

# Hymenopterous parasitoids of codling moth: Performance of their ecosystem service in the matter of plant protection - an overview

Helen Pfitzner and Annette Herz

Julius Kühn-Institut, Institute for Biological Control, Darmstadt

E-mail of corresponding author: [helen.pfitzner@julius-kuehn.de](mailto:helen.pfitzner@julius-kuehn.de)

During the last years, codling moth (*cydia pomonella*), a key pest in apple, became resistant to several plant protection products. Therefore it is of particular importance to search for alternatives or additional plant protection strategies. Here we focus on the ecosystem service provided by hymenopterous parasitoids in pome fruit production. The aim is to develop strategies for practical and sustainable use of functional biodiversity. Therefore basic knowledge on abundance and diversity of hymenopterous parasitoids in different regions, their food web interactions and temporal occurrence as well as their basic biology is necessary.

For getting information about the actual status of biodiversity in apple orchards samples have been taken in three main apple growing regions which are located in North, Centre and South of Germany. In all regions arthropod sampling took place in plantations of integrated and organic production and additionally in orchards without any plant protection measure.

There was taken an analysis of occurrence of parasitoids and other insects during the growing season 2015, 2016 and 2017 using methods as sweeping net, beating sampling, collecting attacked apples, installing and again collecting corrugated cardboard. These data were used to detect diversity and abundance of hymenopterous parasitoids of all developmental stages of codling moth in all management systems and regions.

To monitor the natural hatch of Parasitoids, an 'outdoor insectarium' has been installed comprising eclectors which contained all collected corrugated cardboards of one growing season. These data will give us the opportunity to give advice to practitioners regarding a gentle plant protection management and to realize parasitoids' full potential.

Selected parasitoids which hatched during the season were used to establish rearings for further investigations on their biology, interaction and reaction on plant protection strategies.

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