

Notes on species of Ceraphronidae and Platygasteridae (Hymenoptera) reared from Cecidomyiidae (Diptera) in Denmark

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Host records are given for 1 species of Ceraphronidae and 14 species of Platygasteridae. *Platygaster verrucosa* Kieffer, 1916 is redescribed on the basis of reared material. The rearing method is discussed in detail.

Dansk sammendrag

Noter om arter af Ceraphronidae og Platygasteridae klækket af Cecidomyiidae i Danmark

15 arter sorthvæpse blev klækket fra galmyg indsamlet på Læsø, hvilket afslørede talrige nye værtsforhold. Værtsspektret for mange af hvæpsene viser sig at være bredt. *Platygaster verrucosa* Kieffer genbeskrives på grundlag af klækket materiale. Når myggelarverne fremkommer af plantematerialet, anbringes de i potter med 2-3 dl halvgroft sand, maks. 150 larver i hver potte. Når klækningen skønnes at nærme sig, sættes en gennemsigtig plastpose holdt oppe af stål-bøjler over hver potte, og de klækkede imagines opsamles i tuber med sprit. Gennem den lange tid i klækkepotterne, der ofte omfatter en overvintring, er der ofte stor dødelighed blandt larver. Især er det et problem at opretholde en passende fugtighed i sandet.

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Introduction

Many species of the families of tiny wasps Ceraphronidae and Platygasteridae are parasitoids on gall midges (Cecidomyiidae). Reared material is always of greater value than material collected by other means, e.g. it can often help to solve taxonomic problems. From several of the new records given below it appears that the wasp species often have a rather wide host range with regard to both type of plant and of midge host. This probably contributes to morphological variation among the wasps and makes determination more difficult, but it also points to the importance of refugia in agrolandscapes, as the beneficial wasps seem to be able to benefit from the plant diversity there.

All the material recorded below was collected by JJ on the island of Læsø, North East Jutland, Denmark, in the years 2000-2009 during his studies on gall midges, cf. Skuhravá et al. (2006). The material was determined by PNB. It is now deposited in the Zoological Museum, University of Copenhagen.

Standard abbreviations used are A1-A10 = antennal segments 1-10, OOL = distance between lateral ocellus and eye, LOL = distance between lateral and anterior ocelli, and T1-T6 = tergites 1-6.

Material and methods

Plant parts which seemed to be infested by gall midges or which were suspected to be infested by these were collected in suitable plastic boxes. In some cases the midges and their parasitoids were reared directly from the plant material (polyvoltine species), but in the majority of cases the emerged larvae were collected to be reared later the same year or next year after hibernation – this was mostly the case for univoltine species, which are synchronized with e.g. the short flowering period of the host plants.

The larvae were placed in small plastic pots containing beach sand of medium grain size (2-3 dl in each pot). To reduce spread of pathogenous microorganisms the number of larvae was sought to be limited to 100-150 in each pot.

When the time for emergence was assumed to be close, the surface of the pots were covered by transparent plastic bags of suitable size, supported by small wire hoops which were anchored in the sand. The emergence of the insects was noted, and they were collected in small glass tubes containing 70 % alcohol.

This method is suitable only for species which pupates in the ground. Often it has resulted in low emergence percentages or given no results at all. The reasons for this could be the great difficulty in maintaining the right humidity in the often long hibernation period. Too high a humidity during development often leads to condensation in the plastic bags which causes serious damage also to the emerged adults, especially fragile midges.

Results

Aphanogmus tenuicornis Thomson, 1858

9 females, 2 males, ex cones of *Picea sitchensis* (Bong.) Carr. with numerous species of gall midges; cones collected in Klitten, Læsø, 15.viii.2006, emerged 16.viii.-2.ix.2006.

