

Double trouble! Tank mix of thiacloprid and EBI-fungicide - field study on effects on honey bees

Nadine Kunz¹, Abdulrahim Alkassab^{1,2}, Wolfgang Kirchner² and Jens Pistorius¹

¹Julius Kühn-Institut, Institute for Bee Protection, Braunschweig

²Ruhr University Bochum, Faculty of Biology and Biotechnology, Bochum

E-mail of corresponding author: nadine.kunz@julius-kuehn.de

In a series of laboratory experiments on tank mixtures of plant protection products (PPPs), strong effects on the mortality of adult honey bees were observed when they were exposed to a mixture of prochloraz (ergosterol-biosynthesis-inhibiting (EBI) fungicide) and the neonicotinoidal insecticide thiacloprid. Our aim was to investigate, whether effects on mortality on single bees from laboratory studies will result in adverse effects on bee colonies in a field realistic scenario.

In the field study, the recommended application rate (tank mixture of 72 g thiacloprid/ha (BISCAYA®) and 675 g prochloraz/ha (MIRAGE 45 EC®) was applied on flowering phacelia during bee flight. Four honey bee colonies were placed next to each field with 2 control fields and 2 tank mix fields in a paired setup. The fields were located in two federal states (Lower Saxony and North Rhine Westphalia) in Germany. Several parameters like adult mortality, flight activity and colony development of three colonies were investigated. The fourth colony was used for residue analy-

sis in different matrices (forager bees, nectar, pollen, honey, bee bread).

Our results showed adverse effects on adult mortality and flight activity. At colony level, a slight reduction in the number of adults per colony compared to the control was found as well as a decrease of the brood area in the treatment groups in both setups. The results from the residue analysis are pending.

As EBI-fungicides are known to affect the mechanisms of detoxification in honey bees when combined with pyrethroid insecticides, this seems to apply for the combination with the neonicotinoidal insecticide thiacloprid, too. Therefore, the results suggest that this mixture poses a possible risk to foraging honey bees and colonies under field conditions when applied during bee flight when bees are actively foraging. Further studies on the magnitude of the effects including the risk on bumble bees and solitary bees will be conducted in 2018; furthermore, the effectiveness of further risk mitigation measures, such as restriction to application after daily bee flights, will be investigated.