

New records of Encyrtidae (Hymenoptera, Chalcidoidea) from Norway IV

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The study of the collection of the family Encyrtidae at the Natural History Museum of Oslo continues. Eighteen species are reported for the first time from Norway in this revision, bringing the total number of Norwegian encyrtids up to 105. Comments on the biology and distribution for these species are given. The aim of this study is to highlight the distribution of the family in Norway and to provide a complete list of the Norwegian species.

Key words: Hymenoptera, Chalcidoidea, Encyrtidae, new records, Norway.

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Introduction

The chalcid family Encyrtidae represents one of the most important agents in biological control of insects occurring as plant pests. They are, together with the family Aphelinidae, successfully used against many pest species, especially scale insects (Hemiptera, Coccoidea) (Noyes 1985, Nikolskaya & Yasnosh 1966). More than 400 species have been used worldwide as biological control agents of insect pests (Greathead 1986, Neueschwander *et al.* 1990, Noyes 1985, 2014). Parasitoids like encyrtids are the major component of many terrestrial ecosystems and may constitute up to 20% of all insect species (LaSalle & Gauld 1991, Godfray 1994, Memmot *et al.* 1994).

This is the fifth paper on Norwegian Encyrtidae based on the collections at the Natural History Museum of Oslo. The previous papers are Hansen *et al.* (2012), Japoshvili *et al.* (2013), Japoshvili & Hansen (2013) and Hansen & Japoshvili (2013).

The aim of these contributions is to highlight the distribution of the family Encyrtidae in Norway, and finally provide a catalogue of Norwegian Chalcidoidea.

Material and Methods

This contribution focuses on ethanol preserved material of Encyrtidae, in the collections at the Natural History museum in Oslo. The material was sorted and dried using ethanol and hexamethyldisilazane (HMDS), then card mounted, or, if necessary, slide mounted, following the guidelines of Noyes (2014). For identification, the general key for Palaearctic encyrtids was used (i.e. Trjapitzin 1989), in addition to other related publications on lower taxa (e.g. Gibson *et al.* 1997, Guerrieri & Noyes 2009, Graham 1991).

The faunistic divisions within Norway follows Økland (1981), and are given in **bold**.

The coordinates are given in decimal degrees (Grid: *Lat/Lon hddd.dddd*[°]; datum: *WGS84*). The taxonomy follows Noyes (2014). Data on biology and distribution is extracted from Noyes (2014), and for distribution in Europe all countries are listed, but not for other regions. All records refer to fully labeled specimens or slides deposited in the collections at the Natural History Museum of Oslo, and for some duplicates in the collection at the Entomology and Biocontrol Research Centre, Agricultural University of Georgia.

List of species

Anagyrus securicornis Domenichini, 1953

Material examined: BUSKERUD eastern [BØ], Røyken: Kinnartangen [N59.71343° E10.33646° ±10m], 1♀ 1–31 July 1993, Malaise trap / meadow / forest edge, leg. Lars Ove Hansen; BUSKERUD western [BV], Rollag: Vårviken [N60.0158° E09.2594° ±50m], 1♀ 1–30 June 1992, Malaise trap / sandy area, leg. Bjørn A. Sagvolden.

Biology: Seemingly no information (Noyes 2014), but probably associated with *Coccoidea* as some other species of this genus.

Distribution: Europe: Austria, Bulgaria, Czech Republic, Denmark, England, Finland, Germany, Hungary, Italy, Moldova, Netherlands, Romania, Russia and Ukraine; Asia (Kalina 1989, Noyes 2014, Fusu 2014).

Aphycus apicalis (Dalman, 1820)

Material examined: VESTFOLD [VE], Horten: Adalstjernet SE [N59.3703° E10.4378° ±50m], 1♀ 14 May–8 July 2003, Malaise trap / pond / bog, leg. Eirik Rindal.

Biology: Parasitoid on *Pseudococcidae* (Hemiptera) (Noyes 2014).

Distribution: Europe: Austria, Czech Republic, Denmark, England, Finland, France, Germany, Hungary, Moldova, Netherlands, Poland, Russia, Spain, Sweden and Yugoslavia (pre 1991); Asia and N America (Kalina 1989, Fusu 2014, Noyes 2014).

