Sawflies (Hymenoptera, Symphyta) newly recorded from Sweden

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The first records from Sweden of 15 species of sawfly are presented: 2 species of Pamphiliidae, 1 Argidae, 11 Tenthredinidae and 1 Cimbicidae. Of these, *Empria camtschatica* and *E. plana* are also recorded for the first time in Europe. An illustrated key is provided to distinguish them from similar species (*E. immersa*, *E. fletcheri*). *Rhogogaster polaris* Lindqvist, 1964 is treated as a valid species (species revocata). The number of Symphyta species that occur in Sweden and possible deficits in recording strategies are discussed.

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Sawflies and their allies are traditionally placed in the sub-order Symphyta. Unlike the Apocrita, the other much larger sub-order of the Hymenoptera, the Symphyta is a paraphyletic group. Nevertheless, the distinction has much practical value. Adult Symphyta are distinguished from Apocrita by the lack of the "wasp waist" in the former. Sawfly larvae all feed on plants, with the exception of the parasitoid larvae of Orussidae. A striking peculiarity of the Symphyta, is that unlike most other groups of insects, they are more diverse and species rich in cooler, temperate regions of the world, rather than in the tropics. Nearly 9000 species have been described worldwide (Taeger *et al*. 2010), while over 600 species are known in Sweden (Dyntaxa 2013). A good general introduction to the Symphyta, with an emphasis on the fauna of Northern Europe, was provided by Viitasaari (2002a).

The purpose of this paper is to document records of sawfly species, excluding the Nematinae, which to the best of our knowledge have not been previously recorded in Sweden. By "not previously recorded", we mean that no published source exists that states that these species definitely occur in Sweden (see also Discussion). The Nematinae will be dealt with elsewhere, in the course of comprehensive revisions of the Swedish species.

Material and methods

Field work undertaken by some of the authors from 2012 to 2014 as part of the Swedish Taxonomy Initiative's project on the nematine sawflies (Tenthredinidae, Nematinae) also provided specimens of many non-nematine Symphyta (STING 2013). The field work was conducted on several sites in Sweden, distributed all over the country, in the provinces of Skåne, Blekinge, Halland, Småland, Öland, Uppland, Dalarna, Härjedalen, Norrbotten and Torne lappmark. Adult specimens were mostly collected using hand nets, generally by sweeping the vegetation, but sometimes "on sight". They were killed with ethyl acetate, in a freezer, or in alcohol. The majority of specimens were pinned during the evening following the collection event. In addition, a few individuals provided by the Swedish Malaise Trap Project, SMTP (Karlsson *et al.* 2005), are mentioned, as well as specimens from private collections. Note that only a small fraction of the approximately 20,000 sawfly specimens on loan to the authors from the SMTP have so far been examined and determined. Literature used as a starting point for the identification of species reported here is: Argidae (Gussakovskij 1935), Cimbicidae (Taeger 1998), Pamphiliidae (Viitasaari 2002b) and Tenthredinidae (Enslin 1912–1918; Benson 1952; Zhelochovtsev & Zinovjev 1988).

The specimens listed below are deposited in the following collections: Naturhistoriska riksmuseet, Stockholm, Sweden (NHRS); Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (SDEI); private collection of Erik Heibo, Lierskogen, Norway (CEHL); collection of Ole J. Lønnve (BioFokus), Oslo, Norway (COLO). Nomenclature and placement in families and subfamilies follows Taeger *et al.* (2010).

Results

PAMPHILIIDAE

Pamphilius jucundus (Eversmann, 1847)

Öland, *Skogsby*, Station Linné 1 km E, 56.617°N 16.507°E, 40 m altitude, 1 ♂ 2 ♀, 29.05.2013, leg. Liston, Prous & Taeger (NHRS, SDEI).

Pamphilius jucundus has been recorded in much of Europe, including Finland, but not in Sweden, Norway or the British Isles, and is generally rare (Viitasaari 2002b: as *P. nemorum*). So far, there are no records from outside Europe. The host plants of the larvae are wild and cultivated strawberries, *Fragaria* spp. (Viitasaari 2002b).

Pamphilius fumipennis (Curtis, 1831)

Dalarna, *Mora*, Stenis, 60.933°N 14.468°E, 160 m altitude, 1 ♀, 15.6.2013, leg. Liston, Prous & Taeger (NHRS), swept from *Alnus incana*.

Pamphilius fumipennis is widespread throughout most of Europe, but is seldom collected (Viitasaari 2002b). Published records already exist from Norway (Midtgaard 1986). So far, there are no records from outside Europe. The usual larval host plant in much of Europe is *Alnus incana*, but *Corylus avellana* can be used instead (Viitasaari 2002b).

ARGIDAE

Arge metallica (Klug, 1834)

Uppland, *Nora,* Tärnsjö 4 km WSW, 60.134°N 16.859°E, 75 m altitude, 4 ♀, 17.6.2013, leg. Liston, Prous & Taeger (NHRS, SDEI), all collected from inflorescences of *Angelica sylvestris*.

Arge metallica (sometimes placed in *Spinarge* Wei, 1998: Hara & Shinohara 2006) has a wide distribution in Central and Northern Europe (Taeger *et al.* 2006), extending to the Far East of Russia, but is rarely collected, probably because it occurs very locally. Although known from Denmark, Estonia and Finland, there are no previous published records from Sweden or Norway. *Betula pendula* is the only known host plant, although the recorded preference of *A. metallica* for damp areas (Taeger *et al.* 1998) suggests that its larvae might also feed on *B. pubescens*.

