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Observations on host plants and egg laying behaviour in some hoverflies (Diptera, Syrphidae)

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Abstract

Egg laying was observed in *Chrysotoxum cautum, Melanostoma mellinum, Cheilosia chlorus, Cheilosia vernalis, Cheilosia variabilis, Neoascia unifasciata* on different plant species.

Keywords : Oviposition, *Chrysotoxum, Melanostoma, Cheilosia, Neoascia.*

As mentioned elsewhere (ROTHERAY 1993; REEMER & GOUDSMITS 2004), little is known about eggs, egg laying behaviour and early stages of many european hoverflies species. Thus every new observation could be of interest. During the summers 2004 to 2008, we observed the egg laying behaviour of some species in Belgium. On each occasion the females were seen carefully laying one or more eggs on a plant species, than captured to identify them with certainty and a picture was taken of the layed eggs.

***Chrysotoxum cautum* (Harris, 1776)** (Fig. 1). On 30-V-2005 as well as on 30-V-2008, some females were seen flying low above the vegetation of a recently cleared calcareous grassland at Treignes (Viroinval, Province of Namur) and Resteigne (Tellin, Province of Luxemburg) respectively. The weather was quiet but very cloudy. On several occasions the females landed on *Brachypodium pinnatum* blades and deposited isolated eggs on the upper face of the plants, not more than 20 cm high above ground. On one occasion only did a female lay one egg on a *Bromus erectus* blade on 30-V-2008. The picture clearly shows that the egg surface is covered with villosities. These structures were previously called « studs » by CHANDLER (1968). As the eggs of *Xanthogramma citrofasciatum* have almost the same structures on their surface (CHANDLER, 1968), it would not be surprising that these villosities to be in relation with the fact that the larvae of *Xanthogramma citrofasciatum* and probably also of *C. cautum* feed on aphids tended by ants (STUBBS & FALK, 2002). The egg is approximatively 1 mm long. Other previous observations mention grasses and large sedges as host plants for egg laying (STUBBS & FALK, 2002 ; REEMER & GOUDSMITS, 2004), but the grass species is not precised (REEMER, pers. com.).

***Melanostoma mellinum* (Linnaeus, 1758).** On 28-VIII-2004, a gravid female was seen flying slowly across tall herbs in an alkaline *Molinia* grassland at Berg (Kampenhout, Province of Flemish Brabant). The weather was quiet and sunny. The female landed on a *Lysimachia vulgaris* blade, 30 cm above ground. She run on the lower face of the blade where she deposited one single egg, then flew away before been captured. The whole plant was carefully examined but no aphid was found. The nearest plants were also examined but without finding any aphids.

STUBBS & FALK (2002) reported that the larval stages are rarely found at aphid colonies. Some authors (CHANDLER 1968; SMITH 1976 mentioned by GILBERT 1993) have shown that *Melanostoma* species lay eggs on leaves irrespective of wether aphids are present or not. ROTHERAY (1993) and GILBERT (1993) suggest that the larva may be a generalised predator amongst leaf litter.

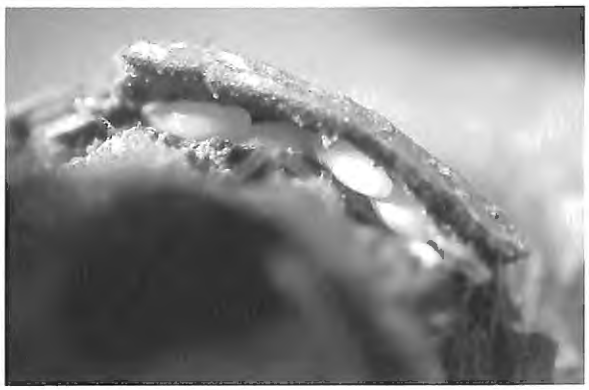
***Cheilosia chlorus* (Meigen, 1822)** (Fig. 2). On 1-V-2005 two females were observed flying between grasses and forbs of a sunny place in an *Alnus* wood, at Renipont (Lasne, Province of

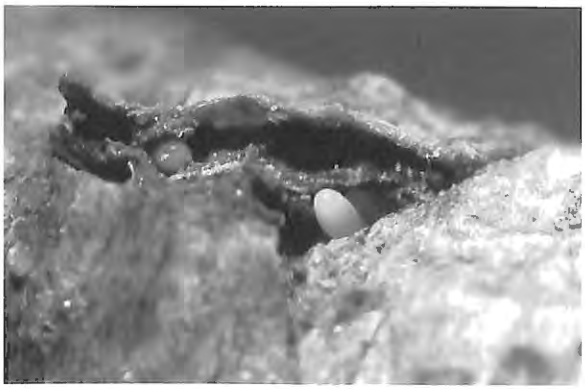
Fig. 1. Eggs of *Chrysotoxum cautum* on the upper face of a *Brachypodium pinnatum* blade

Fig. 2. Egg of *Cheilosia chlorus* on the upper face of *Cirsium oleraceum*

Fig. 3. Egg of *Cheilosia vernalis* on the basal part of *Leucanthemum vulgare*

Fig. 4. Egg of *Cheilosia variabilis* on a basal dead leaf of *Scrophularia umbrosa*





Figs 5-6. Eggs of *Neoascia unifasciata* in cracks of a *Populus* dead twig

Walloon Brabant). The weather was quiet and sunny. The hoverflies landed several times on *Cirsium oleraceum* blades and deposited one or more isolated eggs on the upper face of the basal part (not more than 15 or 20 cm high above ground) of the blades. The eggs are approximatively 1 mm long and their surface is smooth.

