Tryphoninae (Hymenoptera: Ichneumonidae) reared from sawflies (Hymenoptera: Symphyta) in the Netherlands

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KEY WORDS
Ichneumon wasps, Exenterini, Tryphonini, new records

Entomologische Berichten 82 (1): 9-18

A survey is presented of 22 Tryphoninae species belonging to the tribes Exenterini and Tryphonini (Ichneumonidae) reared from sawfly larvae in the Netherlands. Nearly all species emerged out of free living sawfly larvae. Only three species were reared from concealed larvae: two *Grypocentrus* species from mining larvae of *Fenusa pumila* and *Metallus lanceolatus* and one species, *Polyblastus macrocentrus*, emerged from *Hoplocampa fulvicornis*, which lives in fruitlets. For seven ichneumonids, a host has been found for the first time: for *Eridolius bimaculatus: Nematus viridis* on *Salix cinerea*, for *Exyston subnitidus: Pristiphora biscalis* on *Prunus spinosa*, for *Smicroplectrus quinquecinctus: Nematus lucidus* on *Crataegus*, for *Ctenochira genalis: Cladius pectinicornis* on *Rosa*, for *Erromenus bibulus: Pristiphora armata* on *Crataegus monogyna*, for *Neleges proditor: Sterictiphora geminata* on *Rosa* and for *Tryphon signator: Dolerus haematodes* on grass. Conversely for *Pristiphora armata*, *Pristiphora biscalis* and *Sterictiphora geminata*, the presented parasitoids are the first found for these sawflies. Two ichneumonid species are new for the fauna of the Netherlands: *Erromenus bibulus* Kasparyan, 1973 and *Neleges proditor* (Gravenhorst, 1829).

Introduction

Following Zwakhals & Blommers (2020) and Zwakhals *et al.* (2021), we present results of more than fifteen years of rearing parasitoids from field-collected sawfly larvae. Our previous papers dealt with Ctenopelmatinae. Here we present records of parasitoid species of the tribes Exenterini and Tryphonini of the subfamily Tryphoninae. Both tribes consist of solitary koinobiont ectoparasitoid species attacking mainly sawfly larvae (Broad *et al.* 2018); the parent female fixes a single egg on a host larva without killing it; this in contrast to the Ctenopelmatinae which deposit a mature egg, that hatches immediately inside the host larva. Tryphonine eggs develop on the outside of the female ovipositor and the stalk with which the egg sticks to the ovipositor is used by the female to attach it to the host. The tryphonine larva hatches from the externally attached egg only after the host larva is full grown and has spun its cocoon. Usually the tryphonine egg is attached to an (almost) full grown host larva so the egg is exposed to external dangers for only a rather short period of time. This also means only sawfly larvae collected as full grown specimens can deliver a parasitoid. In our present study 22 species of parasitoids were reared from the sawfly families Argidae (*Neleges proditor*), Diprionidae (*Exenterus adspersus*) and Tenthredinidae (all other host species). These 22 species represent about 20% of the two tribes in the Netherlands.

Material and methods

Field-collected sawfly larvae were reared in the same way as described previously (Zwakhals & Blommers 2020). As most sawfly samples originate from localities in and around the town of Rhenen (province of Utrecht), localities are only mentioned if they are outside Rhenen or if the reared ichneumonid is a new species for the fauna of the Netherlands. Unless stated otherwise, the rearing results stem from the second author, who numbered all rearing samples directly after collection.

For the identification of the ichneumonids, the following publications have been used: Kerrich (1952) for the Exenterini and Kasparyan (1989) for the Tryphonini.

The ichneumonid specimens are deposited in the collection of the first author, the sawflies will be deposited in Museum Naturalis (RMNH) in Leiden.

Identification of the host species was based on the morphology of adult sawfly specimens reared from the same sample as the parasitoid. The electronic world catalogue of Symphyta (Taeger *et al.* 2018) and the handbooks by Lacourt (2020) and Macek *et al.* (2020) were particularly useful for checking the appearance of both adults and larvae of some species. For the nomenclature of Symphyta, we follow Taeger *et al.* (2018) but we accept the proposal of Lacourt (2020) to elevate the genus *Euura* (sensu Prous *et al.* 2019) to the level of tribus (Euurini).

The pictures by the first author are the result of stacking photography and were taken with a Canon 90D camera equipped

with a Canon MP-E 65 mm lens. Individual photographs were merged with Affinity Photo (https://affinity.serif.com/en-gb/photo/).

Tribus Exenterini

Genus *Acrotomus* Holmgren, 1857

Acrotomus lucidulus (Gravenhorst, 1829)

Material 1 ♂, from *Cladius pectinicornis* (Geoffroy, 1785) on *Rosa canina*, Amerongse Berg (province of Utrecht), RD 165.9-448.6, collected 26.ix.2016, emergence 8.iv.2017, leg. J. Bouwmans.

The same host was reported by Schmidt & Zmudzinski (2003). Figure 1 shows a longitudinally split-open parasitoid egg on the remnants of the head capsule of a host larva.

Acrotomus succinctus (Gravenhorst, 1829)

Material 1 ♀, #89.03 from *Cladius pectinicornis* (Geoffroy, 1785) on *Rosa,* collected 20.vi.1989, emergence July 1989. 1 ♀, #08.20A from *Cladius pectinicornis* (Geoffroy, 1785) on *Rosa,* collected 27.v.2008, emergence 12.viii.2008.