TENTHREDINIDAE

Allantinae

Empria alpina Benson, 1938

Torne lappmark, *Kiruna*, Abisko, Mt. Njullá above treeline, 68.362°N 18.723°E, 900 m altitude, 2 ♂ 1 ♀, 05.7.2012, leg. Taeger & Liston (NHRS, SDEI).

Empria alpina is a Holarctic species (Prous *et al.* 2011a) which is most often found above the tree line. The larval host plant is *Dryas octo-*

petala (Prous *et al*. 2011a). Although *E. alpina* is recorded from Finland, no reports have previously been made of occurrences in Scandinavia.

Empria hungarica (Konow, 1895)

Öland, *Skogsby*, Station Linné, 56.619°N 16.498°E, 40 m altitude, 1 ♀, 26.5.2011, leg. V. Soon (coll. Soon); as above, but 1 km East of Station Linné, 1 ♂, 29.5.2013, leg. Liston, Prous & Taeger (NHRS).

Empria hungarica is a locally distributed West Palaearctic species found on areas of limerich, dry grassland where its only host plant *Filipendula vulgaris* grows (Liston 2006). This sawfly species has not previously been recorded in Scandinavia. Its closest known occurrence to Öland is on the island of Saaremaa (Viitasaari *et al*. 1998), Estonia, which shares similar types of habitat.

Empria camtschatica Forsius, 1928

Dalarna, *Malung-Sälen*, Malung, 60.684°N 13.702°E, 290 m altitude, 1 ♂ 2 ♀, 9.6.2013, leg. Liston, Prous & Taeger (SDEI). **Härjedalen**, *Härjedalen*, Hede 6 km N, 62.498°N 13.500°E, 525 m altitude, 1 ♀, 6.6.2013, leg. Liston, Prous & Taeger (SDEI). Hede 13 km N, 62.614°N 13.391°E, 840 m altitude, 1 ♂ 1 ♀, 6.6.2013, leg. Liston, Prous & Taeger (SDEI). Hede 20 km N, 62.565°N 13.406°E, 590 m altitude, 1 ♀, 6.6.2013, leg. Liston, Prous & Taeger (SDEI). Lofsdalen, 62.137°N 13.139°E, 730 m altitude, 4 ♀, 8.6.2013, leg. Liston, Prous & Taeger (SDEI). Vemdalen, 62.435°N 13.835°E, 415 m altitude, 1 ♀, 5.6.2013, leg. Liston, Prous & Taeger (SDEI); same locality, 14 ♂ 34 ♀, 7.6.2013, leg. Liston, Prous & Taeger (NHRS, SDEI). **Torne lappmark**, *Kiruna*, Kiruna airport, 67.840°N 20.350°E, 450 m altitude, 1 ♀, 21.6.2012, leg. Liston, Taeger & Blank (SDEI).

Prous (2012) synonymised *Empria asiatica* Muche, 1965 with *E. camtschatica*, but this might have been premature, as the specimens of Muche's type series (holotype female, 3 female and 1 male paratypes) differ from *E. camtschatica* by having tarsal claws with rather small subbasal tooth (more like *E. fletcheri* than other species of the *E. immersa* group) and dark brown or black pterostigma of the forewing (more like *E. immersa* than the other species). Although the structure of the saw of *E. asiatica* is like that in *E. camtschatica*, the penis valve of one male paratype appears to be quite distinctive (http://dx.doi.org/10.6084/m9.figshare.926462). Apart from the type series, no other specimens which could be identified as *E. asiatica* are known to us.

Empria camtschatica was described from Bolsheretsk [Bolscheretsk], Kamchatka Krai, Russia. Specimens are also known from Magadan Oblast and Yamalo-Nenets Autonomous Okrug of Russia, Finland, Mongolia, and Norway (Heibo *et al*. 2014, Prous, unpubl.). The new Swedish, Finnish, and Norwegian (Heibo *et al*. 2014) records are the first from the West Palaearctic. The identity of the larval host plant(s) is unknown.

Empria plana (Jakowlew, 1891)

Härjedalen, *Härjedalen*, Vemdalen, 62.435°N 13.835°E, 415 m altitude, 3 ♀, 7.6.2013, leg. Liston, Prous & Taeger (NHRS, SDEI).

This is the only known West Palaearctic locality for this species. The larval hosts are possibly *Salix* spp. (Prous *et al*. 2011b). Otherwise the species is widely distributed in the East Palaearctic (Prous 2012).

Key to West Palaearctic species of the *Empria immersa* group

Based on a large number (~150) of specimens of the *Empria immersa* group collected in Sweden in 2013 (Härjedalen and Dalarna), at least the females can be segregated into 4 distinct groups (at one locality, Vemdalen, all four were present). *E. fletcheri* (Cameron, 1878) females with pale (reddish) apical abdominal terga can easily be distinguished from all others. *E. immersa* (Klug, 1818) can be distinguished from the remaining specimens by having a black pterostigma of forewing and relatively short antennae. Finally, *E. camtschatica* Forsius, 1928 can be distinguished from *E. plana* (Jakowlew, 1891) by having black metafemora (pale in *E. plana*) and differently shaped serrulae of the lancet. However, specimens of *E. camtschatica* studied from further north (Lapland of Sweden and Finland) have in most cases pale metafemora as in *E. plana*, leaving the structure of the serrulae as the only reliable character to distinguish them. While the males of *E. fletcheri* and *E. immersa* can be distinguished from each other and from the two other species (see the key), it is less clear how males of *E. camtschatica* and *E. plana* can