Cirsium oleraceum is already known as the host plant (DOCZKAL, 1996 and 2002). Perhaps *C. chlorus* is an exception among the thistle feeders as all records of larval and egg-laying hosts refer to only a single plant species. All other thistle feeders with numerous records have a wider host range. The mention of *Petasites paradoxus* as host plant by KALTENBACH (1874) seems to be an error (DOCZKAL, 1996).

***Cheilosia vernalis* (Fallén, 1817)** (Fig. 3). On 3-VIII-2007, some females landed on the foliage of a *Leucanthemum vulgare* carpet in an abandoned dry meadow at Aisemont (Fosses-la-Ville, Province of Namur). The weather was quiet and sunny. The females soon followed the petiole in the direction of the plant base until they diseappeared for some seconds. They then re-emerged and flied away quickly. One female was captured directly at this moment and another one was captured in the vicinity of the *Leucanthemum* population while feeding on *Achillea millefolium* flowers. We found without difficulties some scattered eggs on the basal parts of the *Leucanthemum* plants (see Fig. 3). These eggs are white, smooth and shiny. Both flies were identified as *Cheilosia vernalis*. To our knowledge this is the first mention of *Leucanthemum vulgare* as host plant for this species. Other known host plants are *Achillea millefolium*, *Camomilla recutita*, *Sonchus oleraceus* and *Tragopogon pratensis* (STUBBS & FALK, 2002). As the variability of some morphological traits and of the host plants suggested it, we could be in presence of a complex of species still to be described. We therefore keep the two flies in our collection for any possible future nomenclatural revision.

***Cheilosia variabilis* (Panzer, 1798)** (Fig. 4). On two occasions in may 2008, a female was seen landing on a *Scrophularia umbrosa* young plant in a marshy bog in Hourpes (Thuin, Province of Hainaut). The animal followed the main stem downwards with the typical elongated abdomen posture until it was lost from view for some seconds due to the lush vegetation. Then the female reappeared not far from the base of the plant and flew off. The first careful search for eggs on the stem of the plant did not bring results. Instead on the second occasion an egg was found on a dead basal leaf of the plant. As far as we know (ROTHERAY, 1993; DOCZKAL, 1996; STUBBS & FALK, 2002) larvae have been found on *Scrophularia nodosa* and *S. auriculata*, but not yet on *S. umbrosa*.

Neoascia unifasciata (Strobl, 1898) (Figs 5-6). This rare species only found from one station in Belgium (VERLINDEN, 1994) was found in 2007 in a marshy bog in Hourpes (Thuin, Province of Hainaut). Most of the animals were captured in a dense *Petasites hybridus* stand together with *Neoascia obliqua*. The presence of these *Neoascia* species together in this kind of habitat was also noted by BARKEMEYER & CLAUSSEN (1986). It is now established that *Neoascia obliqua* is clearly associated with *Petasites* (STUBBS & FALK, 2002) the larvae living in the stem and possibly benifiting of the tunnels of other plant-mining insects as *Cheilosia himantopus* (JENS-HERMANN STUKE, pers. comm.). *Cheilosia himantopus* was indeed present on the Hourpes site. Concerning the biology of *Neoascia unifasciata*, we could not find information in the litterature. On the Hourpes site however we were able to observe on 3 occasions the egg-laying behaviour of the female. On one of these occasions no eggs were found. On the two other ones, the female landed on small dead vegetal elements (leaves, twigs) lying on the ground under the *Petasites* leaves and laid some eggs as not to be directly exposed to the view with her elongated and "searching" abdomen. It is only after having collected and carefully examined the vegetal elements that we found the smooth eggs (< 1 mm) under a fragment or just under the bark of a small *Populus* twig (Figs 5-6). These observations should be continued the next seasons to learn more about the larval cycle of this species. In particular it would be interesting to know if *Neoascia unifasciata* also depends on *Petasites hybridus* for its development or not.

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Diplura of Belgium

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Abstract

A checklist of the Diplura occurring in Belgium is presented and the existing literature about the Belgian fauna is discussed. Thirteen species were found of which five are new to the Belgian fauna: *Campodea meinerti*, *C. plusiochaeta*, *C. remyi*, *C. rhopalota* and *C. wallacei*. An identification key to the Belgian Diplura was developed, which also includes several species that might be expected in Belgium.

Keywords : checklist, identification key, Belgian fauna, diversity.

Samenvatting

Een soortenlijst van de Belgische Diplura wordt voorgesteld en de literatuur over de Belgische fauna wordt bediscussieerd. Dertien soorten werden gevonden waarvan vijf nieuw zijn voor de Belgische fauna: *Campodea meinerti*, *C. plusiochaeta*, *C. remyi*, *C. rhopalota* en *C. wallacei*. Een determinatie-sleutel voor de Belgische Diplura werd opgesteld waarin ook verschillende soorten werden opgenomen die kunnen verwacht worden in België.

Résumé

Une liste des espèces belges de Diplura est présentée et la littérature sur la faune belge est discutée. Treize espèces ont été trouvées dont cinq sont nouvelles pour la faune belge : *Campodea meinerti*, *C. plusiochaeta*, *C. remyi*, *C. rhopalota* et *C. wallacei*. Une clé pour les Diplura belges est donnée dans laquelle nous tenons compte aussi des espèces suspectées de Belgique.

Introduction

Diplura is an order of wingless, blind arthropods belonging to the class of the Entognatha. The habitus of a representative of the genus *Campodea* is presented in Fig. 1. Most Diplura are inhabitants of damp, stable environments and can be found under stones on humid soil, in degrading lodges, in forest litter and in humid soils. Due to their small size, their subterranean lifestyle and the difficulty of their identification, they did not receive much