Teunissen (1948) also recorded this host. Our records of two *Acrotomus* species using the same host on the same food plant come from different sites.

1. Split-open *Acrotomus lucidulus* egg on the remnants of the face of a *Cladius pectinicornis* larva. Photo: Kees Zwakhals
1. In lengterichting opengebarsten ei van *Acrotomus lucidulus* op de overblijfselen van de kop van een *Cladius pectinicornis*-larve.

Genus *Cteniscus* Haliday, 1832

Cteniscus pedatorius (Panzer, 1809)

Material 1 ♂, #07.68B from *Eriocampa ovata* (Linnaeus, 1761) on *Alnus glutinosa,* Rhenen, Rimboe RD 169.2-444.9, collected 10.ix.2007, emergence 28.vi.2008. 1 ♂, #07.71 from *Craesus alniastri* (Bechstein & Scharfenberg, 1805) on *Alnus glutinosa*. Rhenen, Rimboe, RD 169.2-444.9, collected 10.ix.2007, emergence 2.vii.2008. 1 ♀, from *Craesus septentrionalis* (Linnaeus, 1758) on *Alnus glutinosa*, Achterberg (province of Utrecht), RD 171.3-442.8, collected 4.x.2015, emergence 10.xii.2015, leg. J. Bouwmans.

Figure 2 shows the emerged female. Shaw & Kasparyan (2005) recorded *Craesus septentrionalis* (Linnaeus, 1758) and *Hemichroa crocea* (Geoffroy, 1785) as hosts. The latter is also reported by Hinz (1961) and is another species feeding on *Alnus* and *Betula*.

2. Reared female of *Cteniscus pedatorius*. Photo: John Bouwmans
2. Uitgekweekt vrouwtje van *Cteniscus pedatorius*.

Genus *Eridolius* Foerster, 1869

Eridolius bimaculatus (Holmgren, 1856)

Material 1 ♀, #09.99X from a single larva resembling *Pristiphora luteipes* Lindqvist, 1955 on *Salix cinerea,* Rhenen, Palmerswaard, RD 166.4-441.5, collected 13.x.2009, found dead on 17.v.2010. 1 ♂, from *Pristiphora luteipes* Lindqvist, 1955 on *Salix cinerea,* Rosmalen, Maximakanaal (province of Noord Brabant), RD 153.2-411.8, collected 30.ix.2016, emergence 15.iv.2017, leg. A.W.M. Mol.

This is the first host record for *E. bimaculatus* (Yu *et al.* 2016).

Eridolius curtisii (Haliday, 1838)

Material 1 ♀ #09.62 from *Hemichroa australis* (Lepeletier, 1823) on *Alnus glutinosa*, collected 8.ix.2009, emergence 15.vii.2010.

The same host, but collected on *Betula*, is reported by Kerrich (1952).

Genus *Excavarus* Davis, 1897

Excavarus apiarius (Gravenhorst, 1829)

Material 1 ♀, from *Craesus alniastri* (Scharfenberg, 1805) found as full grown larva on *Alnus glutinosa,* Rhenen, Kwintelooyen, RD 166.08-444.97, collected 29.ix.2015, emergence 18.xi.2015, leg. J. Bouwmans.

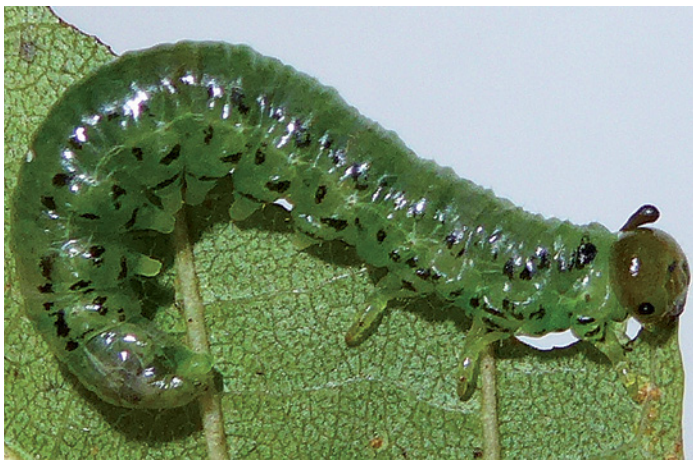
The rearing was conducted indoors, leading to precocious emergence. Boevé (1991) describes the oviposition of *E. apiarius* immediately behind the head of *Craesus alniastri* (as *varius*) and *C. septentrionalis* larvae on *Alnus*, with *C. alniastri* as the preferred host. Figure 3 shows the above-mentioned *C. alniastri* larva with an *E. apiarius* egg attached immediately behind the head. Figure 4 shows the emerged *E. apiarius* female.

Genus *Exenterus* Hartig, 1837

Exenterus adspersus Hartig, 1838

Material 1 ♂ & 2 ♀♀, from *Diprion* sp. cocoons found on *Pinus sylvestris*, Rhenen, Kwintelooyen RD 165.8-445.3, collected 7, 10 & 20.iv.2017, emergence ♂ 18.iv, ♀♀ 26.iv, 2.v.2017 leg. J. Bouwmans.

