

Side Effect testing on bumblebees (*Bombus terrestris*)

Biobest Green Lab

Specialized research facility for side-effect and compatibility testing
of chemical and biological control agents



Introduction



Green Lab side effect research on bumblebees is mainly focusing on laboratory and semi-field testing. As a first step, products are screened on their compatibility with bumblebees according to small scale laboratory trials. Due to a continuous exposure to the compound, severe conditions are created for the adult bumblebees and their brood. The outcome of such trials will indicate whether a compound is completely compatible or not.

When a compound turns out to be toxic, moderately toxic or slightly toxic, further steps towards greenhouse semi-field or field trials might mitigate the impact of the compound on the bumblebees. As such commercial conditions are mimicked whereby parameters like pollination activity and hive development are observed.

Information about the mode of action, the persistence, the efficacy, ... of the test compound is crucial to create a protocol that contributes to the intended results. Protocols are compiled and discussed in cooperation with the outsourcing company.

Laboratory trials on the bumblebee *Bombus terrestris*

Dermal / Oral toxicity



- Trials are performed in climate rooms
- Small bumblebee colonies will be created, starting with 5 workers of the same age
- Every object (treatment) consists of 8 individual colonies (replicates)
- Different application methods: dermal, oral via sugar water or oral via pollen
- Feeding of sugar water and pollen ad libitum
- Observations on: direct toxicity, possible sub-lethal effects and brood development
- Duration of the trial for dermal applications only: 3-4 weeks
- Duration of the trial for oral applications: between 10 and 15 weeks

Greenhouse Semi Field trials on the bumblebee *Bombus terrestris*

Direct spray or residue trials



- Trials are performed in separate screen cages
- It is possible to choose the relevant crop type
- Per screen cage a sufficient number of flowering plants of the relevant crop type are used
- Plant parts are treated in an optimal way (persistence tests are also possible)
- Per screen cage one bumblebee hive is used, with a small brood to avoid over pollination
- Only hives with equal flight activities are used (selection based on preliminary countings)
- Replicates (several screen cages per treatment) are recommended
- Parameters recorded include flight activity and brood development
- Duration of the trial: max 4 weeks

Greenhouse Field trials on the bumblebee *Bombus terrestris*

Direct spray or residue trials



- Trials are performed in separate greenhouses
- It is possible to choose the relevant crop type
- Greenhouses are filled with flowering plants of the relevant crop type
- Plant parts are treated in an optimal way (persistence tests are also possible)
- Per greenhouse one bumblebee hive is used, with a small brood to avoid over pollination
- Only hives with equal flight activities are used (selection based on preliminary countings)
- Parameters recorded include flight activity and brood development
- Duration of the trial: 4-6 weeks