Comments. Reared from *Dasineura napi* (Loew) (*D. brassicae* Winnertz) on brassica (Sylvén, 1949) and from cola galls of the cynipid *Andricus lignicola* (Hartig) (Hymenoptera) collected off oaks (*Quercus*) in Ireland (Buhl & O'Connor, 2010). The Danish specimens were reared directly from the cones. The cones are a habitat for many insects. In Denmark six species of cecidomyiids have been found. Three – *Kaltenbachiola strobi* Winnertz, *Asynapta strobi* Kieffer and *Resseliella conicola* (Foote) feed on cone scales. *Plemeliella abietina* Seitner feeds on seeds, *Lestodiplosis holstei* Kieffer and *L. conii* Kieffer are predators on various species. The majority of the reared midges in the present case (169 specimens) were *Asynapta strobi*.

Acerotella humilis Kieffer, 1913

2 females, 6 males, ex *Achillea ptarmica* L. with *Rhopalomyia palearum* (Kieffer) and other midges (*Ozirhincus millefolii* (Wachtl), a *Contarinia* sp. and a predacious *Lestodiplosis* sp.).

Comments. Bionomics of this genus is very poorly known; a few Nearctic species of *Acerotella* are known to be associated with *Acer* (Vlug, 1995).

Inostemma boscii Jurine sensu Szélényi (1938) and Kozlov (1978)

4 females ex *Contarinia jacobaeae* (Loew) on *Senecio jacobaea* L. (flowers).

1 female ex *Achillea ptarmica* L. with *Rhopalomyia palearum* (Kieffer) and other midges (*Ozirhincus millefolii* (Wachtl), a *Contarinia* sp. and a predacious *Lestodiplosis* sp.).

1 female ex *Jaapiella* sp. in flowers of *Centaurea cyanus* L., emerged 19.vi.2004.

Comments. This species has been recorded from a wide variety of hosts (Vlug, 1995). The concept of the species followed here might differ from that of Jurine (D.G. Notton, in litt.)

Isostasius punctiger (Nees ab Esenbeck, 1834)

5 females, 19 males, ex *Achillea ptarmica* L. with *Rhopalomyia palearum* (Kieffer) and other midges (*Ozirhincus millefolii* (Wachtl), a *Contarinia* sp. and a predacious *Lestodiplosis* sp.).

Comments. Reared from *Contarinia tritici* Kirby and *Sitodiplosis mosellana* (Géhin) on *Avena* sp. and *Triticum vulgare* Villars (Vlug, 1995).

Platygaster athamas Walker, 1835

1 female, ex *Contarinia jacobaeae* on *Senecio jacobaea* L. (flowers).

Comments. Reared from *Bayeria capitigena* (Bremer) on *Euphorbia esula* L., from *Rabdop-haga terminalis* Loew on *Salix alba* L. (Vlug, 1995), from *Wachtliella* on *Rosa* (Buhl, 2001), and from *Jaapiella veronicae* (Vallot) on *Veronica longifolia* L. (Buhl, 2008).

Platygaster betularia Kieffer, 1916

2 females, 2 males, ex *Semudobia betulae* (Winnertz) on *Betula pendula* Roth (seeds from female birch catkins, also with galls of *Semudobia skuhravae* Roskam), emerged 14.iv-29.v.2006.

Comments. Also earlier recorded from *S. betulae* on *Betula*, but only on *B. pubescens* Ehrh. (*B. alba* L.) (Vlug, 1995).

Platygaster compressicornis Thomson, 1859

6 females, 3 males ex *Thecodiplosis brachyntera* Schwaegrichen on *Pinus silvestris* L. and *P. mugo* Turra, emerged 18-21.iv.2002.

Comments. Also earlier recorded from *Thecodiplosis brachyntera* (on *Pinus silvestris*) (Vlug, 1995).

Platygaster munita Walker, 1835

4 females, ex *Contarinia floriperda* Rübssaamen on *Sorbus aucuparia* L. and *S. intermedia* (Ehrh.) Pers. (flowers). A *Jaapiella* sp. (1 female) and a *Lestodiplosis* sp. (1 female) were also present.

Comments. Reared from *Wachtliella caricis* Loew on *Carex otrubae* Podp. and *Carex pendula* Huds., and from *Dasineura leguminicola* (Lintner) on clover (? *Trifolium* sp.) (Buhl, 2009).

