

Some European Ichneumon wasps (Hymenoptera, Ctenopelmatinae) reared from sawflies (Hymenoptera, Symphyta)

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KEYWORDS

Ctenopelmatini, Euryproctini, Mesoleiini, parasitoid wasps, Pionini, Scolobatini

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A survey is given of 31 reared Ctenopelmatinae species, belonging to the tribes Ctenopelmatini, Euryproctini, Mesoleiini, Pionini and Scolobatini. For one ichneumonid a host has been found for the first time: *Pseudodineura fuscata*, a mining species in *Ranunculus acer*, for *Smicrolis parvicar*. Seven ichneumonids are new for the fauna of the Netherlands: *Synodites amoenus*, *Anoncus marginellus*, *Campodorus difformis*, *Smicrolis parvicar*, *Rhorus petropolitanus*, *Rhorus xanthopygus* and *Syntactus varius*. *Saotis tricolor* is new for the fauna of Italy.

Introduction

Following on from Zwakhals & Blommers (2020), we present results of more than ten years of rearing parasitoids from field-collected sawfly larvae. Our previous paper dealt only with reared Perilissini and here we give records of parasitoid species from five remaining tribes of the ichneumonid subfamily Ctenopelmatinae. This subfamily almost entirely consists of parasitoid species attacking sawflies. The parasitoids now recorded belong to the tribes Ctenopelmatini, Euryproctini, Mesoleiini, Pionini and Scolobatini as defined by Townes (1970); they consist in our region of five, fourteen, twenty three, thirteen and one genus respectively (Zwakhals 2013). All are solitary koinobiont endoparasitoids and they were reared from the sawfly families Argidae, Diprionidae, Pamphiliidae and Tenthredinidae.

Material and methods

Field-collected sawfly larvae were reared in the same way as explained in a previous paper (Zwakhals & Blommers 2020). As most 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 or was collected from abroad. In these cases for specimens from The Netherlands the RD coordinates of the locality are given. The RD system is the national rectangular coordinate grid as used on the maps of The Netherlands' Cadastre, Land Registry and Mapping Agency (RD = Rijksdriehoeksmeting = 'National Triangulation'). Each batch of reared larvae from the same date and locality, called a rearing, has been coded by the second author right after collection, so as to serve as reference in a database and those rearing codes are shown on the labels of emerged specimens, both sawflies and parasitoids. Unless otherwise stated the rearing results were obtained by the second author.

For the identification of the ichneumonids the following publications have been used: for *Ctenopelma* Kasparyan (2004), for *Campodorus* Kasparyan (2003, 2005, 2006), for *Mesoleius* Kasparyan (2000, 2001), for *Rhinotorus* Reshchikov (2016), for *Glyptorhaestus* Hinz (1975), for *Rhorus* Aubert (1988) and Kasparyan (2014, 2015, 2019), for *Saotis* Kasparyan & Kopelke (2010) and for the other genera Schmiedeknecht (1913-1925). For additional literature on the mentioned Ichneumonidae, see Yu et al. (2016). The ichneumonid specimens have been deposited in the collection of the first author, the sawflies in the collections of the second and third authors.

Identification of the host species was based on the morphology of adult specimens in the same sample as the parasitoid. The electronic world catalogue of Symphyta (Taeger et al. 2018) was particularly useful for checking the most recent nomenclature, and the appearance of some species.

Names of the host species in the original publications, and reported as such in Yu et al. (2016), have been corrected according to Taeger et al. (2018), but are mentioned also in brackets. This applies notably to the recent rather drastic changes of nomenclature in the subfamily Nematinae (Nyman 2006, Prous et al. 2014, 2019).

The ichneumonid pictures are the result of stacking photography. Photographs were taken with a Canon 90D camera equipped with a Canon MP-E 65 mm lens. Individual photographs were merged with Affinity Photo.

Tribus Ctenopelmatini

Genus *Ctenopelma* Holmgren, 1857

Ctenopelma tomentosum (Desvignes, 1856)

Material 1 ♂, rearing #08.12 from *Neurotoma mandibularis* (Zaddach, 1866) on *Quercus robur*, collected 20.v.2008, emergence 20.iv.2009.



1. *Pristiphora testacea* larvae on *Betula pendula*. Ooststellingwerf (province of Friesland), 11.ix.2016. Photo: Tineke Cramer
1. Larven van *Pristiphora testacea* op *Betula pendula*. Ooststellingwerf (Friesland), 11.ix.2016.



2. Almost full-grown larvae of *Periclista pubescens* from old oak trees. Rhenen (province of Utrecht), 2.v.2009, rearing#09.29. Photo: Leo Blommers
2. Bijna volgroeide larven van *Periclista pubescens* van oude eiken. Rhenen (Utrecht), 22.v.2009, kweek #09.29.

Shaw et al. (2003) report this species as a parasitoid of *Pamphilius hortorum* (Klug, 1808) on *Rubus*.

Genus *Xenoschesis* Förster, 1869

Xenoschesis fulvicornis (Kriechbaumer, 1891)

Material 1 ♀, rearing #09.13 from *Pamphilius sylvarum* (Stephens, 1835) on *Quercus robur*, Nunspeet, Elspeter Struiken (province of Gelderland), RD 184-478, collected 16.v.2009, emergence 30.iv.2010.

Ozols (1961) reports *Pamphilius gyllenhali* (Dahlbom, 1835) and *Trichiosoma sorbi* Hartig, 1840 (which seems unlikely as it is a cimicid rather than a pamphiliid) as hosts. These observations confirm that species of Ctenopelmatini attack web-spinning sawflies (Pamphiliidae), as has been generally understood.

Tribus Euryproctini

Genus *Hypamblys* Förster, 1869

Hypamblys albopictus (Gravenhorst, 1829) (figure 1)

Material 1 ♀, from *Pristiphora testacea* (Jurine, 1807) on *Betula pendula*, Ooststellingwerf, Fochteloërveen, Bonghaar (province of Friesland), RD 221-557, collected 11.ix.2016, emergence 21.iii.2017, leg. A.W.M. Mol. 1 ♂ from *Euura papillosa* (Retzius, 1783) on *Salix aurita*, Veenendaal, Kwintelooyen (province of Utrecht), RD 166.2-445.0, collected 16.ix.2016, emergence 9.xi.2016, leg. J. Bouwmans.

