.086, 20.8 550 m 950 m 2020-06-28 M. Mutanen, M. Prous, A. Liston netting M. Prous & A. Liston SDEI MZ479477 MW939777 MW939849

94230 80158 DEI-GISHym80158 Pristiphora cincta Newman, 1837 adult male 1 Sweden Torne Lappmark Abisko 6 km W 68.342, 18.691 650 m 900 m 2016-07-02 A. Liston & M. Prous netting M. Prous SDEI KY698066 KY698224 MW939782

133670 80321 DEI-GISHym80321 Pristiphora cretica W. Schedl, 1981 adult male 1 Greece Achaia Achaiko Chorio S 38.1371, 22.061 1150 m 2017-04-25 SDEI Hymgroup netting M. Prous SDEI MT385400 MT385404 MT385408

133490 80258 DEI-GISHym80258 Pristiphora dedeara Liston & Prous, 2017 adult male 1 Germany Brandenburg Ruhlsdorf bei Strausberg 52.5707, 13.9978 70 m 2017-04-09 A. Liston & M. Prous netting paratype Pristiphora dedeara Liston & Prous, 2017 SDEI MF426918 MF426921 MK624822

150357 88800 DEI-GISHym88800 Pristiphora fausta (Hartig, 1837) adult male 1 Bulgaria Varna Staro Oryahovo 2 km SW 42.976, 27.787 120 m 2018-04-08 A. Liston & M. Prous netting M. Prous SDEI MZ479651 MW939749 MW939865

89815 20989 DEI-GISHym20989 Pristiphora geniculata (Hartig, 1840) adult male 1 Estonia Ida-Virumaa Vasavere 1.5 km E [59.29578, 27.54339] 59.29578, 27.54339 50 m 2015-05-19 2015-06-04 M. Heidemaa Malaise trap M. Prous SDEI KX602585 KY698209 MK624820
157320 12005 DEI-GISHym12005 Pristiphora gerula (Konow, 1904) adult male 1 Estonia Tartumaa Tuiki [58.4115N 26.5292E] 58.4115, 26.5292 2007-05-26 M. Heidemaa Malaise trap M. Prous CMH MZ479587 MW939732 MW939881
151440 31859 DEI-GISHym31859 Pristiphora helvetica (Benson, 1960) adult male 1 Austria Tirol Hochgurgl, Timmelsjochstr. Kehre 3 46.9, 11.05 1900 m 2018-05-26 A.D. Liston netting A. D. Liston SDEI MK624677 MK624765 MK624818
150394 88837 DEI-GISHym88837 Pristiphora insularis Rohwer, 1910 adult male 1 Bulgaria Burgas Indzhe Voivoda 3 km NE 42.235, 27.451 250 m 2018-04-12 A. Liston & M. Prous netting M. Prous SDEI MZ479672 MW939776 MW939864
166755 80652 DEI-GISHym80652 Pristiphora leucopodia (Hartig, 1837) adult male 1 Russia Primorskiy Kray Anisimovka: Gribanovka 1 km N 43.126, 132.797 450 m 2019-05-08 M. Prous netting M. Prous SDEI MZ479421 MW939712 MW939796
93923 80112 DEI-GISHym80112 Pristiphora malaisei (Lindqvist, 1952) adult male 1 Sweden Torne Lappmark Bjoerklden 68.409, 18.639 500 m 850 m 2016-07-01 A. Liston & M. Prous netting M. Prous SDEI KY698127 KY698256 MW939852
87919 31040 DEI-GISHym31040 Pristiphora mollis (Hartig, 1837) adult male 1 Sweden Norrbottens Laen Aengestraesk 3 km N 66.035, 22.16 40 m 2014-05-28 A. Liston & M. Prous netting M. Prous SDEI KX602587 KY698230 MK624821
89566 31311 DEI-GISHym31311 Pristiphora opaca Lindqvist, 1955 adult male 1 Sweden Pajala 4 km E (Norrbotten) 67.212, 23.497 170 m 2014-06-10 A. Taeger netting M. Prous SDEI KX602552 KY698174 MK624808
157996 80813 DEI-GISHym80813 Pristiphora punctifrons (Thomson, 1871) adult male 1 Russia Primorsky Krai Anisimovka 10 km NW 43.195, 132.665 150 m 2019-05-09 M. Prous & S. Tuerk netting M. Prous SDEI MZ479605 MW939722 MW939822

Supplementary material I

Studied specimens
Authors: Marko Prous, Andrew Liston, Marko Mutanen
Data type: Excel table
Explanation note: Occurrence data of the studied specimens.
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Link: https://doi.org/10.3897/jhr.84.68637.suppl1
Supplementary material 2

Sequence alignments
Authors: Marko Prous, Andrew Liston, Marko Mutanen
Data type: ZIP archive
Explanation note: Alignments used for phylogenetic analyses.
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Link: https://doi.org/10.3897/jhr.84.68637.suppl2