4.10.P Development and validation of a bumble bee adult chronic oral test

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Abstract

The regulation of pesticide uses is based on the local Risk Assessment frameworks, including a specific framework for pollinators. These frameworks rely on data from honey bee toxicity in a three-tiered process, from laboratory to semi-field to field settings, and exposure estimates based on application rates or refined via residue levels in nectar and pollen. In recent years, concerns about the risk to other bees such as bumble bees have been the driver for the development of new methods to address toxicity and exposure with selected surrogate species. Here, we present the results from the second international ring test for a bumble bee adult chronic oral test. Nine European laboratories conducted the 10-d test with *Bombus terrestris* workers while 3 US laboratories conducted the test with *B. impatiens*. Along with biological observations and consumption measurements, the stock solutions and feeding diets were confirmed for the concentration of dimethoate. There were 5 and 7 dimethoate test levels for the European and US ring test, respectively. The LC_{50} endpoints derived from these tests were on average 0.468 and 0.258 mg a.s./kg of diet for *B. terrestris* and *B. impatiens*, respectively. Similarly, the LD_{50} endpoints derived from the tests were on average were 0.093 and 0.032 µg a.s./bee/d for *B. terrestris* and *B. impatiens*, respectively. Our results indicate the test design is robust and replicable, and after a two-year effort, a validation report is in preparation to initiate the process to develop it into an OECD Guideline document.

4.11.P Method development for a larval test design for the solitary bee *Osmia cornuta* - First experiences with different larval pollen provisions

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Abstract

The important role of bees for the pollination of agricultural crops is widely acknowledged. Besides the honey bee, other pollinators like bumble bees and solitary bees are used to support pollination services. Therefore, it is particularly important to understand the biology of these species to assess the potential exposure of managed non-*Apis* bees to plant protection products. Several initiatives support the development of new test methods for solitary bees. To gain a better understanding of the development of solitary bee larvae, we performed an experiment with the aim to develop a standardized larval test design for the solitary bee *Osmia cornuta* by combining semi-field and laboratory methods. To obtain a sufficient number of eggs of *O. cornuta*, adult bees in a colony size of 1250 individuals (sex ratio females:males 1:1,5) were established under confined conditions in oilseed rape. Nesting tubes with eggs and newly emerged larvae were transferred to the laboratory. Eggs and young larvae were carefully taken out of the nesting tube and transferred into 48-well culture plates either together with the pollen provision or without the pollen provision to artificial pollen provisions. The plates were checked daily for larval mortality. At the end of the larval period, the numbers of cocoons and offspring were assessed. The pupation rate of *O. cornuta* larvae was constantly high between 85 and 95% irrespective of the food source and the amount of food. There was no difference between the treatments: Oil seed rape pollen from nesting blocks, artificial pollen mix with 25 % sugar solution, artificial pollen mix with 15 % sugar solution, artificial pollen mix with 30 % Api-Invert. Even so, the hatching rate of *O. cornuta* was high, between 85 and 100%, the sex ratio was shifted towards an excess of male bees. This might reflect the artificial rearing conditions in a "semi-field" design and needs further method improvement and standardization.