Hypamblys albopictus has been reported as attacking various free-living, often gregariously-feeding, nematine species. Hinz (1961) reports *Hemichroa australis* (Serville, 1823), *Nematus* (= *Croesus*) *septentrionalis* (Linnaeus, 1758), *N.* (= *C.*) *latipes* (Villaret, 1832) as hosts and Zinnert (1969) also reports *Pristiphora testacea* (Jurine, 1807), *Euura pavidus* (Serville, 1823) (= *Nematus pavidus*), *E. papillosa* (Retzius, 1783) (= *Nematus melanaspis* Hartig, 1840). *Nematus septentrionalis* is mentioned as host by Weiffenbach (1988).

Genus *Mesoleptidea* Viereck, 1912

Mesoleptidea cingulata (Gravenhorst, 1829)

Material 5 ♂♂, from *Tenthredo zona* Klug, 1817 on *Hypericum perforatum*, collected in Rhenen (province of Utrecht) (#06.45, #12.32), Herkenbosch, de Meinweg (province of Limburg) (#12.23), Tilburg, De Kaaistoep (province of Noord-Brabant), RD 129-394 in June of various years, emerged next year in May and June.

Brischke (1878) mentions *Rhogogaster scalaris* (Klug, 1817) (= *Rhogogaster viridis* auct.) as host.

Mesoleptidea stalii (Holmgren, 1858)

Material 1 ♂, #12.75 from *Tenthredo livida* Linnaeus, 1758 on *Geum urbanum*, Amerongen, Bovenpolder (province of Utrecht), RD 161.1-441.9, collected 29.viii.2012, emergence 24.vi.2013.

Hinz (1961) reared the species from larvae of *T. livida* Linnaeus, 1758 and *T. mandibularis* Fabricius, 1804 and Weiffenbach (1988) from *T. mioceras* (Enslin, 1912). Apparently, the parasitoid is not very selective with respect to using *Tenthredo* species as host. *T. livida* and *T. mioceras* are both rather polyphagous, while all three share a relatively large body size.

Genus *Occapes* Townes, 1970

Occapes selandriae (Brischke, 1878) (figure 2)

Material 1 ♂, #08.11 on *Quercus robur*, collected 19.v.2008, emergence 16.iv.2009, the two eonymphs disappeared immediately underground, and a single parasitoid finally emerged, one host larva resembled *Apethymus filiformis* (Klug, 1818). 1 ♂, #09.10 from *Periclista pubescens* (Zaddach, 1859) on *Quercus robur*, Nunspeet, Elspeter Struiken (province of Gelderland), RD 184-478, collected 16.v.2009, emergence 10.iv.2010. 1 ♀, #09.26 from *Periclista lineolata* (Klug, 1816) larva on *Quercus robur*, Rosmalen, Nulandse Heide (province of Noord-Brabant), RD 156.9-415.3, collected 18.v.2009, emergence 16.iv.2010, leg. A.W.M. Mol. 1 ♀, #09.29 from *Periclista pubescens* on *Quercus robur*, collected 22.v.2009, emergence 22.iv.2010.



3. Larva of *Euura annulata* on *Rumex obtusifolius*. Amerongen (province of Utrecht), 26.vi.2015, rearing #15.42.2. Photo: Leo Blommers
3. Larve van *Euura annulata* op *Rumex obtusifolius*. Amerongen (Utrecht), 26.vi.2015, kweek #15.42.2.

Hinz (1961) also reported *Periclista pubescens* as host species. The relation with *Periclista* species is obvious, while the host status of *Apethymus* may be questioned, as these two genera belong to different subfamilies, Blennocampinae and Allantinae respectively, but they share the same habitat, growing shoots of oak *Quercus* in April and May.

Synodites amoenus (Roman, 1909)

New for the fauna of the Netherlands

Material 1 ♀, #15.42.2 on *Rumex obtusifolius*, Amerongen, Amerongse Bovenpolder (province of Utrecht), RD 161.1-444.7, collected 26.vi.2015, emergence 10.v.2016.

Host unknown so far. The host from which this parasitoid emerged, see figure 3, resembled *Euura annulata* (Gimmerthal, 1834) (= *Pachynematus rumicis* (Linnaeus, 1758)), as reared from *Rumex* elsewhere (see below under *Anoncus marginellus*).

Tribus Mesoleiini

Genus *Alexeter* Förster, 1869

Alexeter niger (Gravenhorst, 1829)

Material 1 ♂, #10.11 from *Strongylogaster mixta* (Klug, 1817) on *Dryopteris dilatata*, collected 26.v.2010, emergence 20.iv.2011. 2 ♀♀ & 2 ♂♂, from *Strongylogaster multifasciata* (Geoffroy, 1785) on *Pteridium aquilinum*, collected 2.vi.2012, emergence 22-24.v.2013. 1 ♂, from *Strongylogaster mixta* (Klug, 1817) on *Dryopteris dilatata*, Nistelrode, Loo, Palmenweg (province of Noord-Brabant), RD 169.0-413.4, collected 1.vi.2013, dead specimen noted in 2014. 1 ♂, #13.56 probably from *Stromboceros delicatulus* (Fallén, 1808) on *Dryopteris*, collected 25.vi.2013, emergence August 2014.

With the key in Schmiedeknecht (1913-1925), this species can only be determined if the metasoma and hind femur are completely black. These characters appear to vary; the metasoma can be red to some extent and in males the hind femur seems to be red rather often. In one of the reared females the metasomal tergites 2-5 are red and in all but one female the hind femur is red. However, *A. niger* can be recognized in both sexes by the shape of the clypeus and the shape of the head. The



4. Clypeus of a female *Alexeter niger*. Scale bar = 1 mm. Photo: Kees Zwakhals

4. Clypeus van een vrouwtje *Alexeter niger*. Maatstreepje = 1 mm.



5. Head of a female *Alexeter niger*. Scale bar = 1 mm. Photo: Kees Zwakhals

5. Kop van een vrouwtje *Alexeter niger*. Maatstreepje = 1 mm.

clypeus has a blunt apical edge (figure 4) and the head is not narrowing behind the eyes (figure 5).