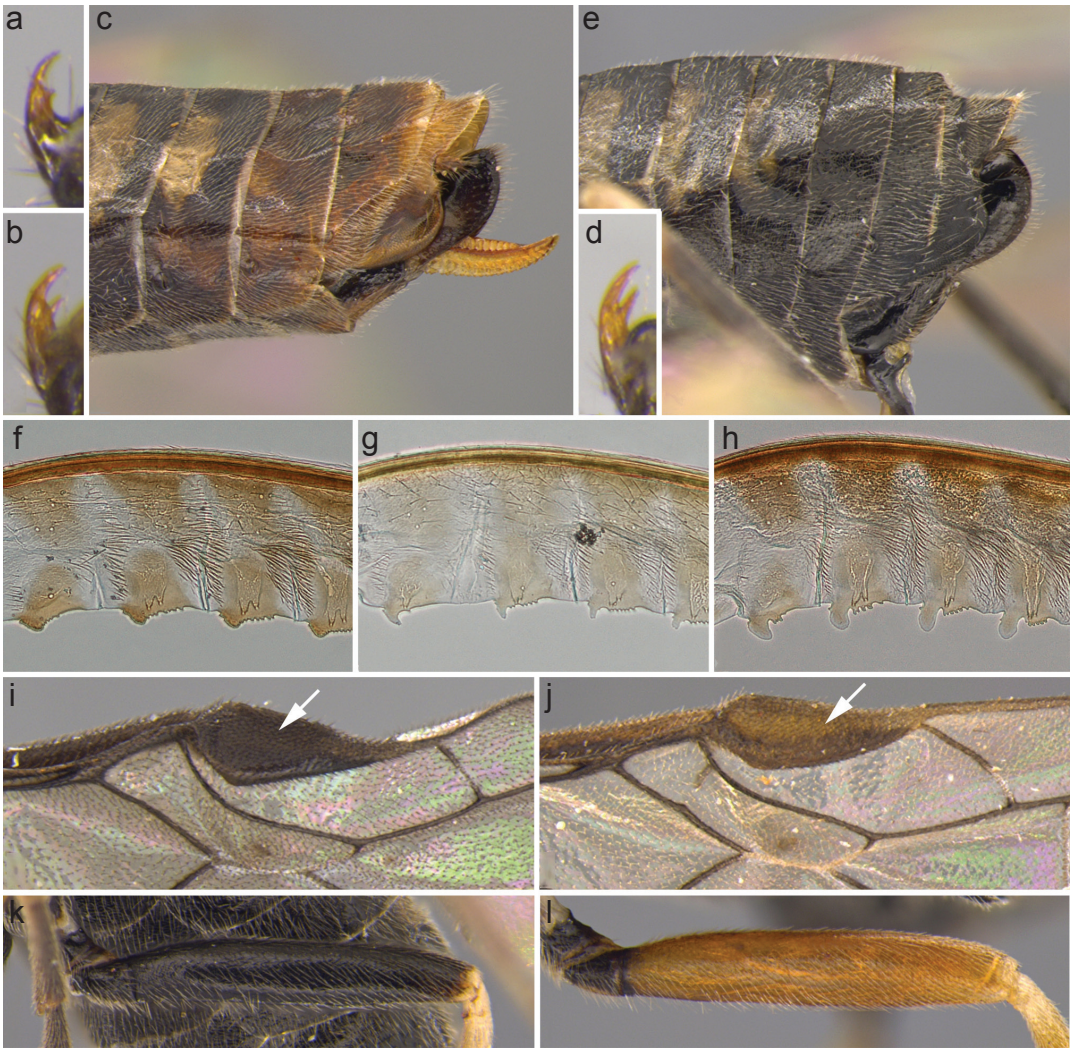

Figure 1. Characters for identification of species in *Empria immersa* group: – a) Claw of *E. fletcheri*, – b) claw of *E. fletcheri*, – c) abdomen of *E. fletcheri*, – d) claw of *E. camtschatica*, – e) abdomen of *E. camtschatica*, – f) basal serrulae of *E. fletcheri*, – g) basal serrulae of *E. camtschatica*, – h) basal serrulae of *E. immersa*, – i) pterostigma of *E. immersa*, – j) pterostigma of *E. camtschatica*, – k) metafemur of *E. camtschatica*, – l) metafemur of *E. plana*.

Artkaraktärer för steklar i *Empria immersa* gruppen: – a) klo av *E. fletcheri*, – b) klo av *E. fletcheri*, – c) bakroppen på *E. fletcheri*, – d) klo av *E. camtschatica*, – e) bakroppen på *E. camtschatica*, – f) sågtänder vid basen av honans äggläggare på *E. fletcheri*, – g) sågtänder vid basen av honans äggläggare på *E. camtschatica*, – h) sågtänder vid basen av honans äggläggare på *E. immersa*, – i) pterostigma på *E. immersa*, – j) pterostigma på *E. camtschatica*, – k) baklår på *E. camtschatica*, – l) baklår på *E. plana*.

