European Crop Protection

Non-Apis *(Bombus terrestris)* versus honeybee *(Apis mellifera)* acute oral and contact sensitivity – Preliminary results of ECPA company data evaluation

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INTRODUCTION

A preliminary data evaluation was conducted by ECPA companies to compare the sensitivity of bumblebees *(Bombus terrestris)* with the sensitivity of honeybees *(Apis mellifera)*.

MATERIALS AND METHODS

For the evaluation 75 data sets were available for acute contact exposure and 52 data sets for acute oral exposure. The data sets for adult worker bee toxicity of *B. terrestris* and *A. mellifera* comprised fungicides, herbicides, insecticides in about equal numbers plus a few other substances. The data evaluation used all available contact and oral LD50 values (in terms of a.s./bee), including LD50 endpoints higher (">") than the tested dose. To analyze the sensitivity of bumblebees versus honeybees the ratio of the honeybee LD50 value divided by the bumblebee LD50 value for each substance was calculated and plotted.

RESULTS AND DISCUSSION

The ratios of the honeybee LD50 values divided by the bumblebee LD50 values are given for the acute contact and oral toxicity tests in Figure 1 and 2, respectively.

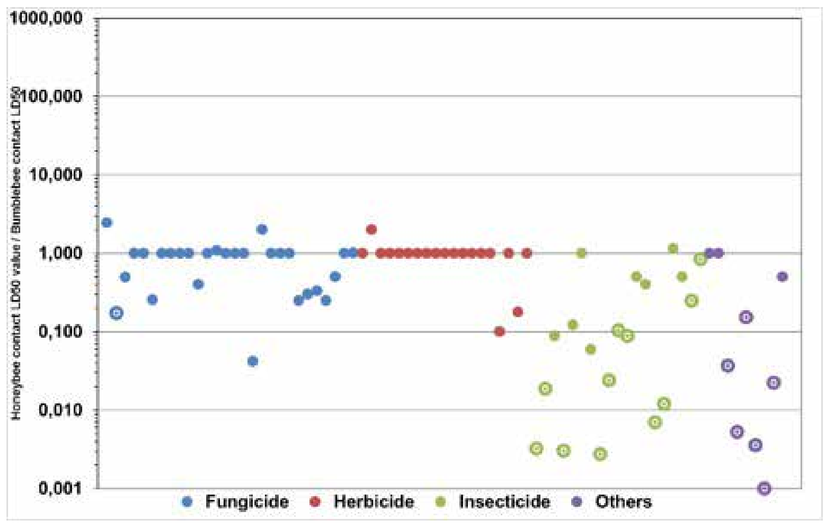

Figure 1
Ratio of honeybee contact LD50 divided by bumblebee contact LD50 value (Large bullet points represent ratios based on discrete LD50 values for both, honeybees and bumblebees)

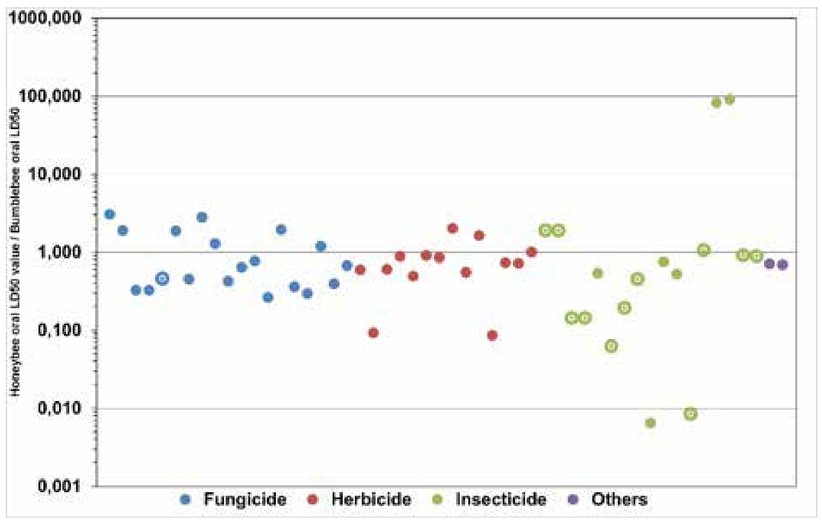

Figure 2
Ratio of honeybee oral LD50 divided by bumblebee oral LD50 value (Large bullet points represent ratios based on discrete LD50 values for both, honeybees and bumblebees)

The data evaluation of acute contact LD50 values indicates lower or similar contact sensitivity of bumblebees vs. honeybees (Figure 1). Where there was no toxicity observed and the endpoint was the same maximum dose tested in both cases, the ratio was 1:1. For 18 (and 11 of those were insecticides) of the 75 acute contact LD50 data sets, discrete LD50 values were determined for both honeybees and bumblebees. For all of those 18 data sets the ratio of honeybee contact LD50 values divided by bumblebee contact LD50 value was lower than one, demonstrating that honeybees were more sensitive to the test substances than bumblebees.

Similarly, lower or similar oral sensitivity of bumblebees vs. honeybees was determined (Figure 2). Where the endpoint was the maximum dose tested, a ratio of 1:1 was rare because the endpoint is adjusted according to actual dose consumption. For 12 (and 11 of those were insecticides) of the 52 acute oral LD50 data sets, discrete acute oral LD50 values were determined for both honeybees and bumblebees. Only for one insecticide higher acute oral bumblebee sensitivity compared to honeybees was determined (for two different formulations). For this insecticide, higher tier semi-field data with *B. terrestris* is available and results do not indicate any negative impact on bumblebees or their colony development at the maximum intended use rate.

CONCLUSIONS

Overall, the ECPA company data evaluation indicates that bumblebees are not more sensitive than honeybees.