All the host species belong to the Strongylogastrini and live on ferns. However their host plants and phenology differ: older larvae of *S. mixta*, on *Dryopteris dilatata* are the earliest available hosts in late May, followed by *S. multifasciata* in June and *Stromboceros* from late May till August. Moreover, their body sizes are rather different; adult lengths are 7-9, 8-11 and 5.5-7 mm, respectively (Benson 1952). Welke (1959) reared *A. niger* from *Strongylogaster xanthocera* (Stephens, 1835) and *S. multifasciata* (Geoffroy, 1785) (= *S. lineata* (Christ) and gives an extensive description of the life history of both host and parasitoid. The *A. niger* larva hibernates as first-stage larva in the host eonymph, resumes its growth very early in spring and kills the host in a few weeks. When the larva is full-grown (3rd stage), it leaves the host and spins its own cocoon in which it pupates. About one month later the *Alexeter* imago appears.

Genus *Anoncus* Townes, 1970*Anoncus marginellus* (Gravenhorst, 1829)

New for the fauna of the Netherlands

Material 2 ♀♀, #20.10 from *Pristiphora mollis* (Hartig, 1837) on *Vaccinium myrtillus*, Rhenen, Remmerdense Heide (province of Utrecht), RD: 165.2-444.3, collected 6.v.2020, emergence 16.iv.2021

Anoncus spec.

Material 1 ♂ & 1 ♀, #07.13 from *Mesoneura opaca* (Fabricius, 1775) larvae swept under *Quercus robur*, Rhenen, Grebbeberg (province of Utrecht), RD 170.0-440.6, collected 9.v.2017, emergence 26.iv.2018. Could not yet be identified to species level.

Genus *Azelus* Förster, 1869*Azelus erythropalpus* (Gmelin, 1790)

Material 1 ♂, #4.05 from *Dolerus madidus* (Klug, 1818) on *Juncus effusus*, collected 29.v-3.vi.2004, emergence April 2005.

Györfi (1947) and Ozols (1961) mention *Dolerus pratorum* (Fallén, 1808) and *D. gonager* (Fabricius, 1771) respectively as hosts for *Azelus erythropalpus*, but these species live on *Equisetum* and grasses, not on *Juncus*.

Genus *Campodorus* Förster, 1869*Campodorus difformis* (Holmgren, 1876)

New for the fauna of the Netherlands

Material 2 ♀♀, #12.43 from *Cladius brullei* (Dahlbom, 1835) on *Rubus idaeus*, Rhenen, Willibrordweg (province of Utrecht), RD 168.0-441.5, collected 21.vi.2012, emergence 6.viii.2012.

In the past, *Campodorus difformis* (Holmgren, 1876) and *C. scapularis* (Stephens, 1835) were considered synonyms. According to Kasparyan (2003) they represent two different species. In *C. difformis* the claws are pectinate while in *C. scapularis* they are simple. So, old references to reared 'scapularis' specimens need to be verified.

Campodorus formosus (Gravenhorst, 1829)

Material 1 ♂ & 1 ♀, #07.11 from *Periclista albida* (Klug, 1816) larvae on small *Quercus robur*, collected 8.v.2007, emergence 24.iv.2008, det. Horstmann. 3 ♀♀, #10.18 *Periclista pilosa* Chevin, 1971 on *Quercus robur*, Naarden, dunes at Gooimeer (province of Noord-Holland), RD 143.0-480.1, collected 5.vi.2010, emergence 20-23.iv.2011. 1 ♂, #09.23 from *Periclista pilosa* on *Quercus robur* Rosmalen, Nulandse Heide (province of Noord-Brabant), RD 156.9-415.3, collected 18.v.2009, emergence 25.iv.2010, leg. A.W.M. Mol.

The species attacks various species of *Periclista*: *P. pubescens* (Hinz 1961), *P. lineolata* (Weiffenbach 1988), *P. albida* (Horstmann 2008), and according to our observations *P. pilosa* too.

Campodorus haematodes (Gravenhorst, 1829)

Material 1 ♀, #07.69 from *Nematus luteus* (Fabricius, 1804) on *Alnus glutinosa*, collected 10.ix.2007, emergence 1.v.2008.

Hinz (1961) reports the species from larvae of *Eutomostethus luteiventris* (Klug, 1816), but a recent search in the collection of the Zoologische Staatssammlung Munich (ZSM) of the *Campodorus haematodes* specimens reared by Hinz revealed no specimens from *E. luteiventris* but only from *Nematus fuscipennis* (Serville, 1823) (also as *Nematus abdominalis*) and *N. luteus* (Panzer, 1803) (= *willigkiae* Stein, 1926), all from 1974. So we assume *E. luteiventris* as host to be an error. Both *Nematus* species cited live on *Alnus*.



6. Half-grown larva of *Euura viridis* on *Salix cinerea*. Rhenen (province of Utrecht), 13.x.2009, rearing #09.99B. Photo: Leo Blommers

6. Half volgroeiende larve van *Euura viridis* op *Salix cinerea*. Rhenen (Utrecht), 13.x.2009, kweek #09.99B.



7. Full-grown larva of *Euura bergmanni* on *Salix cinerea*. Rhenen (province of Utrecht), 9.x.2009, rearing #09.96A. Photo: Leo Blommers

7. Half volgroeiende larve van *Euura bergmanni* op *Salix cinerea*. Rhenen (Utrecht), 9.x.2009, kweek #09.96A.

Campodorus variegatus (Jurine, 1807) (figure 6-8)

Material 1 ♀, #07.57 from *Euura viridissima* (Möller, 1882) on *Alnus glutinosa*, collected 8.ix.2007, emergence 10.v.2008. 1 ♂, #09.99B from a single unidentified larva probably of *Euura viridis* (Stephens, 1835), on *Salix* near *cinerea*, collected 13.x.2009, emergence 16.iv.2010. 2 ♀♀, #09.96A & #09.99A from *Euura bergmanni* (Dahlbom, 1835), on *Salix cinerea* and *Salix viminalis*, collected 9.x.2009 and 13.x.2009 respectively, emergence 25.iv.2010.