Platygaster sagana Walker, 1835

16 females, 14 males, ex *Achillea ptarmica* L. with *Rhopalomyia palearum* (Kieffer) and other midges (*Ozirhincus millefolii* (Wachtl), a *Contarinia* sp. and a predacious *Lestodiplosis* sp.).

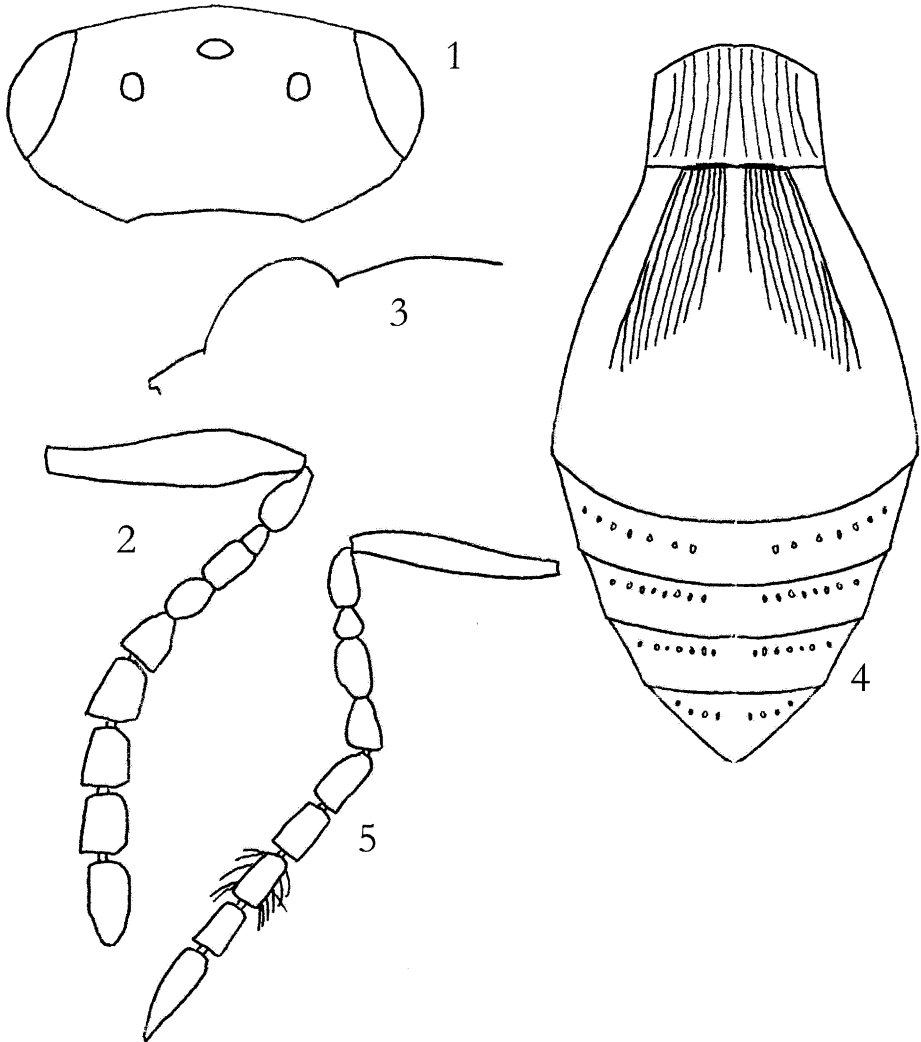
1 female, ex *Contarinia rubicola* Kieffer on *Rubus fruticosus* L. (flowers), emerged 17.iv-16.v.2004.

Comments. *Achillea ptarmica* is the well-known host plant for this species, the single female from *Rubus* is aberrant, large (1.5 mm) with unusually long and pointed metasoma, 1.5 times as long as rest of body, and T5 only 1.25 times as wide as long.

