

Botanical Origin and Share of Agricultural Crops in Honey During One Growing Season in Estonian Beehives - Abstract

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Summary

In last decades, concern about the health of pollinator and their provided pollinating service is grown exceptionally. Most prevalent concern is the decreasing number of honeybee colonies, reported by beekeepers. Main stressors that can lead to the loss of colonies are considered to be: use of pesticides, loss of habitat, decrease in diverse food sources and also pathogens. Often the real cause of colony loss, is not clear, which means the reason lies in combination of different factors. Factors that individually would have not caused the lethal outcome. Due to intensive agriculture in most regions honeybees are managed, natural pollinators, managed bees and other organism have had to adapt to new food sources and living conditions. Mixed food sources honeybees are dependent both, on natural landscapes with natural forage plants and agricultural landscapes with concentrated agricultural plants. Critical aspect for beekeepers, to achieve maximum honey production is the selecting the best location for the season, for their colonies. Natural nectar sources are ensuring constant food source through the foraging season. Agricultural crops in the other hand are proven to be the dominant source of honey for many Estonian honeybee colonies. This means, beekeepers have to communicate with the farmers to choose the best location for their colony groups. Certain agricultural crops are considered to be good forage plants, and attractive to pollinators. This study will give an overview of the pollen sources that occurred in the honey across Estonian honeybee colonies in the summer of 2021. Study is based on honey samples collected from 60 different colonies, in June, July and August. Data about crops in agricultural land use is provided by ARIB (The Agricultural Registers and Information Board). This gives a overview of changes in food sources through the foraging season. Also giving insight on the attractiveness of agricultural crops in the sense of effort and reward taking into account the distance and size of the visited fields. These results can be used by beekeepers to adjust their colony group placement in certain landscapes to ensure maximum potential for honey production and also to assess risks accompanied by crops in the area with intense use of potentially dangerous agrochemicals. For the farmers, this study will be a good indicator of, which crops are pollinated and does the communication between the farmer and beekeeper is enough to provide sufficient pollination for their crops. First results show that agricultural crops were present in the pollen in all three months of sample collection. Average percentage of agricultural crops were highest in June and July, when rapeseed *Brassica napus* was the dominant culture, present in more than 20 samples with the 53% average of all the pollen detected in these samples. Also, buckwheat (*Fagopyrum esculentum*), clovers (*Trifolium L.*) and horticultural crops were present in the sampled honey. Results show that not all agricultural crops, considered attractive foraging crops in close proximity of colonies, would not necessarily be present in the honey. Or are present, but the amount of pollen is not proportional with the distance and size of fields with observed crops. Attractive and productive field crops for the honeybees are considered to be: California bluebell (*Phacelia tanacetifolia*), Sainfoin (*Onobrychis viciifolia*) Honey clover (*Melilotus albus*) Fodder galega (*Galega orientalis*) White clover (*Trifolium repens*),

Proceedings of HAICTA 2022, September 22–25, 2022, Athens, Greece

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CEUR Workshop Proceedings (CEUR-WS.org)

Buckwheat (*Fagopyrum esculentum*), Rapeseed (*Brassica napus*), Alfalfa (*Medicago*) Pink clover (*Trifolium hybridum*), White mustard (*Sinapis alba*), Red Clover (*Trifolium pratense*).

Keywords

Pollinators, pollen, land use, floral resources, honeybee