1 ♀, from *Nematus alniastri* (Scharfenberg, 1805) on *Alnus glutinosa*, Mill en St. Hubert, Kasteel de Tongelaar (province of Noord-Brabant), AC 182.2-413.8, collected 5.ix.2016, emergence 22.iii.2017, leg. A.W.M. Mol. 1 ♂, from *Euura bergmanni* on *Salix aurita*, Rhenen (province of Utrecht), RD 166.2-445.0, collected 25.viii.2016, emergence 2.ix.2016, leg. J. Bouwmans. 1 ♀, from *Stauronematus platycerus* (Hartig, 1840) on *Populus* sp., Udenhout, Nieuwe Tiend (province of Noord-Brabant), RD 137.5-403.5, collected 5.x.2016, emergence 13.v.2017, leg. A. Mol & C. Cramer. 2 ♂♂, also from a *S. platycerus* larva on *Populus canescens*, Tilburg, De Kaaistoep (province of Noord-Brabant), RD 129.2-395.0, collected 26.vi.2015 (figure 8), cocoon 3.vii.2015, emergence



8. Half-grown larvae of *Stauronematus platycerus* on *Populus canescens*. Tilburg, De Kaaistoep (province of Noord-Brabant), 26.vi.2015. Photo: Tineke Cramer

8. Halfwas larven van *Stauronematus platycerus* op *Populus canescens*. Tilburg, De Kaaistoep (Noord-Brabant), 26.vi.2015.

23.vii.2015, leg. A.W.M. Mol & C. Cramer. The two males emerged from a single larva!

It is with some hesitation that we report the specimens from *Stauronematus platycerus* as *C. variegatus*. A striking character of *C. variegatus* is the strongly developed carinae on the propodeum. In the specimens from *S. platycerus* those carinae are much less developed.

Hosts previously reported are *Euura bergmanni* (= *Nematus bergmanni*) (Ozols 1961), *Euura viridis* (= *Nematus viridis*) (Shaw & Kasparyan 2003) and *Euura leucosticta* (Hartig, 1837) (= *Phyllocolpa erythropyga* (Förster, 1854)) Kasparyan & Kopelke (2009). The last one is, in contrast to the other species, a tiny species with larvae developing in leaf edge rolls caused by a gall-inducing substance injected by the sawfly female before the egg is laid, see Zinovjev & Vikberg (1998).

Campodorus sp.

Material 1 ♂, #10.02 from *Strongylogaster mixta* (Klug, 1817) on *Dryopteris dilatata*, Rhenen, Grebbeberg (province of Utrecht), RD 169.7-440.5, collected 20.v.2010, emergence 17.iv.2011.

Genus *Lamachus* Förster, 1869

Lamachus eques Hartig, 1838

Material 2 ♀♀, from *Neodiprion sertifer* (Geoffroy, 1785), Amerongen, Amerongse Berg (province of Utrecht), RD 163.3-448.1, collected 13.v.2019, emergence 18-24.iii.2020, leg. J. Bouwmans.

Lamachus eques is a well-known parasitoid of Diprionidae, not only from *N. sertifer* but also from *Diprion pini* (Linnaeus, 1758) (Oehlke 1965). Pschorn-Walcher (1982) gives an extensive review of parasitoids of Diprionidae.

Genus *Mesoleius* Holmgren, 1856

Mesoleius aulicus (Gravenhorst, 1829)

Material 2 ♀♀, #07.42 from *Eriocampa ovata* (Linnaeus, 1760) on *Alnus glutinosa*. Ede, Hindekamp (province of Gelderland),

RD 178.7-451.1, collected 27.viii.2007, emergence 25-30.v.2008, det. Horstmann. 1 ♀, #10.04 from *Pristiphora mollis* (Hartig, 1837) on *Vaccinium myrtillus*, collected 22.v.2010, emergence 17.iv.2011. 1 ♂, #08.63A from *Nematus luteus* (Fabricius, 1804) on leaf *Alnus glutinosa*, collected 16.ix.2008, emergence 17.v.2009. 1 ♀, #09.16 from *Pristiphora mollis* on *Vaccinium myrtillus*, Nunspeet, Elspeter Struiken (province of Gelderland), RD 184-478, collected 16.v.2009, emergence 20.iv.2010.

Apparently *Mesoleius aulicus* attacks quite diverse hosts. *Eriocampa ovata* on alder *Alnus* and *Pristiphora mollis* on blueberry *Vaccinium* belong to the subfamilies Allantinae and Nematinae respectively, and have been mentioned by Hinz (1961) already. The latter author also reported the nematines *Mesoneura opaca* (Fabricius, 1775) on oak and *Euura annulata* (Gimmerthal, 1834) (= *Pachynematus rumicis* (Linnaeus, 1758)) on dock *Rumex*. Moreover, this author and Zinnert (1969) reported *Eutomostethus luteiventris* (Blennocampinae) living on *Juncus*. Other reported Nematinae hosts are *Nematus latipes* Villaret, 1832. (= *Craesus latipes*) and *Pristiphora maesta* (Zaddach, 1876) (= *P. moesta*) on apple, also by Zinnert (1969).

Mesoleius opticus (Gravenhorst, 1829)

Material 1 ♀, #12.94 from a green larva with red apex, possibly *Pristiphora ruficornis* (Olivier, 1811) on *Salix*, Lienden, Drosseweg (province Gelderland), RD 165.3-440.7, collected 17.ix.2012, emergence 29.v.2013.

The two hosts already reported for *M. opticus* also live on *Salix*: *Euura papillosa* (Retzius, 1783) (= *Nematus melanaspis* Hartig, 1840) (Hinz 1961), and *E. pavidus* (Serville, 1823) (= *Nematus pavidus*) (Zinnert 1969).

Mesoleius pyriformis (Ratzeburg, 1852)

Material 2 ♀♀, #08.54 from *Aneugmenus coronatus* (Klug, 1818) on *Dryopteris filix-mas*, Nunspeet, De Vennen (province of Gelderland), RD 183-484, collected 24.viii.2008, emergence 11.vi.2009.

Brischke (1878) mentions *Aneugmenus padi* (Linnaeus, 1760) also living on ferns, as host.