Blastothrix brittanica Girault, 1917

Material examined: AKERSHUS [AK], Bærum: Oksenøya, Storøykilen NR [N59.89466° E10.60080° ±10m], 1♀ 1 July–31 August 2002, Malaise trap / calcareous meadow / seashore, leg. Lars Ove Hansen.

Biology: Parasitoid on *Coccidae* (Hemiptera) (Noyes 2014).

Distribution: Europe: Belarus, England, France, Germany, Moldova, Netherlands, Poland and Russia; Asia and North America (Noyes 2014).

Cerchysiella planiscutellum (Mercet, 1921)

Material examined: BUSKERUD eastern [BØ], Hurum: Tofteholmen [N59.5158° E10.5594° ±50m], 1♀ 31 July–1 September 1991, Malaise trap / deciduous forest, leg. Lars Ove Hansen.

Biology: Parasitoid on *Meligetes aeneus* (Fabricius, 1775) (Coleoptera, Nitidulidae) (Noyes 2014).

Distribution: Europe: Andorra, Bulgaria, Czech Republic, England, France, Hungary, Macedonia, Montenegro, Netherlands, Portugal, Russia, Serbia, Spain, Sweden, Ukraine and Yugoslavia (pre 1991); Asia (Kalina 1989, Fusu 2014, Noyes 2014).

Copidosoma cuproviride Springate & Noyes, 1990

Copidosoma cuproviridis Springate & Noyes, 1990

Material examined: BUSKERUD eastern [BØ], Drammen: Underlia [N59.75551° E10.17677° ±10m], 1♀ 1–31 August 1992, Malaise trap / south facing slope / pine forest], leg. Lars Ove Hansen.

Biology: Seemingly no information (Noyes 2014), but probably associated with *Lepidoptera* as several other species of this genus.

Distribution: Europe: England, France, Germany, Netherlands and Sweden; North America (Noyes 2014).

Copidosoma terebrator Mayr, 1876

Material examined: AKERSHUS [AK], Oslo: Maridalen, Kirkeby [NW] [N59.99618° E10.75852° ±10m], 1♂ 26 June–31 July 2007, Malaise trap A / meadow, leg. Anders Endrestøl & Lars Ove Hansen.

Biology: Parasitoid on *Gelechia albicans* Heinemann, 1870 (Lepidoptera, Gelechiidae) (Noyes 2014).

Distribution: Europe: Austria, Czech Republic, Denmark, England, Finland, France, Germany, Hungary, Romania and Sweden; Asia (Kalina 1989, Guerrieri & Noyes 2009, Noyes 2014).

***Copidosoma serricorne* (Dalman, 1820)**

Material examined: NORD-TRØNDELAG interior [NTI], Lierne: Nordli, Skograudberget [N64.44907° E13.93577° ±10m; 407 m a.s.l.], 1♀ 7 August–25 September 2008, Malaise trap, leg. Geir E.E. Søli & Eirik Rindal.

Biology: Parasitoid on different species of Geometridae and Oecophoridae (Lepidoptera) (Noyes 2014).

Distribution: Europe: Austria, Czech Republic, England, Finland, Germany, Hungary, Netherlands, Romania, Scotland, Sweden, and Switzerland; Asia (Guerrieri & Noyes 2009, Noyes 2014).

***Echthroplexis puncticollis* (Thomson, 1876)**

Material examined: BUSKERUD eastern [BØ], Drammen: Underlia [N59.75551° E10.17677° ±10m], 1♀ 1–31 August 1992, Malaise trap / south facing slope / pine forest], Leg. Lars Ove Hansen.

Biology: Parasitoid on *Andricus caputmedusae* (Hartig, 1843) (Hymenoptera: Cynipidae) and *Hemerobius* L., 1758 sp. (Neuroptera: Hemerobiidae) (Noyes 2014).

Distribution: Europe: Czech Republic, Estonia, Finland, France, Germany, Hungary, Italy, Moldova, Romania, Russia, Slovakia, Spain, Sweden, England, Montenegro and Yugoslavia (pre 1991); Asia (Fusu 2014, Noyes 2014).