A well-known parasitoid of *Diprion* and *Neodiprion* on *Pinus* (Pschorn-Walcher 1967, 1973, 1988). The host species belongs to the family Diprionidae, a family mainly living on northern coniferous trees. Most parasitic Hymenoptera larvae consume only the liquid contents of their host and leave the host's skin entire. As a consequence, the remnant host skin takes up some space within the cocoon spun by the host larva before the development of the parasitoid larva began (figure 5). The parasitoid larva can only make its cocoon in the remaining space on top of the empty host skin. Figure 6 shows an emerged *E. adspersus* female.



3. *Nematus alniastri* larva with an *Excavarus apiarius* egg attached behind the head. Photo: John Bouwmans
3. *Nematus alniastri*-larve met een *Excavarus apiarius*-ei direct achter de kop.

Genus *Exyston* Schiødte, 1839

Exyston genalis Thomson, 1883

Material 1 ♀, from unidentified sawfly larva on grass, Veenendaal (province of Utrecht), RD 166.0-448.4, collected 19.vii.2016, emergence 12.viii.2016, leg. J. Bouwmans.

Hinz (1961) reports *Pachynematus clitellatus* (Lepeletier, 1823) as host, which lives also on Gramineae, as well as on *Carex* and *Juncus* (Liston 1995).

Exyston subnitidus (Gravenhorst, 1829)

Material 1 ♂, #11.14B from *Pristiphora biscalis* (Förster, 1854) on *Prunus spinosa*, collected 19.v.2011, emergence 2.v.2012.

This is the first host record for this parasitoid species (Yu *et al.* 2016).

4. Reared female *Excavarus apiarius*. Photo: John Bouwmans
4. Uitgekweekt vrouwtje *Excavarus apiarius*.

Genus *Kristotomus* Mason, 1962

Kristotomus triangulatorius (Gravenhorst, 1829)

Material 1 ♀, #09.12 from *Apethymus* cf. *cereus* (Klug, 1814) on *Quercus robur*, Nunspeet, Elspeter Struiken (province of Gelderland), RD 184-478, collected 16.v.2009, found dead in rearing on 1.ix.2009.

Gupta (1990) reports *Apethymus braccatus* and *A. serotinus* as hosts, now considered to be a single species: *Apethymus serotinus* (Müller, 1776) (Taeger *et al.* 2018).

Genus *Smicroplectrus* Thomson, 1883

Smicroplectrus quinquecinctus (Gravenhorst, 1820)

Material 1 ♂, #11.12X from *Nematus lucidus* (Panzer, 1801). The host was found as full grown larva on *Crataegus* sp. with a parasitoid egg attached to its face, see figure 7. Winterswijk, Borkense Baan (province of Gelderland), RD 249.5-438.5, collected 14.v.2011, emergence 15.iv.2012.

Up to now only a single host species, *Monophadnoides rubi* (Harris, 1845) (as *M. geniculatus*), has been reported, based on Fulmek (1968). This might be an error as that sawfly species lives on *Rubus*, *Geum urbanum* and *Filipendula* (Liston, 1995) and is only half the size of *N. lucidus*.

5. Empty skin of *Diprion* larva in the cocoon left by *Exenterus adspersus*. Photo: Kees Zwakhals.
5. Door *Exenterus adspersus* leeg gezogen huid van *Diprion*-larve, achtergelaten in de cocon.

Tribus Tryphonini

Genus Ctenochira Foerster, 1855

Ctenochira genalis (Thomson, 1883)

Material 1 ♀, from *Cladius pectinicornis* (Geoffroy, 1785) on *Rosa* sp, 's Hertogenbosch, Zandvanger, rivier de Aa (province of Gelderland), RD 152.9-411.4, collected 8.x.2015, emergence 18.v.2006, leg. A.W.M. Mol. 1 ♂, from *Cladius pectinicornis* (Geoffroy, 1785) on *Rosa* sp, Boxtel, Geelders (province of Gelderland), RD 154.4-400.7, collected 9.x.2015, emergence 12.v.2016, leg. A.W.M. Mol.

This is the first host record for this parasitoid (Yu *et al.* 2016).

Ctenochira pastoralis (Gravenhorst, 1829)

Material 1 ♀, from *Nematus olfaciens* Benson, 1953 on *Ribes rubrum,* Veenendaal, Roode Haan (province of Utrecht), RD 164.581-450.240, collected 15.v.2019, emergence 24.iii.2020, leg. J. Bouwmans.

Figure 8 shows the emerged female. Kasparyan (1989) mentions *Pachynematus scutellatus* as host.

Ctenochira sanguinatoria (Ratzeburg, 1852)

Material 2 ♂♂, from *Cladius grandis* (Lepeletier, 1823) on *Populus* x *canescens,* Nieuw-Balinge, Lentsche veen (province of Drenthe), RD 235.4-532.1, collected 9.ix.2016, emergence 3.v.2017, leg A.W.M. Mol & C.B. Cramer.

This is a well-known host, recorded as *Trichiocampus viminalis* by Zinnert (1969) and Shaw & Kasparyan (2005).

Genus *Erromenus* Holmgren, 1857

Erromenus bibulus Kasparyan, 1973

New for the fauna of the Netherlands

Material 1 ♂, #08.70A from *Pristiphora armata* (Thomson, 1862) on *Crataegus monogyna*. Rhenen, Palmerswaard, RD 166.4-441.5, collected 18.ix.2008, emergence 16.iv.2009. 1 ♂, from *Pristiphora melanocarpa* (Hartig, 1840) / *ruficornis* (Olivier, 1811) on *Betula pendula*. Valkenswaard, Plateaux (province of Noord Brabant), RD 156.6-364.2, collected 24.viii.2016, emergence 28.ix.2016, leg. A.W.M. Mol. Since it is not possible to distinguish the larvae of the two sawfly species and only one larva was collected, we cannot give a more specific host name.