Genus *Otlophorus* Förster, 1869

Otlophorus congruens (Holmgren, 1858) (figure 9)

Material 2 ♀♀, from *Caliroa cerasi* (Linnaeus, 1758) on *Crataegus monogyna*, Rosmalen, Maximakanaal (province of Noord-Brabant), RD 153.2-411.6, collected 2.vii.2017, emergence 26, 28.viii.2017, leg. A. Mol & C. Cramer (figure 10).

Holmgren (1858) described the species as *Mesoleius congruens*. Thomson (1894) moved the species to *Spudaeus*, an emendation of *Spudaea* Förster, 1869, but Schmiedeknecht (1913-1925) retained the species in *Mesoleius*. Aubert (1976) transferred the species to *Otlophorus*, but as Townes (1970) said 'this is a heterogeneous genus'. Carl (1976) presents information about the life history under the name *Rhinotorus congruens*, where *Rhinotorus* is a replacement name for the pre-occupied name *Spudaea*. According to Carl's study the parasitoid lays its egg in the 4th to 6th instar of the host larva. The parasitoid's first instar larva does not start its further development until the host larva changes from eonymph to pronymph. In an overwintering host larva, this means not until the host breaks its diapause. The parasitoid larva then completes its development in a short time (8-10 days). Schönrogge (1991) mentions *Caliroa cinxia* as a host too.

In *O. congruens* the propodeum is very short; the horizontal part is shorter than the scutellum, with a very steep area petiolaris and with very high carinae (figure 11).



9. Female of *Otlophorus congruens*. Scale bar = 2 mm. Photo: Kees Zwakhals

9. Vrouwtje van *Otlophorus congruens*. Maatstreepje = 2 mm.



12. Full-grown larva of *Cladius rufipes* on elm. Oost-Souburg (province of Zeeland), 29.ix.2016. Photo: Tineke Cramer

12. Volgroeide larve van *Cladius rufipes* op iep. Oost-Souburg (Zeeland), 29.ix.2016.



10. Nearly full-grown larva of *Caliroa cerasi* on *Crataegus monogyna*. Rosmalen (province of Noord-Brabant), Maximakanaal, 2.vii.2017. Photo: Tineke Cramer

10. Bijna volgroeide larve van *Caliroa cerasi* op *Crataegus monogyna*. Rosmalen (Noord-Brabant), Maximakanaal, 2.vii.2017.



11. Propodeum of a female *Otlophorus congruens*. Scale bar = 0.5 mm. Photo: Kees Zwakhals

11. Propodeum van een vrouwtje *Otlophorus congruens*. Maatstreepje = 0.5 mm.

Genus *Rhinotorus* Förster, 1869

Rhinotorus compactor (Thunberg, 1822)

Material 3 ♂♂, from *Nematus septentrionalis* (Linnaeus, 1758) on *Betula pendula*, Rosmalen, Wamberg (province of Noord-Brabant), RD 154.6-411.8, collected 17.viii.2016, emergence 2 ♂♂ 18.ix.2016 and 1 ♂ 28.ix.2016, leg. A. Mol & C. Cramer.

Reported hosts are: *Euura papillosa* (Retzius, 1783) (= *Nematus melanaspis*, Hartig, 1840) and *E. pavidus* (Serville, 1832) (= *Nematus pavidus*) by Zinnert (1969) and *Cladius grandis* (Serville, 1823) (= *Trichiocampus viminalis*) by Györfi (1947).

Rhinotorus leucostomus (Gravenhorst, 1829) (figure 12)

Material 1 ♀, #08.68 from *Cladius rufipes* Serville, 1823 on *Ulmus minor*, collected 18.ix.2008, emergence 14.v.2009. 1 ♀, from *Cladius rufipes* on *Ulmus*, Oost-Souburg, Reijersweg (province of Zeeland), RD 31.8-388.8, collected 29.ix.2016, emergence 3.v.2017, leg. A. Mol & C. Cramer.

Reshchikov (2016) reports *Cladius pectinicornis* (Geoffroy, 1785) as a host.

Genus *Saotis* Förster, 1869

Saotis tricolor (Thomson, 1883)

New for the fauna of Italy

Material 1 ♀, #94.3 from *Hoplocampa plagiata* (Klug, 1816) in *Amelanchier ovalis* fruitlets, Italy, Trentino, San Michele all'Adige, Castelreal, collected 12.v.1994, emergence (in the Netherlands) 1.v.1995.

Larvae of this host species were omnipresent in the young ovaries of even small bushes of the *Amelanchier* species on mountainous, more or less open, rocky places in Trentino. About 40 adults have been reared from various samples, and no more than one parasitoid specimen emerged.

As far as known, the genus *Saotis* consists of species that attack galling and leaf edge rolling species of *Euura* (formerly *Pontania* and *Phyllocolpa*) (Kasparyan & Kopelke 2010, Kasparyan & Shaw 2003) and *S. tricolor* has been reported by Hinz (1961) without any further detail as parasitoid of *Euura ischnocera* (Thomson, 1863) (as *Pontania leucostigma*) found near Hannover, Germany in 1951. Now, *E. ischnocera* is considered to be part of a complex of species that cannot be distinguished as adults (Liston et al. 2017). Several species of this so-called 'ischnocera-complex' are known to occur in Germany, viz. *Euura polita* (Zaddach, 1883) and *E. prussica* (Zaddach, 1883).



13. Female *Smicrolius parvicalcar*. Scale bar = 1 mm. Photo: Kees Zwakhals

13. Vrouwtje *Smicrolius parvicalcar*. Maatstreepje = 1 mm.

Genus *Smicrolius* Thomson, 1893

Smicrolius parvicalcar (Thomson, 1894) (figure 13)

New for the fauna of the Netherlands

Material 1 ♀, #08.23 from 3 *Pseudodineura fuscula* (Klug, 1816) mines in leaf *Ranunculus acer*, Vorden, Schimmeldijk (province of Gelderland), RD 219.3-456.7, leg W. Ellis, collected 30.v.2008, emergence 2.v.2009.