***Encyrtus infidus* (Rossi, 1790)**

Material examined: AKERSHUS [AK], OSLO, Hengsenga [N59.91551° E10.67054° ±25m], 1♀ 25 June–8 August 2007, Malaise trap, leg. Andres Enderstøl.

Biology: Parasitoid on various species of Coccidae and Kermesidae (Hemiptera) (Noyes 2014).

Distribution: Europe: Croatia, Czech Republic, England, France, Germany, Greece, Ireland, Italy, Moldova, Netherlands, Poland, Russia, Slovakia, Spain and Sweden; Africa, Asia and North America (Kalina 1989, Fusu 2014, Noyes 2014).

***Leptomastidea bifasciata* (Mayr, 1876)**

Material examined: HEDMARK southern [HES], Elverum: Starmoen [NR] [N60.84990° E11.69168° ±10m], 2♀♀ 29 July–14 September 2004, Malaise trap S / sandy pine forest, leg. Lars Ove Hansen and Eirik Rindal.

Biology: Parasitoid on various species of Pseudococcidae (Hemiptera) (Noyes 2014).

Distribution: Europe: Austria, Croatia, Czech Republic, Denmark, England, Finland, France, Germany, Hungary, Italy, Moldova, Russia, Serbia, Slovakia, Spain and Ukraine; Asia (Fusu 2014, Noyes 2014).

***Metaphycus unicolor* Hoffer, 1954**

Material examined: AKERSHUS [AK], Ullensaker: Sessvollmoen, Aurtjernet W [N60.23147° E11.11660° ±10m, 200m a.s.l.], 1♀ 26 June–25 August 2007, Malaise trap / sandy area / forest edge, leg. Lars Ove Hansen.

Biology: Parasitoid on various species of *Physokermes* Targioni Tozzetti, 1868 (Hemiptera, Coccidae) (Noyes 2014).

Distribution: Europe: Czech Republic, Finland, Germany, Greece, Hungary, Italy, Russia and Slovakia; Asia (Fusu 2014, Noyes 2014).

***Metaphycus zebratus* (Mercet, 1917)**

Material examined: AKERSHUS [AK], Ullensaker: Sessvollmoen, Aurtjernet W [N60.23147° E11.11660° ±10m, 200m a.s.l.], 1♀ 26 June–25 August 2007, Malaise trap / sandy area / forest edge, leg. Lars Ove Hansen; OSLO, Bleikøya [N] [N59.88940° E10.74275° ±50m], 1♀ 15 July–29 August 2008, Malaise trap / forest edge, leg. Anders Endrestøl. HEDMARK southern [HES], Elverum: Starmoen [NR] [N60.84990° E11.69168° ±10m], 1♀ 29 July–14 September 2004, Malaise trap S / sandy pine forest, leg. Lars Ove Hansen and Eirik Rindal. BUSKERUD eastern [BØ], Kongsberg: Skollenborg, Labro

[E] [N59.61841° E9.67744° ±10m; 120m a.s.l.], 1♀ 9 July–2 August 2008, Malaise trap / pine forest / sand-pit, leg. Lars Ove Hansen; Nedre-Eiker: Mjøndalen, Ryggkollen [W] [N59.75442° E10.05056° ±10m; 16m a.s.l.], 1♀ 1–31 July 2008, 1♀ 3 August–28 September 2008, Malaise trap / sand-pit / pine forest, leg. Lars Ove Hansen; Drammen: Underlia [N59.75551° E10.17677° ±10m], 1♀ 1–31 August 1992, Malaise trap / south facing slope / pine forest] leg. Lars Ove Hansen.

Biology: Recorded as a parasitoid on different species from several families of Coccoidea (Hemiptera) (Noyes 2014).

Distribution: Europe: Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Moldova, Montenegro, Netherlands, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Ukraine and Wales; Asia and North America (Fusu 2014, Noyes 2014).

Metaphycus stagnarum Hoffer, 1954

Material examined: AKERSHUS [AK], Ullensaker: Sessvollmoen, Aurtjernet W [N60.23147° E11.11660° ±10m, 200m a.s.l.], 1♀ 26 June–25 August 2007, Malaise trap / sandy area / forest edge, leg. Lars Ove Hansen.