Platygaster verrucosa Kieffer, 1916

14 females, 7 males, ex *Anabremia bellevoeyi* Kieffer on *Lathyrus pratensis* L., emerged 3.v-6.vi.2006, collected ultimo July 2005 and in 2006 from stipule galls. (In 2005 94 reddish yellow larvae assumed to be *Dasineura lathyricola* (Rübssaamen) were present, as well as 7 yellow larvae of *Anabremia bellevoeyi* which is regarded as an inquiline of *D. lathyricola*. In 2006 only 20 yellow larvae were present. No *D. lathyricola* were reared but the wasps could have emerged from these as well as from *A. bellevoeyi*.)

Comments. Types reared from *Anabremia bellevoeyi* on *Lathyrus pratensis* in France but type material lost (Vlug, 1995), the new Danish material therefore described below as a supplement to Kieffer's original short description which answers rather well to the



Figs 1-5. *Platygaster verrucosa* Kieffer. 1, head from above; 2, female antenna; 3, scutellum and propodeum in lateral view; 4, female metasoma from above; 5, male antenna (setation indicated only on A8).

material. The Danish material also runs to *P. verrucosa* in Kieffer's (1926) key, so there is hardly any doubt that this is really Kieffer's species, characterised most importantly by the rather strong punctures with setae on apical tergites.

Redescription. Female. Body length 1.2-1.6 mm. Body black; antennae and legs dark brown; most of fore tibiae, base and apex of mid and hind tibiae, and segments 1-4 of all tarsi lighter brown.

Head from above (Fig. 1) 2.0 times as wide as long, 1.05 times as wide as mesosoma; occiput rather strongly and densely transversely striated; vertex and frons dull, finely reticulate-coriaceous, vertex with weak transverse striation laterally, frons with weak transverse striation in lower half. OOL:LOL = 4:3. Head in frontal view 1.25 times as wide as high. Antenna (Fig. 2) with A1 as long as distance between inner orbits, 0.85 times as long as height of head; A9 1.25-1.33 times as long as wide.

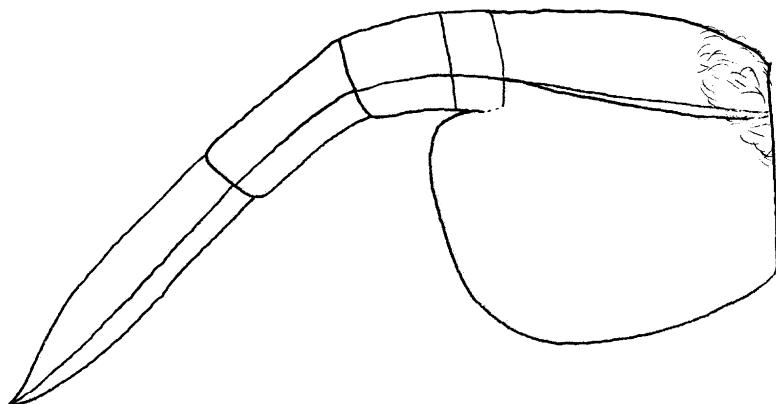


Fig. 6. Metasoma in lateral view of *Synopeas (Sactogaster)* sp. reared from *Contarinia jacobaeae* on *Senecio jacobaea*. The long ovipositor is coiled up in the strongly expanded 2nd sternite when not in use.

Mesosoma 1.33 times as long as wide, hardly higher than wide. Sides of pronotum reticulate-coriaceous (not longitudinally so) all over. Mesoscutum with sparse, scattered setae, dull, finely reticulate-coriaceous (not longitudinally so); notauli finely indicated in posterior two-thirds, missing anteriorly; mid lobe slightly blunt, just touching base of scutellum; scuto-scutellar grooves covered by dense long setae. Mesopleuron smooth, in upper 0.25 with a dull area with longitudinal elements. Scutellum (Fig. 3) evenly convex, smooth and bare along middle, dull and moderately setose towards sides. Metapleuron with dense pilosity all over. Propodeal carinae parallel, area between them smooth and shiny, about 1.7 times as wide as long.

Fore wing about 0.75 times as long as entire body, 2.4 times as long as wide, clear, in apical half with long and rather dense microtrichia; marginal cilia 1/15 width of wing. Hind wing 5.5 times as long as wide, with 2-3 hamuli; marginal cilia slightly less than 0.3 the width of wing.