Up till now no host was known for *Smicrolius parvicalcar*. The hosts of Mesoleiini presented here are species of various sub-families of Tenthredinidae and one conifer sawfly (Diprionidae). It may be noted also that, in contrast to the Perilissini, which often attack leafminers of the subfamilies Fenulinae and Heterarthrinae (Zwakhals & Blommers 2020), the host of *S. parvicalcar* is a mining species of Nematinae.

Tribus Pionini

Genus *Glyptorhaestus* Thomson, 1894

Glyptorhaestus periclistor Hinz, 1975

Material 1 ♂, #13.03A2 from *Periclista albida* (Klug, 1816) on *Quercus robur*, collected 30.v.2013, emergence 12.iii.2014, from the same batch of *P. albida* larvae a ♀ *Trematopygodes aprilius* (Giraud, 1872) emerged as well (Zwakhals & Blommers 2020). 1 ♀, #09.18 from *Periclista albida* on *Quercus robur*, Nunspeet, Elspeter Struiken (province of Gelderland), RD 184-478, collected 16.v.2009, emergence 11.iv.2010.

Periclista albida was also reported as host by Hinz (1975).

Genus *Rhorus* Förster, 1869

Rhorus austriator Aubert, 1988 (*neustriae* auct.)

Material *Rhorus austriator* was obtained in 14 rearings from three different hosts, all *Allantus* spp. on *Rosa*: from *A. cinctus* (Linnaeus, 1758) 7 ♂♂ and 1 ♀ in 8 rearings, from *A. viennensis* (Schrank, 1781) 3 ♂♂ and 3 ♀♀ in 5 rearings and one female from *A. calceatus* (Klug, 1818). These samples were gathered in and around the town of Rhenen, except #16.16B from Noord-Holland: Hoeve Vredesteijn, Bakkum, RD 105.1-511.7 on 3.vi.2016. The above-mentioned results are summarized in table 1.

All three host species have two annual generations, with peak numbers of larvae in May-June and August-September, and the flight periods of the parasitoid are well synchronized with the appearance of the larvae. Part of the first sawfly generation delivers a second generation in the same year, while another part hibernates and produces a new generation the following year. The same pattern was observed in the parasitoids. From first generation *A. cinctus* four male parasitoids and one female emerged; two of these males and the female emerged the same year whereas two males appeared the next year, one in April and one in August. *Allantus viennensis* larvae were collected only in August and September, and parasitoids from them hibernated as is to be expected.

As the table shows, one *R. austriator* male reared from *A. cinctus* skipped two generations, in rearing #08.20B. This skipping of generations is not unusual among both sawflies and their ctenopelmatine parasitoids, for larval growth of the latter does not begin until the host larva becomes an eonymph (e.g. Welke 1959). In our 32 rearings of *A. cinctus*, generation-skipping of the sawfly was seen three times, but most attempted rearings were not kept and observed for long enough to witness

Rearing nr.	Sex	Collected	Emergence	Days	Host Species
#12.47B	♀	18-06-2012	06-08-2012	49	<i>calceatus</i>
#08.20B	♂	27-05-2008	16-08-2009	446	<i>cinctus</i>
#09.35D	♂	12-06-2009	05-08-2009	54	<i>cinctus</i>
#09.44C	♂	18-05-2009	13-08-2009	87	<i>cinctus</i>
#10.48B	♂	03-09-2010	28-04-2011	237	<i>cinctus</i>
#12.47A	♀	18-06-2012	07-08-2012	50	<i>cinctus</i>
#12.70B	♂	24-08-2012	12-06-2013	292	<i>cinctus</i>
#12.70B	♂	24-08-2012	21-06-2013	301	<i>cinctus</i>
#16.16B	♂	03-06-2016	10-07-2016	37	<i>cinctus</i>
#08.58	♀♂	06-09-2008	16-05-2009	242	<i>viennensis</i>
#08.58.2	♂	06-09-2008	28-04-2009	225	<i>viennensis</i>
#10.44	♀	02-09-2010	21-06-2011	291	<i>viennensis</i>
#10.48A	♂	03-09-2010	26-04-2011	235	<i>viennensis</i>
#15.66B	♀	13-08-2015	28-05-2016	289	<i>viennensis</i>

Table 1. Emergence of *Rhorus austriator* from *Allantus* species.

Tabel 1. Uitkomst van *Rhorus austriator* uit *Allantus*-soorten.



14. Larva of *Allantus cinctus*. Rhenen (province of Utrecht), 20.ix.2010, rearing #10.48B. Photo: Leo Blommers

14. Larve van *Allantus cinctus*. Rhenen (Utrecht), 20.ix.2010, kweek #10.48B.

such skipping. In fact, the physical difficulty of keeping rearings alive for more than one year must have reduced numbers of emerging ichneumonids to some extent.

Figure 14 shows the single *A. cinctus* larva of rearing #10.48B. *Rhorus austriator* has not been seen in 12 rearings of *A. calceatus* on low *Potentilla* plants growing in the flood plains of the Rhine near Rhenen.

Aubert (1988) described *Rhorus austriator* from a male specimen in the collection of the British Museum from Breitenbrunn in Austria reared from *Allantus cinctus* and bearing an identification label '*Rhorus neustriae* Schrk. det Kerrich'.

There is some confusion about the name "*Rhorus neustriae*" in the literature. The name was based on a species reared by Schrank as a gregarious parasitoid of *Malacosoma neustria* caterpillars (Lepidoptera) and published as *Ichneumon neustriae* Schrank, 1802. Since then various authors placed *neustriae* in various Ctenopelmatinae genera, but ctenopelmatines parasitize sawfly larvae, not caterpillars. In 1937, Hellén presented *Rhorus neustriae* in his list (Hellén 1937) and from that moment on a species named *Rhorus neustriae* figured in the entomological literature. It was not until 2006 when Horstmann cleared the situation and explained that *Ichneumon neustriae* Schrank, 1802 is a braconid, probably a *Cotesia* species (Horstmann 2006).

