

### 3.7 Set-up of tunnel trials: Importance of technical background for the outcome of a study

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Other than open field studies with several bee hives standing at and foraging on the same field, tunnel (semi-field) trials with numerous tunnels and one bee hive per tunnel (e.g. EPP0 170(4), OECD Guidance Document No. 75) are the only field-studies with true, i.e. statistically independent replicates. Thus, uniformity of the tunnel tents in any detail is highly important and should be considered already when building the tunnels.

One of the main endpoints of tunnel trials is the honeybee mortality assessed on the linen sheets which are spread in the crop area of each tunnel. Slight differences in the details of the tunnel layout (e.g. imprecision in overall tunnel area, in size and placing of the linen sheets as well as their partial overlapping by the gauze covering the tunnels) may result in remarkable differences of the number of dead bees found on the linen area.

Only exactly measured plots ensure homogeneous spray area, equal amount of sprayed solution within the replicates and exposure of the honeybees to the treated crop and comparability of the data collected.

Eurofins Agrosience Services has improved the system of construction over the past years in order to standardise the process and to exclude avoidable differences between tunnels. By providing exactly measured plots with stable framework, using specific and modified machines, offering appropriate field plots, preventing the escape of honeybees and damage of the crop.

Statistical power during data analysis may be increased by increasing the number of replicates (tunnels) within a study. Since the temporary installation of the tunnels is a challenge in terms of material logistics and amount of work, we have developed some sophisticated tools in order to facilitate and speed up the construction of these tunnels.



**Photo 1** Furling of gauze, 20m /40m long, 3 times faster and more comfortable than by hand



**Photo 2** Hilling up soil by tractor with a modified ridge hilling machine

## References

- OECD Guidance Document No. 75 (2007): Guidance Document on the Honeybee (*Apis mellifera* L.) Brood Test under Semi-Field Conditions. OECD Environment, Health and Safety Publications, Series on Testing and Assessment No. 75, ENV/JM/MONO(2007)22.
- OEPP/EPPO (2010): Efficacy evaluation of plant protection products – Side effects on honeybees. OEPP/EPPO, PP 1/170 (4), EPPO Bulletin 40, 313-319.

## 3.8 'Focal species' – can this well-known concept in higher-tier risk assessments be an appropriate approach for solitary bees?

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### Abstract

Bumble bees and solitary bees have to be considered in addition to honey bees regarding environmental pollinator risk assessments. For solitary bees it is proposed to use *Osmia cornuta* (LATR., 1805) or *O. bicornis* (L., 1758) as test organisms. Whereas for higher-tier assessments, semi-field testing of solitary bees has been proved to obtain sound results, experience from current *Osmia* field studies show that exposure of adults and larvae is not necessarily the case due to the pronounced polylectic feeding behaviour. As an alternative refinement option the 'focal species' concept may be used, which is well-known as a kind of first step for higher tier bird and mammal risk assessments. This approach as it applies to solitary bees, as well as its needs, refinement options and limitations is presented.

**Keyword:** Solitary bees, higher tier, environmental risk assessment, focal species, pesticides, pollinator

### Introduction

According to EFSA (2013) bumble bees and solitary bees have to be considered in addition to honey bees regarding environmental pollinator risk assessments (hereafter RA). However, suitable testing methods in the lab are only partly available or under development for species other than *Apis* bees. For solitary bees EFSA (2013) proposes to use *Osmia cornuta* (LATR., 1805) or *O. bicornis* (L., 1758) as test organisms.

Based on Proposals by the ICPPR non-*Apis* working group for solitary bees semi-field testing has been proved to obtain sound results for *Osmia* species. However, experience from currently