be distinguished. The black pterostigma of *E. immersa* seems to be evident only in relatively fresh specimens (up to around 10 years old). In older specimens the pterostigma tends to be indistinguishable from the brown pterostigma of other species. In this case, it can be difficult to distinguish females of *E. plana* and *E. immersa*, because the serrulae are very similar and there

is an overlap in relative length of antennae. Although there appear to be differences in penis valves between *E. plana* from the East Palaearctic and *E. immersa* + *E. camtschatica* (in *E. plana* the penis valves are similar to *E. fletcheri*; Figs 3a, 3b, 3d, 3e), we were not able to confidently recognize any males of *E. plana* in the European material. However, there is at least one specimen from Vemdalen, which externally is indistinguishable from *E. immersa*, but has penis valves resembling those of *E. plana* from the East Palaearctic (Fig. 3c). Considering all these difficulties, it cannot be excluded that *E. camtschatica*, *E. immersa*, and *E. plana* are just one species, although the segregation of most specimens (excluding the few females of *E. plana*) collected in Vemdalen into *E. camtschatica* and *E. immersa* is rather striking. Molecular data might help to resolve the taxonomy of this species complex. For example, it seems to be possible to distinguish with nuclear ITS sequences *E. plana* from *E. camtschatica* and *E. immersa*, as one sequenced female of *E. plana* from Vemdalen groups together with two other specimens from Mongolia and Japan (see Fig. 53 in Prous 2012) to the exclusion of other species (Prous unpublished). Other nuclear markers are needed to test genetic distinctness between *E. camtschatica* and *E. immersa*, as ITS sequenced from two males (one from each taxon) from Vemdalen revealed that ITS sequences of these two taxa can be nearly or completely identical (when considering also other sequenced specimens, see Prous 2012). For simplicity, the following key is restricted to the West Palaearctic. In the East Palaearctic (except Japan), *E. plana*, and often at least females of *E. camtschatica*, have a nearly completely pale clypeus (apical terga and sterna, coxae, trochanters, and trochantelli are also often pale), unlike specimens in the West Palaearctic, which have a black clypeus (or occasionally with slightly pale ventral margin) like in *E. fletcheri* and *E. immersa*. *Empria fletcheri* and *E. immersa* have already been recorded from Sweden (Prous 2012) and therefore are excluded from the species list here.

1 Claws with small subbasal tooth (occasionally, one or two legs with rather large subbasal teeth) (Figs 1a, 1b); in female, apical terga red-brown (Fig. 1c); pterostigma brown (Fig. 1j); serrulae more or less triangular (Figs 1f, 2a); dorsobasal part of valviceps elongate, angle between dorsoapical part of valviceps and ventroapical spine more obtuse (Fig. 3a).....*fletcheri*

– Claws with large subbasal tooth (Fig. 1d); in female, apical terga black (Fig. 1e); pterostigma black (in fresh specimens; Fig. 1i) or brown (Fig. 1j); serrulae papilliform (Figs 1g, 1h, 2b-d); dorsobasal part of valviceps elongate or shortened, angle between dorsoapical part of valviceps and ventroapical spine more or less obtuse (Figs 3b-e).....2

2 Pterostigma black (in fresh specimens; Fig. 1i); in female, metafemur usually black (Fig. 1k), in male, usually pale (Fig. 1l); in female, flagellum length 1.6-1.9(-2.0) times longer than breadth of head, in male, 2.2–2.7; papilliform part of serrulae large (Figs 1h, 2d) ... *immersa*

– Pterostigma brown (Fig. 1j); in female and male, metafemur pale (Fig. 1l) or black (Fig. 1k); in female, flagellum length (1.8-)1.9-2.2 times longer than breadth of head, in male, (2.9-)3.0-3.7 [measurements for males include only *E. camtschatica*, as males of *E. plana* currently cannot be recognized confidently]; papilliform part of serrulae large (Fig. 2c) or small (Figs 1g, 2b).....3

3 Metafemur completely or mainly black (Fig. 1k).....*camtschatica* in part

– Metafemur completely or mainly pale (Fig. 1l)...4

4 Papilliform part of serrulae small (Figs 1g, 2b); dorsobasal part of valviceps shortened, angle between dorsoapical part of valviceps and ventroapical spine less obtuse (Fig. 3b)..... .....*camtschatica* in part

– Papilliform part of serrulae large (Fig. 2c); dorsobasal part of valviceps elongate, angle between dorsoapical part of valviceps and ventroapical spine more obtuse (Fig. 3e).....*plana*

BLENNOCAMPINAE

Monardis plana (Klug, 1817)

Dalarna, *Malung-Sälen*, Malung, 60.684°N 13.702°E, 290 m altitude, 1 ♀, 9.6.2013, leg. Liston, Prous & Taeger (NHRS). **Halland**, *Kungsbacka kommun*, Fjärås Bräcka, 57.444°N 12.185°E, 1 ♀, 21.5.2012, leg. Olberg (COLO).