This is the first host record for *E. bibulus*.

Erromenus calcator (Müller, 1776)

Material 1 ♀, from *Nematus ribesii* (Scopoli, 1763), De Schuilenburg Lienden (province of Utrecht). Collected and reared on Jostaberry (*Ribes x nidigrolaria*), emergence 16.v.1986.

This is a well-known parasitoid of nematines on *Ribes* and has been reported as such by Hellén (1961) and Zinnert (1969).

Genus *Grypocentrus* Ruthe, 1855

As a rule, Tryphonini parasitize free-living sawfly larvae but *Grypocentrus* species are an exception because they parasitize mining hosts. Some *Grypocentrus* species are also exceptional because they parasitize mining Lepidoptera of the family Eriocraniidae instead of mining sawflies. The strongly modified ovipositor of *Grypocentrus* (figure 9), with an almost perpen-

6. Reared female *Exenterus adspersus*. Photo: John Bouwmans
6. Uitgekweekt vrouwtje *Exenterus adspersus*.

7. *Nematus lucidus* larva with a *Smicroplectrus quinquecinctus* egg attached to its face. Photo: Leo Blommers
7. *Nematus lucidus*-larve met een *Smicroplectrus quinquecinctus*-ei bevestigd aan de voorzijde van de kop.

8. Reared female *Ctenochira pastoralis*. Photo: John Bouwmans
8. Uitgekweekt vrouwtje *Ctenochira pastoralis*.

dicularly bent apex, is obviously an adaptation to the mining hosts. Altenhofer (1980) studied larval parasitoids of mining sawflies and concluded on the basis of the egg shapes that five *Grypocentrus* species were involved, but he was not able to identify the imagines to species level. Jordan (1998) studied the eggs of *Grypocentrus* species that live on the caterpillars of four *Eriocrania* species in *Betula* and concluded that at least two different *Grypocentrus* species-groups were involved, but could not find any morphological characteristics to distinguish the two groups.

Grypocentrus albipes Ruthe, 1855

Material 1 ♀, #19.39B from *Fenusa pumila* (Klug, 1914) in leaf-mine on *Betula*, collected 16.ix.2019, emergence 30.iv.2020. 1 ♀, #19.42C from *Fenusa pumila* (Klug, 1814) in leaf-mine on *Betula*, collected 24.ix.2019, emergence 2.v.2020.

The same host is recorded by Shaw & Kasparyan (2005). Zirngiebl (1961) reports *Entodecta gei* (Brischke, 1883), now *Metallus lanceolutus*, as host on *Betula*. This is probably an error, as this host species mines leaves of *Geum* and the other two *Metallus* species mine in leaves of *Rubus*. Here, too, *F. pumila* might have been the true host because '*Entodecta*' *pumila* (Klug, 1814) was apparently not always distinguished from '*Entodecta*' *gei* (see Taeger *et al.* 2018). In an extensive overview of the biology of *Fenusa pumila* and its parasitoids, Eichhorn & Pschorn-Walter (1973) conclude that *G. albipes* is highly specialized on *F. pumila*.

Grypocentrus cinctellus Ruthe, 1855

Material 4 ♀♀, #09.75 from *Metallus lanceolatus* (Thomson, 1870) in mines on *Geum* sp. in garden, collected 16.ix.2009, emergence 4-6.vi.2010.

Figure 9 shows the ovipositor of one of the emerged females. Shaw & Kasparyan (2005) also report *M. lanceolatus* (as *Metallus gei*) as host.

Genus *Neleges* Foerster, 1869

Neleges proditor (Gravenhorst, 1829)

New for the fauna of the Netherlands

Material 1 ♂, #12.14 from *Sterictiphora geminata* (Gmelin, 1790) on *Rosa* sp, Rhenen, Willibrordweg, garden, collected 28.v.2012, emergence 14.v.2013.

Up to now, no validated host was known for *Neleges* and no parasitoid was known from this host of the family Argidae. Brischke (1878) recorded *Lathrolestes luteolator* as parasitoid of *S. geminata* but we consider this an error because *L. luteator* parasitizes *Caliroa* species (Zwakhals & Blommers 2020).

Neleges proditor shows two peculiar characters in which it differs from almost all other ichneumonids, see figure 10: (1) the centre of the clypeus bears two distinct conical projections; and (2) in its lower half the occipital carina is strongly raised and bent outwardly. As those characters are present in both sexes, they may be of some significance in the process of eclosion where the ichneumonid must gnaw its way out of the host cocoon. This leads to the question if argid cocoons differ from other sawfly cocoons. Indeed they can consist of a rather open netting as in the above-ground summer cocoon of *Aproceros leucopoda*, see figure 18 in Mol & Vonk (2015). For hibernation in the soil, the *Aproceros* larva produces a more dense cocoon inside an open outer netting, see figure 19 in Mol & Vonk (2015). *Sterictiphora geminata* also overwinters in the soil but produces a rather coarsely woven cocoon, like the one of *S. serotina* depicted

9. Ovipositor of *Grypocentrus cinctellus*, length 1 mm. Photo: Kees Zwakhals
9. Ovipositor van *Grypocentrus cinctellus*, lengte 1 mm.