Biology: Parasitoid on various species of Coccoidea (Hemiptera) (Noyes 2014).

Distribution: Europe: Belgium, Czech Republic, Denmark, England, Finland, Germany, Italy, Netherlands, Poland, Romania, Russia, Slovakia and Wales; Asia (Noyes 2014).

Metaphycus ater (Mercet, 1925)

Material examined: BUSKERUD eastern [BØ], Nedre-Eiker: Mjøndalen, Ryggkollen [W] [N59.75442° E10.05056° ±10m; 16m a.s.l.], 1♀ 3 August–28 September 2008, Malaise trap / sand-pit / pine forest, leg. Lars Ove Hansen.

Biology: Parasitoid on various species of Eriococcidae (Hemiptera) (Noyes 2014).

Distribution: Europe: Andorra, Austria, Bulgaria, Croatia, Czech Republic, Denmark, England, Finland, France, Hungary, Iceland, Italy, Moldova, Romania, Russia, Scotland, Slovakia, Slovenia, Spain and Wales; Asia (Noyes 2014).

Microterys aeneiventris (Walker, 1837)

Aschitus aeneiventris (Walker, 1837)

Material examined: MØRE OG ROMSDAL interior [MRI], Sunndal: Sunndalsøra, Orheiman [N62.67060° E8.60993° ±50m], 1♀ 13 August–28 September 2008, Malaise trap / meadow, leg. John Bjarne Jordal.

Biology: Parasitoid on *Acanthococcus devoniensis* (Green, 1896) (Hemiptera, Eriococcidae) (Noyes 2014).

Distribution: Europe: Austria, Bulgaria, Croatia, Czech Republic, Denmark, Germany, Greece, Hungary, Moldova, Romania, Scotland, Slovakia, Spain, Sweden, Serbia and Ukraine; Asia (Fusu 2014, Noyes 2014).

Pseudencyrtus salicisstrobili (Linnaeus, 1758)

Material examined: AKERSHUS [AK], Ullensaker: Sessvollmoen, Aurtjernet W [N60.23147° E11.11660° ±10m, 200m a.s.l.], 1♀ 26 June–25 August 2007, Malaise trap / sandy area / forest edge, leg. Lars Ove Hansen.

Biology: Parasitoid on various species of Cecidomyiidae (Diptera) (Noyes 2014).

Distribution: Europe: Austria, Czechoslovakia, England, Finland, Germany, Hungary, Netherlands, Romania, Russia and Sweden; Asia (Noyes 2014).

Syrphophagus vicinus (Trjapitzin, 1978)

Material examined: BUSKERUD eastern [BØ], Nedre-Eiker: Mjøndalen, Ryggkollen [W] [N59.75442° E10.05056° ±10m; 16m a.s.l.], 1♀ 3 August–28 September 2008, Malaise trap / sand-pit / pine forest, leg. Lars Ove Hansen.

Biology: Parasitoid on unspecified Aphididae (Hemiptera) (Noyes 2014).

Distribution: Europe: Russia (Karelia) (Noyes 2014).

Trechnites alni Erdős, 1957

Material examined: BUSKERUD eastern [BØ], Nedre-Eiker: Hagatjern, Ryggsetra [N59,7333° E10,0458° ±25 m], 1♀ 1–30 September 1994, Malaise trap B / hay-meadow, leg. Yngvar Berg & Lars Ove Hansen.

Biology: No information (Noyes 2014).

Distribution: Europe: Czech Republic,

Denmark, England, Finland, Hungary, Ireland, Netherlands, Russia, Slovakia, Sweden and Wales; Asia (Fusu 2014, Noyes 2014).

Discussion

Eighteen species of Encyrtidae not hitherto reported from Norway was recorded in this investigation, and this increases the number of Norwegian species to 105. Ottesen (1993) estimated the number in Norway to 120, but this number is expected to be passed quite soon. As most of the studied material was collected using Malaise traps, we have no information about host associations on these species. However, this reveals valuable information, and may be used to give predictions about the fauna and probable hosts of Norwegian encyrtids.

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