Monardis plana has an extensive West Palaearctic distribution (Lacourt 1999) and occurs also in West Siberia (Zhelochovtsev & Zinovjev

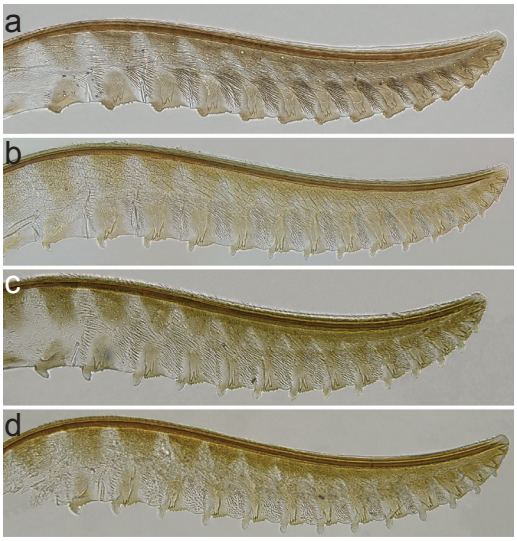

Figure 2. Lancets (valvula 1) of species of *Empria immersa* group: – a) *E. fletcheri* (Scotland), – b) *E. camtschatica* (Sweden), – c) *E. plana* (Sweden), – d) *E. immersa* (Sweden).

Sågens nedre, tandförsedda del hos arter i *Empria immersa* gruppen: – a) *E. fletcheri* (Skottland), – b) *E. camtschatica* (Sverige), – c) *E. plana* (Sverige), – d) *E. immersa* (Sverige).

1996). Although known from Estonia and Finland, there are no published records from Scandinavia (Taeger *et al*. 2006). *Rosa* spp. are the larval host plants and according to Scheibelreiter (1973), garden cultivars are preferred over wild species. Because of the larva's habit of eating the still unopened buds of its host, it can cause considerable damage.

HETERARTHRINAE

Caliroa tremulae Chevin, 1974

Uppland, *Heby*, Tärnsjö 4 km WSW, 60.134°N 16.859°E, 75 m altitude, 1 ♀, 17.6.2013, leg. Liston, Prous & Taeger (NHRS).

Caliroa tremulae has hitherto mainly been found in Central and Southern Europe, but is also known from Estonia and Finland (Taeger *et al*. 2006). The species has not previously been recorded in Sweden or Norway. So far, there are no records from outside Europe. The only recorded larval host is *Populus tremula* (Taeger *et al*. 1998).

SELANDRIINAE

Dolerus pachycerus Hartig, 1837

Norrbotten, *Kalix*, Storöhamn, 65.731°N

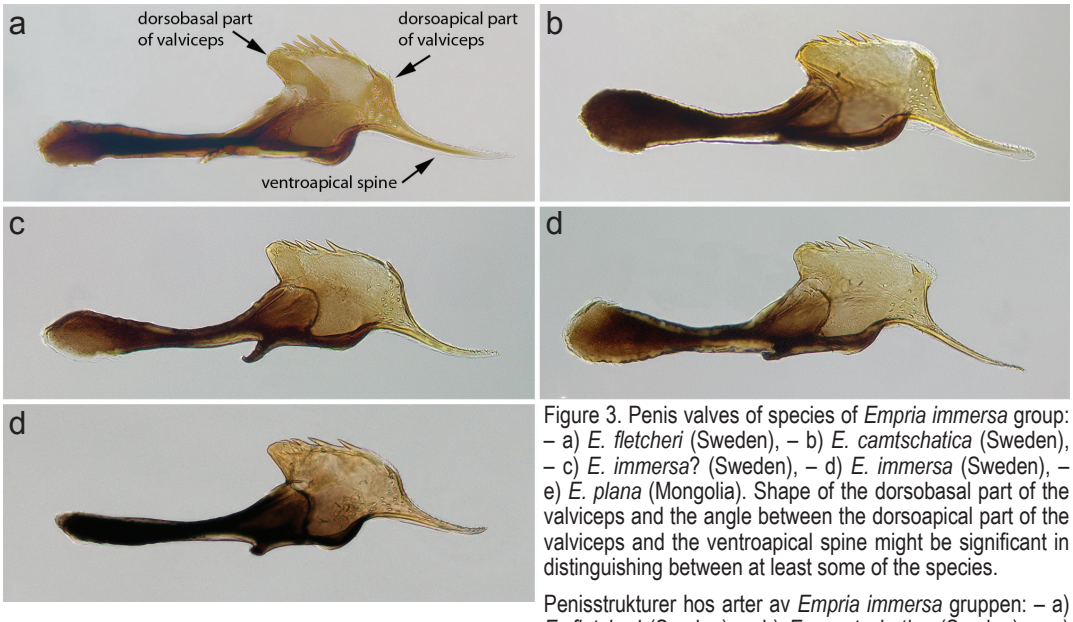

Figure 3. Penis valves of species of *Empria immersa* group: – a) *E. fletcheri* (Sweden), – b) *E. camtschatica* (Sweden), – c) *E. immersa*? (Sweden), – d) *E. immersa* (Sweden), – e) *E. plana* (Mongolia). Shape of the dorsobasal part of the valviceps and the angle between the dorsoapical part of the valviceps and the ventroapical spine might be significant in distinguishing between at least some of the species.

Penisstrukturer hos arter av *Empria immersa* gruppen: – a) *E. fletcheri* (Sverige), – b) *E. camtschatica* (Sverige), – c) *E. immersa*? (Sverige), – d) *E. immersa* (Sverige), – e) *E. plana* (Mongoliet).

23.084°E, 1 m altitude, 1 ♀, 26.5.2014, leg. Liston & Prous (SDEI); same locality and collectors, 1 ♀, 1.6.2014 (NHRS).