10. *Neleges proditor*, clypeus with two conical projections. Photo: Kees Zwakhals
10. *Neleges proditor*, clypeus met twee uitstekende kegels.

11. Ovipositor of freshly emerged female *Polyblastus macrocentrus* still without eggs. See figure 13 for an ovipositor with attached eggs. Photo Kees Zwakhals
11. Ovipositor van vers uitgekomen vrouwtje *Polyblastus macrocentrus*, nog zonder eieren. Zie figuur 13 voor een ovipositor met eieren.

in figure 4 in Eiseman (2015). In theory, one could speculate that the two clypeal projections function as a guide for the loosely woven cocoon strands and hold them in the right position so the mandibles can easily cut them.

There is one other ichneumonid in Europe with two small conical projections on the clypeus, though these projections are smaller: *Boethus thoracicus* (Giraud, 1872), which has been reported from *Arge berberidis* Schrank, 1802, *A. nigripes* (Retzius, 1783) and *A. rustica* (Linnaeus, 1758) (Kasparyan 1989). In this species the occipital carina is completely absent in contrast to *N. proditor*. Pschorn-Walcher & Kriegl (1965) collected over three thousand *Arge* larvae in Austria, Switzerland and Germany and reared parasitoids from them. Among the ichneumonid parasitoids, they reported the ctenopelmatine endoparasitoid *Scolobates auriculatus* (Fabricius, 1804) and the tryphonine *Eclytus multicolor* (Kriechbaumer, 1896), but no *Boethus*. In *S. auriculatus*, the clypeus is slightly produced into a small tooth centrally and in *E. multicolor* the clypeus edge is unmodified. *S. auriculatus* is peculiar in the sense that its head and mesosoma are polished and completely devoid of any punctation or other structures.

So at least as far as *Arge* cocoons are concerned there are ichneumonids with and without a modified clypeus that manage to escape from the host cocoon. Therefore, the conclusion must be that the evolutionary profits of the clypeal modifications found in *Neleges,* though very specific, remain a mystery.

Genus *Polyblastus* Hartig, 1837

Polyblastus (Cophenchus) macrocentrus Thomson, 1888

Material 2 ♀♀, #17.02 from *Hoplocampa fulvicornis* (Panzer, 1801) in fruitlets of *Prunus spinosa*, alongside Spoorbaanweg, Rhenen, collected 16.v.2017, emergence 10, 17.iv.2018. 2 ♂♂ & 2 ♀♀, #18.07 from *Hoplocampa fulvicornis* (Panzer, 1801) in fruitlets of *Prunus spinosa*, same locality, collected 7.v.2018, emergence ♂♂ 8.iv.2019, ♀♀ 12, 20.iv.2019.

Kasparyan & Tolkanitz (1999) mention as host *Hoplocampa brevis* (Klug, 1814), the sawfly species in pear fruitlets. A freshly emerged tryphonine female does not yet have mature eggs as can be seen in figure 11 which shows a freshly emerged *P. macrocentrus* female without any eggs attached to the ovipositor. See figure 13 for an ovipositor with eggs attached.

Polyblastus (Labroctonus) westringi Holmgren, 1857

Material 1 ♀, #16.37 from *Anoplonyx ovatus* (Zaddach, 1883) on *Larix decidua*, collected 15.viii.2016, emergence 18.v.2017.

The original sample consisted of a single larva beaten from a tree in the city forests of Rhenen. It resembles *A. ovatus* (Macek *et al.* 2020, Jan Macek in litteris). See figure 12 for this larva with an attached *Polyblastus* egg immediately behind the head. Zinnert (1969) records *Pristiphora laricis* and *P. wesmaeli,* both also living on *Larix,* as hosts. Figure 13 shows a bunch of eggs on the ovipositor of a *P. westringi* female.

Genus *Tryphon* Fallén, 1813

Tryphon signator Gravenhorst, 1829

Material 1 ♂, #08.24 from probably *Dolerus haematodes* (Schrank, 1781) on grass, Vorden, Heidepol (province of Gelderland) RD 219.6-461.0, collected 31.v.2008, emergence 29.iv.2009.

The sample consisted of a single sawfly larva (figure 14), but two other rearings of similar larvae on grass yielded adults of *D. haematodes*. This is the first host record for *T. signator*.

12. *Anoplonyx ovatus* larva with an attached *Polyblastus westringi* egg. Photo: Leo Blommers
12. *Anoplonyx ovatus*-larve met een *Polyblastus westringi*-ei.

13. Female *Polyblastus westringi* metasoma with a bunch of eggs at the base of the ovipositor. Photo: Kees Zwakhals
13. Vrouwelijk *Polyblastus westringi*-metasoma met een aantal eieren aan de basis van de ovipositor.

14. *Dolerus haematodes* larva on grass with *Tryphon* egg visible behind first left leg. Photo: Leo Blommers
14. *Dolerus haematodes*-larve op gras met *Tryphon*-ei achter eerste linker poot.

Summary

A grand summary of the above presented results together with the results of our two previous papers is presented in table 1. The presentation is in the order of the sawfly hosts and in this way it becomes clear if more than one parasitoid species, sometimes even belonging to different subfamilies, have been found from a single sawfly host species. The parasitoid tribe names refer to more detailed information as given in our previous papers. For the Perilissini see Zwakhals & Blommers (2020), for the Ctenopelmatini, Euryproctini, Mesoleiini, Pionini and Scolobatini see Zwakhals *et al.* (2021) and for the Exenterini and Tryphonini the present paper.

