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ABSTRACT BOOK

three treatment groups (N=6), one of which served as the untreated control. The other groups received respectively one Api-Bioxal administration, and three ApiHerb administrations one week apart.
Twenty-five old workers were sampled from each colony pre- and post-treatment. q-PCR was used to measure N. ceranae abundance in the individual bees through sequences of the Hsp70 and 16S rRNA genes.
The Hsp70 method resulted in significantly lower abundance. This is compatible with the nature of the 16S rRNA gene, which may be present in multiple copies in the N. ceranae genome. On average, the treated groups exhibited a decreased N. ceranae abundance, which was not detected in the untreated colonies. The reduction ranged three to four orders of magnitude, depending on the q-PCR method that was used. Besides, at the post-treatment sampling, some of the ApiHerb treated colonies failed to show infected by N. ceranae.
The results above are in line with previous findings on oxalic acid and ApiHerb. If confirmed by further trials, they may indicate a way to control N. ceranae infections by an environmentally sound approach.

[P.19.490] Understanding the differential hygienic behavior towards drone brood in *Apis mellifera* colonies from Argentina

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Brood diseases of *Apis mellifera* colonies constitute a main problem of beekeeping worldwide. Worker bees display a social health mechanism that consists in detecting, uncapping and removing dead or diseased brood from the hive: the hygienic behavior (CH). These activities are induced by olfactory cues and have been described as associated to hygiene of brood parasitized by Varroa destructor. This mite have preference for drone brood, but the efficiency of CH towards their cells is significantly lower compared with cells of worker brood, being left uninspected by workers. Some authors suggest that a possible cause of the CH differences is due to the cell wax cap of drone brood (thicker than worker cells) acting as a barrier to volatile compounds and obstructing disease detection. The aims of this research were to study the differential CH towards worker and drone brood belonging to highly hygienic colonies from Argentina, and to explore the importance of drone cell wax cap as an interfering factor in the transmission of chemical signals. To this end, removal percentages of pin-killed worker and drone brood were recorded and an innovative cell wax cap exchange was implemented in three different treatments: pin-killed worker pupa with a healthy drone cell wax cap; a healthy worker pupa with a pin-killed drone cell wax cap; and a healthy worker pupa covered with a healthy drone cell wax cap (control). Results showed a greater removal towards worker cells than drone cells. For the cell wax cap exchange experiment, we found that the removal of pin-killed worker pupae covered with healthy drone cell wax cap was significantly high, while the removal of healthy worker pupae covered with pin-killed drone opercula was low. These preliminary results confirms a differential behavior between both type of brood cells and suggests that the cell wax cap of drone brood is not interfering the detection of chemical compounds from the diseased brood by worker bees, regardless the thickness. This work contributes to a better understanding of the detection activity of different types of diseased brood and provides information useful to control strategies of varroosis and other brood diseases.

[P.19.491] Formic acid treatment against Varroa destructor in *Apis mellifera* colonies: Effects on mite mortality and brood

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Formic acid is widely used to control Varroa mites (Varroa destructor) in conventional and organic beekeeping. Despite its intensive use, many key parameters of this active ingredient are still unclear, including its pharmacodynamics and the effect of environmental conditions on treatment efficacy. Inefficient treatments may lead to colony losses and a thorough understanding of its mode of action under field conditions is therefore required.
We tested commercially available dispenser systems differing in the amount of formic acid applied and in the duration of formic acid evaporation in the hives at different weather conditions. Our results show, that long-term application of high amounts of formic acid (average of 406 g formic acid for 12 days in a hive with a volume of 75 L) showed the highest efficacy, but also affected the brood and the brood rearing activity in the colonies at elevated air temperature, even though it had no long-term effect on colony survival and colony strength in spring. We could demonstrate that formic acid affects also mites in capped brood cells, but this effect was small. Ambient air temperature and relative humidity had no effect on formic acid evaporation in the hive.