Dolerus pachycerus is the only European sawfly species that occurs only on salt-marshes. Its only known larval host plant is *Juncus gerardii* (Taeger et al. 1998), a halophyte. Although *D. pachycerus* is recorded from Denmark, Norway and Finland (Konow 1885 [as *D. taeniatus* Zaddach, 1859]; Taeger et al. 2006), no records from Sweden have previously been reported. The species occurs even further North in Europe than the Gulf of Bothnia: Russia, Kanin Peninsula, 1 ♀, [no date], leg. B. Poppius (SDEI).

Strongylogaster filicis (Klug, 1817)

Småland, *Hultsfred*, Kloster Gård, 57.497°N 15.871°E, 100 m altitude, 1 ♂, 31.5.2013, leg. Liston, Prous & Taeger (NHRS).

Strongylogaster filicis is uncommon but widespread in Northern and Central Europe (Taeger *et al*. 2006), occurring East to Japan. It was first recorded in Norway by Siebke (1880) and recently by Nuorteva *et al*. (2005). The larval host plant is *Pteridium aquilinum* (Taeger *et al*. 1998).

TENTHREDININAE

Rhogogaster polaris Lindqvist, 1964, **spec. rev.** (Fig. 4)

Dalarna, *Malung-Sälen*, Öje, 60.810°N 13.866°N, 290 m altitude, 1 ♀, 11.6.2013, leg. Liston, Prous & Taeger (SDEI). **Härjedalen**, *Älvdalen*, Älvdalen 30 km NE, 61.365°N 14.409°E, 580 m altitude, 1 ♀, 11.6.2013, leg. Liston, Prous & Taeger (SDEI). **Torne lappmark**, *Kiruna*, Abisko National Park, E10, 68.353°N 18.815°E, 390 m altitude, 1 ♂, 14.6.2012, leg. Liston & Taeger (SDEI). Abisko 9 km E (Stordalen), 68.350°N 19.035°E, 400 m altitude, 1 ♂ 5 ♀, 17.6.2012, leg. Liston, Taeger & Blank (SDEI); same locality, 2 ♂ 1 ♀, 18.6.2012, leg. Taeger & Blank (SDEI); same locality, 1 ♀, 1.7.2012, leg. Liston & Taeger (SDEI). Björkliden 3 km N, 68.435°N 18.645°E, 380 m altitude, 1 ♂ 1 ♀, 16.6.2012, leg. Taeger & Blank (SDEI). Kiruna airport, 67.840°N 20.350°E, 450 m altitude, 5 ♂ 3 ♀, 21.6.2012, leg. Liston, Taeger & Blank (SDEI); same locality, 1 ♂ 6 ♀, 1.7.2012, leg. Liston & Taeger (SDEI). Torneträsk station, 68.215°N 19.740°E, 400 m altitude, 24 ♂ 3 ♀, 14.6.2012, leg. Taeger & Blank (SDEI); same locality, 1 ♂, 21.6.2012, leg. Liston & Taeger (SDEI).

Figure 4. *Rhogogaster polaris*, male. See also: http://dx.doi.org/10.6084/m9.figshare.862980.

Hane av *Rhogogaster polaris*, som betraktats som synonym med *R. californica*. Den bör dock betraktas som en egen art med nordlig utbredning.

Rhogogaster polaris was described from northern Norway and treated as a junior subjective synonym of *Rhogogaster californica* (Norton, 1862). Nearctic *R. californica* have a different COI Barcode (about 3 % difference to *R. polaris*, but more samples are needed of both forms). Furthermore, the taxa seem unlikely to be conspecific, because *R. californica* is widely distributed in the Nearctic realm, whereas *R. polaris* appears to have a very restricted northern distribution. It is only known from northern Norway and from northern to central Sweden (see data above). Records from France (Alpes Maritimes) need confirmation, as the species may easily be misidentified (females are very similar to *R. dryas* (Benson, 1943), and the male genitalia are rather similar to *R. punctulata* (Klug, 1817)). At present it seems better to treat the European taxon as a valid species. A key to the European *Rhogogaster* species will be provided in a separate paper (Taeger, in preparation).

Tenthredo flaveola Gmelin, 1790

Skåne, *Lund kommun*, Vinterbo, Revingefältet, 55.703°N 13.512°E, 10 m altitude, 1 ♂, 21.5.2012, leg. Gammelmo (COLO), specimen found in a spider's web. *Helsingborg*, Helsingborg, park in city centre, 56.043°N 12.699°E, 10 m altitude, 1 ♂, 23.5.2014, leg. Liston & Prous (NHRS).

Tenthredo flaveola has a wide European distribution (Taeger *et al*. 2006), north to Schleswig-Holstein in Germany (Blank *et al*. 2001), but has not previously been recorded in Scandinavia. The larvae feed on a range of Brassicaceae, including cultivated forms (Taeger *et al*. 1998).

Tenthredo semicolon Mol, 2013

Blekinge, *Sölvesborg kommun*, Norjeboke Camping, 56.114°N 14.693°E, 10 m altitude, 1 ♀, 28.6.2003, leg. Heibo (SDEI); same locality, 1 ♀, 28.6.2003, leg. Heibo (CEHL).

Tenthredo semicolon has only recently been recognised as distinct from *T. colon* Klug, 1817 (Taeger 2013). The diverse larval host plants formerly recorded for *T. colon* (e.g. in Taeger *et al*. 1998) may partly be attributable to *T. semicolon*, and all these records therefore require reassessment. The same applies to distribution records previously published under the name *T. colon*. However, we are able to confirm that *T. colon* occurs in Sweden, based on 12 female and 11 male specimens recently collected in Dalarna and in Lapland (Abisko and Kiruna). Perhaps *T. semicolon* has a more southerly distribution in Sweden than *T. colon*.