Acknowledgements

For the identification of the ichneumonids, the collection of the Zoologische Staatssammlung Munich (ZSM) was of great help. We thank E. Diller and S. Schmidt for their kind help and hospitality. LB is grateful for permission by officials of Het Utrechts Landschap, Vereniging Natuurmonumenten en Staatsbosbeheer to sample sawflies. M.R. Shaw commented on an earlier draft and corrected the English text. M.J. Sommeijer commented on an earlier draft. We thank J. Bouwmans for his reared specimens and for his photographs and A.W.M. Mol who made his reared parasitoids available to us.

Table 1. Synopsis of all reared parasitoids. For the Perilissini from Zwakhals & Blommers (2020), for the Ctenopelmatini, Euryproctini, Mesoleiini, Pionini and Scolobatini from Zwakhals *et al.* (2021) and for the Exenterini and Tryphonini the present paper.
Tabel 1. Overzicht van alle gekweekte parasitoïden. Voor de Perilissini uit Zwakhals & Blommers (2020), voor de Ctenopelmatini, Euryproctini, Mesoleiini, Pionini en Scolobatini uit Zwakhals *et al.* (2021) en voor de Exenterini en Tryphonini dit artikel.

Sawfly host / bladwespgastheer	**Foodplant /** voedselplant	**Ichneumonid parasitoid /** ichneumonide parasotoïd	**Tribus**
Argidae			
Arginae			
Arge pagana	*Rosa* sp.	*Scolobates auriculatus*	*Scolobatini*
Arge pagana	*Rosa canina*	*Scolobates auriculatus*	*Scolobatini*
Sterictiphorinae			
Sterictiphora geminata	*Rosa* sp.	*Neleges proditor*	*Tryphonini*
Diprionidae			
Diprion sp.	*Pinus sylvestris*	*Exenterus adspersus*	*Exenterini*
Neodiprion sertifer	*Pinus* sp.	*Lamachus eques*	*Mesoleiini*
Pamphilidae			
Neurotoma mandibularis	*Quercus robur*	*Ctenopelma tomentosum*	*Ctenopelmatini*
Pamphilius sylvarum	*Quercus robur*	*Xenoschesis fulvicornis*	*Ctenopelmatini*
Tenthredinidae			
Allantinae			
Allantus cinctus	*Rosa* sp.	*Perilissus dissimilitor*	*Perilissini*
Allantus viennensis	*Rosa rubiginosa*	*Perilissus dissimilitor*	*Perilissini*
Allantus viennensis	*Rosa* sp.	*Perilissus dissimilitor*	*Perilissini*
Ametastegia perla	*Salix alba*	*Perilissus pallidus*	*Perilissini*
Ametastegia sp.	*Rumex obtusifolius*	*Perilissus spilonotus*	*Perilissini*
Anaplonyx ovatus	*Larix decidua*	*Polyblastus westringi*	*Tryphonini*
Apethymus cereus	*Quercus robur*	*Perilissus albitarsis*	*Perilissini*
Apethymus filiformis	*Quercus robur*	*Occapes selandriae*	*Euryproctini*
Eriocampa ovata	*Alnus glutinosa*	*Cteniscus pedatorius*	*Exenterini*
Eriocampa ovata	*Alnus glutinosa*	*Mesoleius aulicus*	*Mesoleiini*
Monostegia abdominalis	*Lysimachia vulgaris*	*Rhorus exstirpatorius*	*Pionini*
Monsoma pulveratum	*Alnus incana*	*Oetophorus naevius*	*Perilissini*
Blennocampinae			
Ardis pallipes	*Rosa* sp.	*Lathrolestes caudatus*	*Perilissini*
Periclista albida	*Quercus robur*	*Campodorus formosus*	*Mesoleiini*
Periclista albida	*Quercus robur*	*Glyptorhaestus periclistor*	*Pionini*
Periclista albida	*Quercus robur*	*Trematopygodes aprilinus*	*Perilissini*
Periclista lineolata	*Quercus robur*	*Occapes selandriae*	*Euryproctini*
Periclista pilosa	*Quercus robur*	*Trematopygodes aprilinus*	*Perilissini*
Periclista pilosa	*Quercus robur*	*Trematopygodes rarus*	*Perilissini*
Periclista pubescens	*Quercus robur*	*Occapes selandriae*	*Euryproctini*
Caliroinae			
Caliroa annulipes	*Tilia cordata*	*Lathrolestes luteolator*	*Perilissini*
Caliroa annulipes	*Tilia x vulgaris*	*Lathrolestes luteolator*	*Perilissini*
Caliroa cerasi	*Crataegus monogyna*	*Otlophorus congruens*	*Mesoleiini*
Endelomyia aethiops	*Rosa* sp.	*Lathrolestes moravicus*	*Perilissini*
Fenusinae			
Fenusa dohrnii	*Alnus incana*	*Lathrolestes pictilis*	*Perilissini*
Fenusa dohrnii	*Alnus glutinosa*	*Lathrolestes pictilis*	*Perilissini*

