Earthworm field studies

Welcome To Eurofins Agroscience Services

Eurofins Agroscience Services conducts standard and customised earthworm field studies following the international guidelines and current recommendations of the SETAC Working Group. We also have extensive experience with specific designs for residues studies, monitoring studies and for long term trials to monitor chronic effects. Earthworm field studies are possible in all crops, grassland and orchards. Due to the seasonal activity of earthworms, field studies may be started in spring and autumn only. The study design allows combining standard studies with residue studies and / or micro-arthropod studies.

Objective
The objective of this type of study is to investigate effects of the application of crop protection products on field earthworm populations. Sometimes the assessment of residues in earthworms is also requested.

Importance
Earthworms represent the major group of soil macrofauna in agricultural soils and are important for many soil related processes. Earthworm fauna field testing for ecotoxicological risk assessment is considered for registration procedures of crop protection products in different countries. Within a tiered-test system, field studies will follow the laboratory tests (acute toxicity and laboratory reproduction).
Principle of field studies
The baseline earthworm population density and species distribution will be assessed prior to application. At several times after the application (e.g. in the standard design at one, six and twelve months), the earthworm fauna will be evaluated for potential effects and for earthworm population recovery. The effect of the test substance will be assessed by comparing the population in the treated plots to those in the control plots. A toxic reference is included in order to demonstrate the sensitivity of the test system at trial initiation. Additionally, earthworm samples, soil samples, litter samples, etc. may be taken for residue analysis.

Methodology
Standard earthworm field trials are set up in a randomised block design with four replicate plots per treatment group. On each sampling occasion, four sub-samples per replicate plot are taken.

Earthworms may be sampled using different extraction methods. We recommend using a sampling method that combines manually sifting through a defined soil volume (standard: 0.25 m² area to 20 cm depth) with a subsequent chemical extraction of deep-burrowing earthworms in the excavated hole. The advantage of this combined method is that the sampling efficiency is highest and that species of different life forms and ecological groups are extracted (i.e. anecic, endogeic and epigeic species). Sample area sizes may be adjusted to cover different crop scenarios and/or different earthworm densities in the field. Species identification of earthworms is done in-house down to species level.

Available Trial Sites
Trials can be performed in Northern, Central and Southern Europe. We have experience with earthworm field trials in Sweden, Northern and Southern Germany, Northern and Southern France, Northern and Southern Spain, and in Italy.

We have established expert teams in Germany, Northern France (Alsace), Southern France (near Toulouse), Spain (Santiago de Compostela, Canals) and Portugal (Monção).

Special Studies
• Earthworm determination in our own determination lab by experienced staff
• Residue analytics in our own analytical laboratories
• Special application techniques (granule application in furrow or wide spread, application of spray liquid in furrow, fumigation, application of non-soluble substances on carrier substance etc.)
• Experience in developing and adapting test designs to special requests
• Combined earthworm field study with micro-arthropod study or with arthropod residue study
• Statistics using SAS, Canoco etc.

Participation in working groups, research and publications (selection)
• Participation at the SETAC working group for the development of the earthworm field testing guideline “Technical Recommendations for the Update of the ISO Earthworm Field Test Guideline (ISO 11268-3)”
• Earthworm Field Testing: Application Timing a Factor Influencing the Effect of the Toxic Reference (SETAC, 2006)
• Earthworm Field Testing: Comparison of different sampling methods (SETAC, 2008)
• Spatial and Temporal Distribution of Earthworms in an Arable Field in Southern Germany (SETAC, 2009)
• Spatial and Temporal Distribution of Earthworms in Arable Fields and its Importance for Terrestrial Risk Assessment for Earthworms (SETAC, 2010)
• Getting Rid of Formalin: Using AITC and Mustard Powder Preparations for Earthworm Extraction in Combination with Handsorting (SETAC, 2015)

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.