The colour pattern of the female *Rhorus austriator* is identical to that of the male with the face and clypeus also yellow and the malar space black. Head not narrowing behind the eyes. Flagellum with 28-30 segments. In the key in Kasparyan (2019) the species runs to couplet 25. Then one should choose the first alternative and arrive at couplet 26 and then to 27. In *R. austriator* the second metasomal tergite is rugulose in the basal half only and the 2nd segment of the fore tarsus is about 2x as long as wide. The amount of red colouration of the metasoma is somewhat variable, see figure 15. In the female, tergite 6 is black with a narrow yellow apical margin, tergite 7 is brown at the base and yellowish in the apical half.

Rhorus chrysopus (Gmelin, 1790)

Material 1 ♀, #11.18 from *Macrophya alboannulata* Costa, 1859 on *Sambucus nigra*, Olst, 't Nijendal/Hengforden (province of Overijssel), RD 205.4-481.0, collected 4.vi.2011, emergence 30.iv.2012.

Hinz (1961) reports the following hosts: *Aglaostigma fulvipes* (Scopoli, 1763), *Macrophya albicincta* (Schrank, 1776), *Pachyprotasis*



15. Female *Rhorus austriator*. Scale bar = 2 mm. Photo: Kees Zwakhals

15. Vrouwtje *Rhorus austriator*. Maatstreepje = 2 mm.

simulans (Klug, 1817) and *Tenthredo rubricoxis* (Enslin, 1912). *Macrophya albicincta* (Schrank, 1776) and *M. alboannulata* Costa, 1859 were usually treated as one species (*albicincta*) until Chevin (1975) separated them more clearly.

Rhorus exstirpatorius Gravenhorst, 1829

Material 1 ♀, #07.36 from *Euura pavidus* (Serville, 1823) (= *Nematus pavidus*) on *Salix caprea*, collected 21.viii.2007, emergence September 2007. 1 ♀, from half-grown nematines on *Salix caprea*, collected 14.ix.2007, emergence April 2008. 1 ♂, #08.52 from *Monostegia abdominalis* (Fabricius, 1798) on *Lysimachia vulgaris*, collected 17.ix.2008, emergence 29.vi.2009. 1 ♀, nr 83.22 from *Euura pavidus* (Serville, 1823) (= *Nematus pavidus*) on *Salix caprea*, Belgium (Liège), Robertville, Mont Rigi Biologisch Station, collected 24-26.vi.1983, emergence 3.viii.1983.

Hinz (1961) and Weiffenbach (1988) also report *M. abdominalis* as a host, while Zinnert (1969) also mentions *Pristiphora geniculata* (Hartig, 1840). So this evidently is another polyphagous parasitoid.

Rhorus petropolitanus Kasparyan, 2015 (figure 16-17)

New for the fauna of the Netherlands

Material 5 ♂♂ & 2 ♀♀, from *Pristiphora brevis* (Hartig, 1837) on *Thalictrum flavum*, Zuilichem, Breemwaard (province of Gelderland), RD 136.9-424.6, collected 14.vi.2017, cocoons 15-19.vi.2017, emergence ♂♂ 4, 18, 21, 25.vii.2017 & ♀♀ 11.vii. and 12.viii.2017, leg. A. Mol & C. Cramer. 1 ♀, Zuilichem, Breemwaard, RD 139.5-424.7, collected 20.vi.2018, cocoon 22.vi.2018, emergence 14.vii.2018, leg A. Mol & C. Cramer.

Apparently the infection rate of *P. brevis* was rather high. On May 14, 2017 about 20 full-grown larvae of *P. brevis* were collected of which only five developed into adult sawflies and eight into Ichneumonidae. On May 20, 2018, in spite of intensive search, only two sawfly larvae could be found at the same location, from which one ichneumonid developed.

Rhorus xanthopygus Kasparyan, 2014

New for the fauna of the Netherlands

Material 1 ♂, #16.42 from *Pristiphora wesmaeli* (Tischbein, 1853) on *Larix*, Rhenen, Remmerdense Heide (province of Utrecht), RD 165.2-444.3, collected 19.viii.2016, emergence 7.v.2017.

It has also been reared from *Pristiphora gerula* Konow, 1898 on spruce (Kasparyan 2014).



16. Full-grown larva of *Pristiphora brevis* on *Thalictrum flavum*. Zuilichem, Broomwaard (province of Noord-Brabant), 14.vi.2017. Photo: Tineke Cramer

16. Volgroeide larve van *Pristiphora brevis* op *Thalictrum flavum*. Zuilichem, Broomwaard (Noord-Brabant), 14.vi.2017.

Rhorus sp.

Material 1 ♂, #08.56 from *Dineura stilata* (Klug, 1816) on underside leaf *Sorbus aucuparia*, collected 26.viii.2008, emergence 16.v.2009.

Genus *Syntactus* Förster, 1869

Syntactus varius (Holmgren, 1858)

New for the fauna of the Netherlands

Material 1 ♀, #13.35 from *Strongylogaster mixta* (Klug, 1817) on *Dryopteris dilatata*. Nistelrode, Loo, Palmenweg (province of Noord-Brabant), RD 169.0-413.4, collected 1.vi.2013, emergence 8.iv.-2014. 2 ♂♂, #13.35 from *S. mixta* (Klug, 1817) on *Dryopteris filix-mas*, Nistelrode, Loo, Palmenweg, RD: 169.0-413.4, collected 1.vi.2013, emergence 13.iv.-2014. 1 ♀, #09.19A from *S. mixta* (Klug, 1817) on *Dryopteris filix-mas*, Rhenen, Stadsbos (province of Utrecht), RD 167.0-442.8, collected 18.v.2009, emergence 14.iv.2010. 1 ♂, #10.11, from *S. mixta* (Klug, 1817) on *Dryopteris dilatata*, Rhenen, Roghairspareweg, RD 166.4-442.8, collected 26.v.2010, emergence 7.iv.2011. 1 ♂, #15.20 from *Strongylogaster macula* (Klug, 1817) on *Dryopteris*, Rhenen, Laarsenberg, RD 169.6-440.9, collected 3.vi.2015, emergence 15.iv.2016.

Strongylogaster macula and *S. mixta* are closely related and share a comparable life history (Welke 1959) and see under *Alexeter niger*. *Strongylogaster macula* was already mentioned by Bauer (1958) as host.

