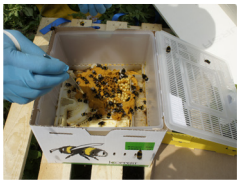
STRONGER TOGETHER

Honey and Bumble Bee Semi-Field Tests



Welcome To Eurofins Agroscience Services

Our experience ranges from standard studies where we evaluate the acute toxicity of a test item applied to an attractive crop through to special studies where we can evaluate, for example, possible risk to the honey bee brood, sublethal effects on bees and residues in bees and their products. Our flexible tunnel tent system, allows us to erect tents covering a crop area up to 200 m².

Honey Bee Standard Semi-Field Tests

In accordance with OEPP/EPPO Guideline No. 170 and EFSA Guidance document, *Phacelia* or rape is used as the test plant in standard semi-field tests. In one trial, several parameters such as flight activity in the crop, mortality of the bees in the crop and in front of the hives, and the conditions of the colonies and brood development before and at the end of the exposure period are recorded. The test design includes different treatments (test item, control and reference item) with several replicates per treatment. Additionally we conduct semi-field studies in wheat (simulation of honeydew) and *Phacelia* according to the French CEB guideline.

Semi-field studies, are also called tunnel tests. The crop area covered by each tunnel tent is at least 80 m² with one bee hive placed in each tunnel. In such studies, the honey bee exposure to a treated crop is checked under comparable conditions for the different treatment groups within one test. As standard, bee flight, bee mortality, behaviour and the condition of the colonies are assessed. In addition, collection of flowers, hive products and/or foraging bees can be done for residue analysis.

Portfolio

- Standard studies according to EPPO and EFSA Guideline No. 170 (each tunnel contains a minimal crop area of 80 m²; several replicates per treatment; assessments: flight activity in the crop, behaviour of the bees, mortality of the bees in the crop and in front of the hives and the conditions of the colonies and brood development before and at the end of the exposure period). Test item can be applied as spray application (after and during bee flight), coated seeds, dust appliaction or via drip irrigation
- Simulation of aphid honeydew on wheat (according to CEB draft Guideline No. 230), (each tunnel contains a minimum crop area of about 100 m²; one replicate per treatment, daily feeding of bees by artificial honey dew (via spraying sugar syrup), assessments: flight activity in the crop, behaviour of the bees, mortality of the bees in the crop and in front of the hives and the conditions of the colonies and brood development before and at the end of the exposure period)
- Coated seeds – effects of guttation (observation of bees collecting guttation droplets from emerged plants before flowering in tunnel tents, assessments of mortality, flight activity in the crop and bee brood development, in addition collection of guttation droplets for residue analysis)

Honey Bee Semi-Field Tests - Relevant Crop

Besides the parameters assessed in standard studies (mortality, behaviour, flight activity in the crop and colony development) additional assessments are included in brood semi-field studies performed according to the OECD guidance document number 75. Special attention is drawn to the evaluation of the condition of the colonies and the bee brood development. For this purpose, cells containing eggs and/or young and old larvae are marked and development of these is assessed. The evaluation of data is performed using Hive Analyzer®. The assessments are carried out frequently over a period of approximately one month after treatment to evaluate acute and possible delayed adverse effects of a test item on the honey bee colony. The observation can be extended up to spring of the following year, if requested.

Bumble Bee Semi-Field Tests

Bumble bees play an important role as pollinators in horticulture worldwide. They form part of the modern concept of Integrated Pest Management in greenhouse crops. Therefore, we need to address the issue of ensuring compatibility between plant protection measures with beneficial insects. PPPs applied on crops under greenhouse conditions (e.g. tomatoes) have to be safe for bumble bees (*Bombus terrestris L.*), which are intrinsic to pollination.

Eurofins Agroscience Services performs laboratory and greenhouse studies to evaluate the possible risk of a plant protection product to bumble bees. Our experience ranges from standard studies where we evaluate the acute contact and oral toxicity of a test item in the laboratory, to semi-field studies where we evaluate the possible risk to bumble bee colonies, sublethal effects and residues in bumble bees and their products.

Laboratory Bumble Bee Tests

Laboratory tests can also be performed based on the OECD guideline No. 213 and No. 214, assessing the effects of PPPs to bumble bees (*Bombus terrestris L.*). For the contact toxicity test the equipment and method used for the honey bee laboratory test can be used whereas the oral toxicity test has to be adapted to the biology of bumble bees. Due to the absence of trophalaxis, group feeding is not possible and acute oral toxicity has to be determined by individual feeding of single bumble bees.

Greenhouse studies in Spain and Italy

Eurofins Agroscience Services performs semi-field studies with bumble bees (*Bombus terrestris L.*) in commercial greenhouses in Southern Spain or Italy. The objective of these studies is to evaluate the side effects of the test item after application during the flowering period and high activity of the bumble bees. Where residual effects are expected, bumble bees can be introduced after a certain waiting period following application. Test items can be applied by drip irrigation system and / or by foliar application. During a trial, several parameters such as flight activity in the crop, mortality of the bumble bees in the crop / inside the hives and the conditions of the colonies and brood development before and at the end of the exposure period are recorded. The test design includes different treatments (test item, control and reference item) with several replicates per treatment and a crop area (e.g. tomato) of up to 400 m² per treatment replicate.

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The Agroscience Group offers unparalleled expertise to the crop protection industry; with over 750 staff globally and more than 80 fully owned facilities across 25 countries, we are committed to developing and growing in order to meet the needs of the Agroscience industry.

Eurofins Agroscience Services Group

easinfo@eurofins.com
www.eurofins.com/agroscienceservices