Sawfly host / bladwespgastheer	**Foodplant /** voedselplant	**Ichneumonid parasitoid /** ichneumonide parasotoïd	**Tribus**
Fenusa pumila	*Betula* sp.	*Grypocentrus albipes*	*Tryphonini*
Fenusa pumila	*Betula* sp.	*Lathrolestes pictilis*	*Perilissini*
Fenusa pusilla	*Betula pubescens*	*Lathrolestes nigricollis*	*Perilissini*
Metallus lanceolatus	*Geum* sp.	*Grypocentrus cinctellus*	*Tryphonini*
Metallus pumilus	*Rubus* sp.	*Lathrolestes verticalis*	*Perilissini*
Parna tenella	*Tilia* sp.	*Lathrolestes pleuralis*	*Perilissini*
Scolioneura betuleti	*Betula pendula*	*Lathrolestes macropygus*	*Perilissini*
Hoplocampinae			
Hoplocampa fulvicornis	*Prunus spinosa*	*Polyblastus macrocentrus*	*Tryphonini*
Hoplocampa plagiata	*Amelanchier ovalis*	*Saotis tricolor*	*Mesoleiini*
Hoplocampa testudinea	*Malus* sp.	*Lathrolestes ensator*	*Perilissini*
Nematinae			
Cladius brullei	*Rubus idaeus*	*Campodorus difformis*	*Mesoleiini*
Cladius grandis	*Populus x canescens*	*Ctenochira sanguinator*	*Tryphonini*
Cladius pectinicornis	*Rosa canina*	*Acrotomus lucidulus*	*Exenterini*
Cladius pectinicornis	*Rosa sp.*	*Acrotomus succinctus*	*Exenterini*
Cladius pectinicornis	*Rosa* sp.	*Ctenochira genalis*	*Tryphonini*
Cladius rufipes	*Ulmus minor*	*Rhinotorus leucostomus*	*Mesoleiini*
Craesus alniastri	*Alnus glutinosa*	*Cteniscus pedatorius*	*Exenterini*
Craesus alniastri	*Alnus glutinosa*	*Excavarus apiarius*	*Exenterini*
Craesus septentrionalis	*Alnus glutinosa*	*Cteniscus pedatorius*	*Exenterini*
Dineura stilata	*Sorbus aucuparia*	*Rhorus* sp.	*Pionini*
Euura near annulata	*Rumex obtusifolius*	*Synodites amoenus*	*Euryproctini*
Euura bergmanni	*Salix cinerea*	*Campodorus variegatus*	*Mesoleiini*
Euura bergmanni	*Salix viminalis*	*Campodorus variegatus*	*Mesoleiini*
Euura bergmanni	*Salix aurita*	*Campodorus variegatus*	*Mesoleiini*
Euura pavida	*Salix caprea*	*Rhorus exstirpatorius*	*Pionini*
Euura papillosa	*Salix aurita*	*Hypamblys albopictus*	*Euryproctini*
Euura viridissima	*Alnus glutinosa*	*Campodorus variegatus*	*Mesoleiini*
Hemichroa australis	*Alnus glutinosa*	*Eridolius curtisii*	*Exenterini*
Mesoneura opaca	*Quercus robur*	*Trematopygodes auriculator*	*Perilissini*
Mesoneura opaca	*? Quercus robur*	*Anoncus* sp.	*Mesoleiini*
Nematinus luteus	*Alnus glutinosa*	*Campodorus haematodes*	*Mesoleiini*
Nematinus luteus	*Alnus glutinosa*	*Mesoleius aulicus*	*Mesoleiini*
Nematus alniastri	*Alnus glutinosa*	*Campodorus variegatus*	*Mesoleiini*
Nematus lucidus	*Crataegus* sp.	*Smicroplectrus quinquecinctus*	*Exenterini*
Nematus olfaciens	*Ribes rubrum*	*Ctenochira pastoralis*	*Tryphonini*
Nematus septentrionalis	*Betula pendula*	*Rhinotorus compactor*	*Mesoleiini*
Pristiphora armata	*Crataegus monogyna*	*Erromenus bibulus*	*Tryphonini*
Pristiphora biscalis	*Prunus spinosa*	*Exyston subnitidus*	*Exenterini*
Pristiphora brevis	*Thalictrum flavum*	*Rhorus petropolitanus*	*Pionini*
Pristiphora luteipes	*Salix cinerea*	*Eridolius bimaculatus*	*Exenterini*
Pristiphora near melanocarpa	*Betula pendula*	*Erromenus bibulus*	*Tryphonini*
Pristiphora mollis	*Vaccinium myrtillus*	*Anoncus marginellus*	*Mesoleiini*
Pristiphora mollis	*Vaccinium myrtillus*	*Mesoleius aulicus*	*Mesoleiini*
Pristiphora ruficornis	*Salix* sp.	*Mesoleius opticus*	*Mesoleiini*
Pristiphora testacea	*Betula pendula*	*Hypamblys albopictus*	*Euryproctini*
Pristiphora wesmaeli	*Larix* sp.	*Rhorus xanthopygus*	*Pionini*
Pseudodineura fuscula	*Ranunculus acer*	*Smicrolius parvicalcar*	*Mesoleiini*
Stauronematus platycerus	*Populus canescens*	*Campodorus cf. variegatus*	*Mesoleiini*
Selandrinae			
Aneugmenus oronatus	*Dryopteris filix-mas*	*Mesoleius pyriformis*	*Mesoleiini*
Dolerus haematodes	*grass*	*Tryphon signator*	*Tryphonini*
Dolerus madidus	*Juncus effusus*	*Azelus erythropalpus*	*Mesoleiini*
Strongylogaster macula	*Dryopteris* sp.	*Syntactus varius*	*Pionini*
Strongylogaster mixta	*Dryopteris dilatata*	*Perilissus spilonotus*	*Perilissini*
Strongylogaster mixta	*Dryopteris dilatata*	*Alexeter niger*	*Mesoleiini*
Strongylogaster mixta	*Dryopteris filix-mas*	*Syntactus varius*	*Pionini*
Strongylogaster mixta	*Dryopteris dilatata*	*Syntactus varius*	*Pionini*
Strongylogaster multifasciata	*Pteridium aquilinum*	*Alexeter niger*	*Mesoleiini*
Strongylogaster multifasciata	*Dryopteris dilatata*	*Alexeter niger*	*Mesoleiini*
Tenthredininae			
Macrophya alboannulata	*Sambucus nigra*	*Rhorus chrysopus*	*Pionini*
Tenthredo livida	*Geum urbanum*	*Mesoleptidea stalii*	*Euryproctini*
Tenthredo zona	*Hypericum perforatum*	*Mesoleptidea cingulata*	*Euryproctini*
Lepidoptera			
Diseriocrania subpurpurella	*Quercus* sp.	*Lathrolestes clypeatus*	*Perilissini*