Tribus Scolobatini

Genus *Scolobates* Gravenhorst, 1829

Scolobates auriculatus (Fabricius, 1804)

Material 4 ♀♀, from *Arge pagana* (Panzer, 1797) on *Rosa* sp., collected in August and September in four different years, emerged the following year in June and July. 1 ♀, from *A. pagana* on *Rosa canina*, Veenendaal, Kwintelooyen (province of Utrecht), RD 166.2-444.6, collected 2.ix.2016, emergence 2.vi.2017, leg. J. Bouwmans.



17. Female *Rhorus petropolitanus*. Scale bar = 2 mm. Photo: Kees Zwakhals

17. Vrouwtje *Rhorus petropolitanus*. Maatstreepe = 2 mm.

According to Pschorn-Walcher & Kriegl (1965), who reared, and discussed the occurrence of the parasitoids of Argidae, mainly in Switzerland and Austria, *S. auriculatus* is the most numerous parasitoid of at least five *Arge* species in that area, including *A. pagana*.

Conclusion

The 17 Perilissini of our previous paper primarily showed a rather uniform kind of hosts: concealed hosts living in mines or fruits. In contrast, the 31 species presented here show a wider and more variable host spectrum, although almost all sawfly larvae were free-living on trees and herbs. Altogether we have found almost 50 ichneumonid species on sawflies but it should be noted that there are over 800 species of Ctenopelmatinae known to occur in Europe (Zwakhals 2013) and about 250 are expected to occur in The Netherlands so there is still some work to be done!

From two Ctenopelmatinae tribes, Chironotini (= Olethrodontini) and Seleucini, no ichneumonid species have been reared during the present work. Each of these tribes contains only one species in Europe and are not known from The Netherlands. For *Olethrodontia modesta* (Gravenhorst, 1829), a peculiar species with an exceptionally long ovipositor, as long as the metasoma, no host is known (Yu et al. 2016), while *Seleucus cuneiformis* Holmgren, 1860 parasitizes *Blasticotoma filiceti* Klug, 1834 living in stems of *Athyrium filix-femina* (Achterberg & Altenhofer 2013).

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Samenvatting

Enige uit bladwespen (Hymenoptera, Symphyta) gekweekte Europese ichneumoniden (Hymenoptera, Ctenopelmatinae)

In aansluiting op een eerder artikel, worden hier weer ichneumoniden gepresenteerd die uit in het veld verzamelde bladwesplarven zijn gekweekt. In het vorige artikel werden 17 Ctenopelmatinae soorten gepresenteerd die tot het tribus Perilissini behoren. Nu gaat het om soorten van één van de volgende vijf tribes: Ctenopelmatini, Euryproctini, Mesoleiini, Pionini en Scolobatini. In totaal werden nu 31 soorten ichneumoniden gevonden. Daarvan is er één nieuw voor de fauna van Italië: *Saotis tricolor* (Thomson, 1883) gekweekt uit *Hoplocampa plagiata* (Klug, 1816) in vruchtjes van *Amelanchier ovalis* en zijn er zeven nieuw voor de fauna van Nederland: *Synodites amoenus* (Roman, 1909) gekweekt uit *Euura annulata* (Gimmerthal, 1834) of een verwant op ridderzuring *Rumex obtusifolius*, *Anoncus marginellus* (Gravenhorst, 1829) uit *Pristiphora mollis* (Hartig, 1837) op *Vaccinium myrtillus*, *Campodorus difformis* (Holmgren, 1876) uit *Cladius brullei* (Dahlbom, 1835) op framboos *Rubus idaeus*, *Smicrolius parvicalcar* (Thomson, 1894) uit mijnen van *Pseudodineura fuscula* (Klug, 1816) in bladeren van scherpe boterbloem *Ranunculus acer*, *Rhorus petropolitanus* Kasparyan, 2015 uit *Pristiphora brevis* (Hartig, 1837) op poelruit *Thalictrum flavum*, *Rhorus xanthopygus* Kasparyan, 2014 uit *Pristiphora wesmaeli* (Tischbein, 1853) op lariks *Larix*, *Syntactus varius* (Holmgren, 1858) uit *Strongylogaster mixta* (Klug, 1817) en *S. macula* (Klug, 1817) beide op stekelvaren *Dryopteris*. Voor *Smicrolius parvicalcar* is dit ook meteen de eerste melding van een gastheer, de enige van de hier behandelde soorten die uit een bladmijn is gekweekt. Wanneer men het gastheerspectrum van de Perilissini vergelijkt met dat van de nu behandelde tribes dan valt op dat het spectrum bij de Perilissini duidelijk eenvormiger is. Dat is te verklaren omdat de gastheren van Perilissini vaak minerende bladwesplarven zijn die sterk aan één bepaalde plant zijn gebonden. De hier behandelde ichneumoniden parasiteren vrij levende larven en vertonen soms een heel divers gastheerspectrum met gastheren op heel verschillende planten. Bij bladwespen is het niet ongevoen dat een dier een generatie later tevoorschijn komt dan men zou verwachten. Zo kan het gebeuren dat een deel van de nakomelingen van een voorjaarsgeneratie niet in de nazomer van hetzelfde jaar uitkomt maar overwintert en pas het volgende voorjaar tevoorschijn komt. Dat 'overliggen' kan zelfs meerdere winters na elkaar gebeuren. Overliggen kan kennelijk ook gebeuren bij de sluipwespen van de bladwespen. Bij de uitgekweekte sluipwespen trad dit op bij een mannetje van *Rhorus austriator* Aubert, 1988. De gastheer was een *Allantus cinctus*-larve die 27 mei 2008 was verzameld op roos *Rosa*. Deze voorjaarsgeneratie levert in de nazomer een volgende generatie bladwespen, als die niet overliggen, tezamen met de parasitoïden. In dit geval kwam het *Rhorus*-mannetje echter pas 19 augustus 2009 tevoorschijn (dus zelfs niet eens in het voorjaar). Al met al hebben we nu bijna 50 soorten ichneumoniden uitgekweekt uit bladwespen, maar daarbij dient men te bedenken dat er zo'n 800 Ctenopelmatinae soorten uit Europa bekend zijn, waarvan er in Nederland zo'n 250 zijn te verwachten. Er is dus nog wel wat werk te doen.



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