Metasoma (Fig. 4) about as long as head and mesosoma combined, about 0.9 times as wide as mesosoma. T1 with numerous longitudinal carinae. T2 striated to at most 0.6 of length (striation very weak posteriorly), medially to slightly less than 0.4 of length. T3-T6 each with a transverse row of long setae inserted in rather deep punctures; setae each about 34 µm long, most of them reaching posterior margin of tergite.

Male (hitherto unknown). Body length 1.2-1.3 mm. Antenna (Fig. 5) with A9 1.4 times as long as wide. Metasoma hardly 0.9 times as long as head and mesosoma combined.

A single 1.4 mm long female was reared from a flower head of *Cirsium arvense* (L.) Scop., emerged 13.v.-22.vi.2006. From the flower head were also reared two specimens of *Lestodiplosis* sp. The only European species of this genus on *C. arvense* is *L. cirsii* Barnes which is a predator on the gall midge *Macrolabis cirsii* (Rübsaamen), so one of these two midge species is the probable host of this questionable specimen of *P. verrucosa*. This wasp seems to differ from the specimens reared from *Anabremia bellevoeyi* on *Lathyrus pratensis* only in having fewer punctures with setae on apical tergites (eight on each of T3-T6). It is hypothesized that as with *P. sagana* (cf. above) another host could induce aberrant morphology.

Synopeas (Sactogaster) curvicauda (Förster, 1856)

1 female ex (most probable) *Contarinia solani* (Rübsaamen) in flowers of *Solanum dulcamara* L., emerged 4.vi.2006. (A smaller number of the inquiline *Macrolabis dulcamarae* (Rübsaamen) was also present.)

Comments. Earlier recorded from *Asphondylia conglomerata* Stefani on *Atriplex halimus* L. (Vlug, 1995).

Synopeas euryale (Walker, 1835)

4 females, ex *Dasineura leguminicola* (Lintner) on *Trifolium pratense* L. (flowers), emerged 23.iv.-8.v.2002. (*Lestodiplosis trifolii* Barnes, a predator on *Dasineura*, was also present.)

Comments. Reared from the fungus *Meripilus giganteus* (Pers.) at base of dead *Fagus sylvatica* L. in Germany (Buhl, 2000).

Synopeas ?*hibernicum* Buhl & O'Connor, 2009

1 female ex *Placochela nigripes* (F. Löw) on *Sambucus nigra* (flowers), emerged 15-17.vii.2006.

2 females ex *Contarinia anthobia* (F. Löw) on *Crataegus monogyna* Jacq. (flowers), emerged 28.iv.-7.v.2002.

3 females ex *Contarinia floriperda* Rübssaamen on *Sorbus aucuparia* L. and *S. intermedia* (Ehrh.) Pers. (flowers), emerged 4-9.v.2002.

Comments. Specimens very similar to the two known (caught by sweeping) Irish specimens of *S. hibernicum*, apart from less downcurved metasoma in the Danish specimens. But the Danish specimens as such are clearly conspecific, and they show a remarkable diversity in bionomics.

Synopeas (*Sactogaster*) cf. *millefolii* (Kieffer, 1913)

1 female, ex *Contarinia jacobaeae* (Loew) on *Senecio jacobaea* L. (flowers).

Comments. This species runs to *S. millefolii* in Kieffer's (1926) key. *S. millefolii* was reared from a gall midge on *Achillea millefolium* L. in France, but it is impossible to determine the Danish species with certainty from Kieffer's (1926) description (type material unknown). The shape of the metasoma of the Danish specimen is characteristic (Fig. 6) and sets it apart from the well-known N. European species of *Synopeas* subgenus *Sactogaster*.

Synopeas sosis (Walker, 1835)

1 female, ex *Contarinia rubicola* Kieffer on *Rubus fruticosus* L. (flowers), emerged 17.iv.-16.v.2004. (*C. rubicola* the only possible host.)

Comments. Reared from *Jaapiella veronicae* (Vallot) on *Veronica longifolia* L. (Buhl, 2008).

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