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Accepted: December 1, 2021

Samenvatting

In Nederland uit bladwesplarven gekweekte ichneumoniden van de subfamilie Tryphoninae (Hymenoptera: Ichneumonidae & Symphyta)

Als een vervolg op eerdere publicaties wordt nu gerapporteerd over ichneumoniden van de subfamilie Tryphoninae die tot de tribus Exenterini en Tryphonini behoren en uit bladwesplarven zijn gekweekt. In tegenstelling tot de eerder behandelde Ctenopelmatinae die een ei *in* een vaak jonge gastheerlarve leggen, leggen Tryphoninae een ei buiten *op* een (bijna) volgroeide bladwesplarve. Daarmee zijn Tryphoninae alleen te kweken uit bladwesplarven die als bijna volgroeid dier zijn verzameld. De exacte positie van het ei wisselt, maar het is altijd zo is dat de bladwesplarve het ei niet kan verwijderen. Bij de Ctenopelmatinae komt het ei snel uit, maar blijft de larve aanvankelijk klein en brengt de gastheer weinig schade toe. Pas nadat deze een cocon heeft gemaakt start de ontwikkeling van de sluipwesplarve. Bij de hier beschreven Tryphoninae komt het ei pas uit nadat de gastheerlarve een cocon heeft gevormd. De ontwikkeling van de sluipwesplarve begint dan meteen. Daarbij zuigt de sluipwesplarve alleen de vloeibare inhoud van zijn gastheer op en laat diens lege huid achter. Dit in tegenstelling tot wat veel carnivore Hymenoptera Aculeata doen, zoals Crabronidae en Pompilidae, die hun prooi geheel verorberen en als de huid daarvoor te hard is, die dan wel verkruimelen. Dit heeft consequenties voor de ruimte die de huid inneemt binnen de bladwespcocon en voor de ruimte die overblijft voor de verpoppende sluipwesplarve. Normaal gezien worden bij de ichneumoniden de eieren door een ovipositor naar de gastheer getransporteerd, waarbij ze tijdens de ovipositie als een smal langwerpig 'worstje' door de ovipositor worden geperst. Bij Tryphoninae-wijfjes gaat dat anders, want daar bevinden de eieren zich buiten de ovipositor en zijn ze alleen door middel van een smalle steel met de ovipositor verbonden. Met die steel wordt het ei ook op de gastheer verankerd. De eieren van de Tryphoninae zijn ook duidelijk groter en steviger dan die van de Ctenopelmatinae. Op het moment dat de Tryphoninae-vrouwtjes uitkomen zijn die eieren nog niet aanwezig, maar deze ontwikkelen zich eerst in de loop van de tijd. Dit kan er bij het genus *Polyblastus* (vandaar de naam) toe leiden dat er vele eieren tegelijk zichtbaar zijn, maar bij andere genera is er vaak maar één ei aanwezig. In totaal zijn 22 soorten ichneumoniden uitgekweekt; oftewel ongeveer een vijfde van het aantal Nederlandse soorten van de tribus Exenterini en Tryphonini. Het onderzoek leverde een tweetal ichneumoniden op die nog niet eerder zijn vermeld voor de Nederlandse fauna namelijk *Erromenus bibulus* van *Pristiphora armata* op *Crataegus monogyna* en *Pristiphora melanocarpa* op *Betula pendula* en *Neleges proditor* van *Sterictiphora geminata* op *Rosa*. Voor een zevental ichneumoniden werd voor het eerst een gastheer gevonden: voor *Eridolius bimaculatus*: *Nematus viridis* op *Salix cinerea*, voor *Exyston subnitidus*: *Pristiphora biscalis* op *Prunus spinosa*, voor *Smicroplectrus quinquecinctus*: *Nematus lucidus* op *Crataegus*, voor *Ctenochira genalis*: *Cladius pectinicornis* op *Rosa*, voor *Erromenus bibulus*: *Pristiphora armata* op *Crataegus monogyna*, voor *Neleges proditor*: *Sterictiphora geminata* op *Rosa* en voor *Tryphon signator*: *Dolerus haematodes* op gras. Omgekeerd geldt dat *Pristiphora armata*, *Pristiphora biscalis* en *Sterictiphora geminata* bladwespen zijn waarvoor een eerste parasitoïd is gevonden.

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