CIMBICIDAE

Cimbex fagi Zaddach 1863

Skåne, *Lund kommun*, Skäralid, Söderåsen naturreservat, 56.023°N 13.228°E, 10 ♂ 1 ♀, 24.5.2012, leg. Olsen (COLO).

The centre of distribution of *Cimbex fagi* is in Central Europe, with the most southern and eastern records from northern Spain, Croatia and the Ukraine (Forsius 1927, Taeger *et al*. 2006). This corresponds quite closely with the natural range of *Fagus sylvatica*, the only known host plant. There are no records of *C. fagi* from areas outside Europe. Neither has it been recorded in Denmark or previously in other Fennoscandian countries. The only Swedish record, above, is so far the most northerly.

Discussion

Until recently, no complete checklist of Swedish Symphyta existed. Taeger *et al*. (2006) made a start by collating published data on the occurrence of 497 Symphyta species in Sweden. However, this number was misleadingly low. Several publications had been overlooked, most significantly those by Andersson (1962) and Benander (1966), which include numerous first records of Symphyta from the country. Gärdenfors *et al*. (2003) listed the number of species of each family of Symphyta recorded in Sweden and gave the total as 602 species. The best available current estimate is of 659 species that definitely occur in Sweden, based on Dyntaxa (2013), and including the additional 15 species added in this article. Nevertheless, the number of species of Symphyta that really occur in Sweden is still very unclear. There are many reasons for this, but some problems can be mentioned as particularly important:

- Unclear species limits in many of the northern Nematinae. The actual number of species involved could differ greatly, either positively or negatively, from the number of nominal species currently treated as valid.
- Quality of published data. The valuable lists of Symphyta specimens published online by the curators of the Lund University Zoological Museum (Lundqvist 2014) were clearly intended to assist researchers in accessing specimens for further study. In many cases, the identifications of these specimens still need checking. Rashly, Haris (2009) published much of the data in these lists relating to the Nematinae as "hard fact", although he did not examine the specimens.
- The unknown number of still undetected species which are at the northern edge of their range in Sweden and therefore occur only in the south of the country. Intuitively, one might expect that the manifest skill and huge effort of several collectors during the 19th Century (Boheman and Thomson being the most outstanding) and René Malaise during the first half of the 20th Century, would have left few gaps in our knowledge of sawfly species which occur in southern Sweden. That a large deficit nonetheless exists, is demonstrated by several of the new records presented in this article.

The solutions to the first two of these problems are self-evident and need not be elaborated in detail. We clearly have a lot of hard taxonomic work ahead of us, to improve our understanding of the Nematinae. As demonstrated by the discovery in Europe of two previously unrecognised species similar to *Empria immersa*, the other subfamilies of Tenthredinidae also require further study, although they are certainly better understood taxonomically than the Nematinae. On the other hand, some ideas on approaches to a modern survey of the sawfly fauna of southern parts of Sweden deserve a little more comment. Thomson and his contemporaries may have had the advantage of being able to collect in areas (e.g. much of Skåne) that have since suffered a huge loss in species-richness. However, we can compensate for this to a certain extent not only by our much greater mobility, but also by using our significantly better knowledge of sawfly biology. A majority of Symphyta have mono- or oligophagous larvae, and in many cases the adult insects are only found on or near these host plants. The compilation by Taeger *et al*. (1998), supplemented by Liston *et al*. (2012), can be referred to for an indication of which plant species, or genera, might offer the best chances of finding "new" Swedish species (the sawfly fauna of lowland Germany being closely similar to that of the southern parts of Sweden). Just a single example of such a potential target plant is *Impatiens noli-tangere*, the host plant of the sawflies *Siobla sturmii* (Klug, 1817) and *Aglaostigma nebulosum* (André, 1881), neither of which is at present recorded in Sweden. It may also be that such florally and faunally distinctive areas as Öland and Gotland have simply never been sufficiently intensively worked for this insect group. The highly interesting captures made during the brief visit to Öland in 2013 by some of the authors certainly suggest that this is so. Because of the relative isolation of Öland, and the lack of collection records from other parts of Sweden of distinctive species such as *Empria hungarica* and *Pamphilius jucundus*, the idea that they may have only recently arrived there (as a result perhaps of the all too often invoked effects of climate warming) can be effectively dismissed. The fauna and flora of Gotland and Öland is well known to include many species which are today absent or rare in other regions at this latitude. They are considered to be relicts of the early phases of the present interglacial period. Some of these plants and animals appear to be relatively warmth-loving, but on the other hand a boreal-subarctic element is also present. Perhaps what the species of the Baltic karst landscape (Alvar) share, above all else, is a need for an open (nearly treeless) environment (Bengtsson et al. 1988; Coulianos & Sylvén 1983). It is probable, based on its previously known distribution and habitats, that *E. hungarica* is such a species, and perhaps also *P. jucundus*.

