

- the metabolized biomass during pupal development ranged from 37% (*M. scalare*) to 53% (*Pl. fulviventris*) of the total pupal biomass  
The results are being discussed in respect of various life history strategy hypotheses (reproductive allocation, risk-spreading).

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### Polymorphic mimicry of bumblebees by hoverflies

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A great many of the larger hoverflies appear to mimic hymenopterans, most commonly honeybees, social wasps or bumblebees. While some syrphid species show some variation in colour, this is most marked in bumblebee mimics. In *Merodon equestris* the different colour forms intergrade so it is not always easy to classify an insect into one of a discrete number of distinct morphs. However, in *Volucella bombylans*, *Criorhina berberina* and *Criorhina ranunculoides* the morphs are distinctive and appear to mimic particular species (or groups of species) of *Bombus*. Is there any evidence that these polymorphic species benefit from having two or more distinctive mimetic morphs?

A survey is proposed to test this hypothesis involving collaboration with colleagues throughout Europe.

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### Responses and adaptations of *Episyrphus balteatus* to allelochemicals from Brassicaceae plant through their preys

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Brassicaceae species are cultivated as vegetable or oilseed plants and are known to contain secondary substances (glucosinolates) which are transformed in volatile compounds (mainly nitriles and isothiocyanates) when the plant is damaged. Allelochemicals from plants play a major role in the host plant localisation and selection by herbivore insects. Moreover, the effects of these chemical compounds are not limited to the second trophic level. Indeed, they influence the nutrition choice of herbivore insects but also the biology and the behaviour of crop pest natural enemies. It is

the reason why the determination of the herbivores - natural enemies relationships must be integrated in tritrophic models including the host plant. The aim of this work was to describe the interactions between Brassicaceae plants, aphids and their predators. Two pest species, the cabbage aphid (*Brevicoryne brassicae* L.) and the generalist (*Myzus persicae* Sultzer), both reared on crucifers were used to feed the aphidophagous hoverflies, *Episyrphus balteatus* DeGeer. An other predator, *Adalia bipunctata* L. was studied to compare the different adaptations of both beneficial insects to the allelochemicals from plants through the aphid preys. The use and the choice of biological control agent are discussed in term of integrated pest management strategies and efficacy.

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### **Evaluation of the presence of some aphidophagous hoverfly species in Belgium over the last 7 years**

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Adults of many species belonging to the Syrphinae subfamily are important pollinators while the larvae are aphid predators. Some species as *Episyrphus balteatus* (De Geer) have been the subject of numerous studies and can be used as biological agent even if the effectiveness of the aphidophagous syrphids depends on the climatic conditions and the aphid colony abundance. The knowledge of Belgian hoverfly species was summarised by Verlinden (1994). It presented the geographical distribution of 320 species throughout the country. In this paper, we focused on predator species from some genus (*Episyrphus*, *Syrphus*, *Metasyrphus* and *Dasysyrphus*). To assess the distribution evolution of these hoverflies, individuals from the Gembloux Agricultural University collection (caught during the 7 last years) were examined and identified. The presence of the studied species mainly in the south part of Belgium (Wallonie) was discussed in relation to their potential impact in integrated pest management against aphid species.

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### **Studies of the biology of the Syrphidae over the last century**

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