P051 Neonicotinoids decrease sucrose responsiveness of honey bees at first contact

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Neonicotinoid insecticides are known to have harmful effects on the behaviour and physiology of many insects. Through pollination services, honey bees are exposed to these insecticides in pollen and nectar. Impaired navigation and decreased foraging activity are some of the negative effects reported for neonicotinoids. We exposed caged foragers to sublethal acute doses of three neonicotinoids (clothianidin, imidacloprid, and thiamethoxam) and tested them individually for sucrose responsiveness. We also tested the effect of a range of sucrose solutions laced with neonicotinoids on bees previously unexposed to neonicotinoids, to mimic the situation where foragers would first encounter poisoned nectars varying in sugar concentrations. Thus, bees were exposed to the insecticides either in the diet fed to caged foragers for 24 hours before testing or in the test solutions used to measure sucrose responsiveness, or both. We report a detrimental effect on honey bee responses to mid-to-high sucrose concentrations under all experimental conditions. Previously unexposed bees displayed unexpectedly low responses to the higher sucrose concentrations tested. This attenuation of sucrose response is further evidence that neonicotinoids are multisensory disruptors, with potent actions at first contact, against pollinators and other beneficial insects.

P052 Effects of neonicotinoid insecticide exposure on nest-founding bumblebee queens

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Bumblebees are among the world's most important groups of pollinating insects in natural and agricultural ecosystems. Each spring, queens emerge from overwintering and initiate new nests, and the success or failure of these efforts shapes the spatial patterning and abundance of pollination services by workers later in the season, as well as bumblebee population dynamics and persistence along greater timescales. Here we present the first laboratory experiment with the model bumblebee species Bombus impatiens that explores how early nesting success is impacted by the effects of temporary or more chronic exposure to sublethal levels of a neonicotinoid-type insecticide (imidacloprid at 5 ppb in nectar) one factor that have been previously implicated in bumblebee decline. We found that queens exhibited increased mortality and dramatically reduced activity levels when exposed to imidacloprid, as well as delayed nest initiation and lower brood numbers in the nest, but partially recovered from these effects when they only received early, temporary exposure. These findings speak to the sensitivity of queen bumblebees during the nest initiation phase of the colony cycle, with implications for how queens and their young nests are uniquely impacted by exposure to threats such as pesticide exposure.

P053 Monitoring of honeybee colonies exposed to pesticide contamination in apple orchards and vineyards by means of Melixa systems

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The study of pesticides effects on honeybees is a crucial topic in the current research on honeybee decline. Frequently the estimation of these effects is difficult in particular in the field. Since many crop protection products do not produce evident signs in the hives, their effects can only be verified by measuring the adult bees' population, the presence and

the persistence of brood, colony food stocks and honey production into honeybee colonies. This monitoring, as well as being very time consuming, requires precise environmental conditions to be done and often the controls between different stations occur at too long a time distance. For this reason, it was decided to adopt Melixa Systems as tools to evaluate if the data relative to the flight activity and the weight of the honeybee colonies can equally provide an effective image of the development of the colonies, in relation to the presence or absence of contaminants in the main matrices of the hive: wax, pollen and honey.
Melixa Systems are electronic monitoring devices applied to hives and they may offer an important support in this kind of experimentation, recording and transferring to the pc the following remoting information:

1. Flight activity in relation to weather conditions
2. Trend of the honeybee colony weight in relation to weather conditions

Two parallel field experiments were conducted, during 2018, to evaluate the effects on bees of the exposure to crop protection products in two different agricultural environments: apple orchards and vineyards. Small apiaries were made up in three different vineyards and in three orchards, all in Trentino (Northern Italy). In every apiary, three Dadant Blatt hives were equipped with Melixa System and simultaneously other hives were used to collect wax, honey and pollen loads. The analysis of both residues on hives matrix and the data obtained by Melixa Systems, allowed the evaluation of the health state of the colonies and, in case of contaminations, the severity of the colony impairment.

P054 Effects of pesticides on walking behavior of *Apis mellifera*

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Different pesticides are known to influence honeybees´ physiology and behavior. Furthermore, there is growing concern that multiple pesticides display more severe effects than assumed when added up independently. Yet understudied are the effects of pesticides on walking behavior of honey bees, although this can be well assessed in laboratory environment.
Presenting preliminary results, we show that pesticides in sublethal concentrations affect honeybees walking behavior especially when combined. We orally administered insecticides and acaricides (thiacloprid, clothianidin, flumethrin, amitraz, coumaphos, tau-fluvalinate and lambda-cyhalothrin) and tracked walking distance, velocity and patterns for 60 sec 30 and 60min after the administration, using a round glass arena and video recordings. Compared to control groups, honeybees that ingested pesticides displayed a variety of behavioral changes, which will be presented in the poster. Amongst them are changes in walking distance and altered walking patterns. Other impacts of pesticide treatment such as diarrhea, tremor and hyper excitation were also observed.
So far, our results present a variety of impairments by single and mixed pesticide administration, with varying effect durations. With our results we hope to provide a better risk assessment of interacting effects and multi-factorial damage to individual honeybees and hives by pesticides in the future.

P055 Impacts of nutrition on the bumblebee's sensitivity to pesticides

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With ~2.000 species currently recorded in Europe, bees are a highly diversified and efficient group of pollinating insects. Their decline could therefore lead to a risk for ecosystems functioning and crop yields. The drivers of this decline have been well documented in Europe, specifying multiple factors such as pesticides, pathogens, poor nutrition or climate change. Moreover these factors can potentially interact synergistically. For exemple, how organisms deal with