In view of the preceding discussion, it may appear pointless to speculate on the total number of sawfly species that occur in Sweden. However, in relation to what is known of the fauna of some neighbouring countries, a rough guess can still be attempted. For example, one might assume that nearly all species that occur in Finland also occur in Sweden. This assumption seems to be well supported by the data that are currently available. The distinctive eastern element in the Finnish sawfly fauna, comprising species which only just reach into Karelia from their main ranges in the East (e.g. *Siobla ruficornis* (Gimmerthal, 1834), *Eriocampa dorpatica* Konow, 1887 and *Ussurinus nobilis* Saarinen, 1945), cannot be expected to occur in Sweden. But this contingent is numerically negligible. Most species that occur in southern, central and subarctic Finland do occur also in Sweden, or can realistically be expected to occur. The "southern contingent" is however not so well represented in Finland as in Sweden. Therefore it seems reasonable to expect that the number of sawfly species occurring in Sweden actually exceeds that known in Finland, which according to Taeger *et al*. (2006), currently stands at over 700 species.

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Svensk sammanfattning

I samband med starten av ett projekt om svenska bladsteklar (underfamiljen Nematinae i Tenthredinidae, finansierat av Svenska Artprojektet) genomfördes fältinsamlingar i olika delar av Sverige under 2012-2014. Även om huvudfokus för insamlingarna är Nematinae, samlades även annat material av växtsteklar vilket utgör huvudkällan för materialet som presenteras. Även enstaka exemplar från det Svenska Malaisefälleprojektet och privata samlingar finns med i genomgången. De samlingar i vilka beläggexemplar är förvarade är listade i slutet av den engelska introduktionen.

De första fynden för Sverige av femton arter av växtsteklar presenteras här; 2 arter av spinnarsteklar (Pamphiliidae), 1 art av borsthornsteklar (Argidae), 11 arter av bladsteklar (Tenthredinidae) och 1 art av klubbhornsteklar (Cimbicidae). För två av arterna, *Empria camtschatica* och *E. plana* (Tenthredinidae, Allantinae) är det första fynden i Europa. En illustrerad nyckel för att skilja dessa två från liknande arter (*E. immersa*, *E. fletcheri*) presenteras. *Rhogogaster polaris* Lindqvist, 1964 behandlas som en giltig art (species revocata) som har nordlig utbredning.

Följande arter är så långt vi vet nya fynd för Sverige (för fynddata, se engelska delen av artikeln):

Pamphiliidae:
Pamphilius jucundus (Eversmann, 1847)
Pamphilius fumipennis (Curtis, 1831)
Argidae:
Arge metallica (Klug, 1834)
Tenthredinidae:
Allantinae
Empria alpina Benson, 1938
Empria hungarica (Konow, 1895)
Empria camtschatica Forsius, 1928
Empria plana (Jakowlew, 1891)
Blennocampinae
Monardis plana (Klug, 1817)
Heterarthrinae
Caliroa tremulae Chevin, 1974
Selandriinae
Dolerus pachycerus Hartig, 1837
Strongylogaster filicis (Klug, 1817)
Tenthredininae
Rhogogaster polaris Lindqvist, 1962
Tenthredo flaveola Gmelin, 1790
Tenthredo semicolon Mol, 2013
Cimbicidae
Cimbex fagi Zaddach 1863

I den checklista som publicerades av Taeger *et al*. (2006) publicerades 497 som kända från Sverige. Den siffran är en stor underskattning av det verkliga antalet. Den bästa uppskattningen av antalet arter av växtsteklar som förekommer i Sverige baserad på Dyntaxa (2013) är att det finns 644 arter i landet. Lägger man till de 15 nya arter som presenteras i denna artikel blir det 659 arter, men antalet växtstekelarter i Sverige är fortfarande högst osäkert. Anledningarna är många, men några kan anses som särskilt viktiga; oklara artavgränsningar mellan många nordliga Nematinae-arter, kvaliteten på publicerade data är i flera fall tveksam och ett okänt antal oupptäckta växtstekelarter som har sin nordliga utbredningsgräns i Sverige och bara förekommer i de sydliga delarna av landet. Många av problemen med den stora gruppen Nematinae hoppas vi kunna lösa genom pågående taxonomiska studier och i samband med detta kontrollera tidigare publicerade arbeten. Det är anmärkningsvärt att trots enorma insatser av mycket skickliga svenska samlare under 1800-talet (Thomson, Boheman räknas som särskilt viktiga) och första halvan av 1900-talet (René Malaise) finns så stora kunskapsluckor om den sydliga växtstekelfaunan, vilket denna artikel belyser. Mycket av artrikedomen har antagligen gått förlorad sedan 1800-talet. Men vi har bättre förutsättningar för att få en bra överblick över artsammansättningen i landet eftersom vi idag har bättre kunskap om arternas biologi och värdväxter samtidigt som vi är mer mobila. Taegers (1998) sammanställning över Tysklands växtsteklar och deras biologi och utbredning och Liston *et al*. (2012) kan ge indikationer på vilka nya arter man kan förväntas hitta i Sverige eftersom faunan i Tysklands lågland liknar den i sydliga Sverige.

Man kan göra en uppskattning av det reella antalet arter av växtsteklar i Sverige baserad på det vi känner till om våra grannländers fauna. När det gäller Finland, finns vissa östliga element på finska Karelen som inte kan förväntas förekomma i Sverige, men dessa är relativt få till antalet. I övrigt borde de arter som finns i sydliga, centrala och subarktiska Finland också förväntas förekomma i Sverige. Den "sydliga kontigenten" verkar ha flera representanter i Sverige (och sydliga Norge) än i Finland och därför är det rimligt att anta att antalet arter i Sverige är högre än i Finland som enligt Taeger *et al*. (2006) uppskattas till drygt 700 arter.