Crop Protection Case study

How does farming weeds answer questions about pesticide risk?

Background
Envigo was approached by a European company producing a standard herbicide for maize who had been asked by the regulator to conduct a study to provide data to refine the small mammals risk assessment. The concern was not only the residue on the maize but also on the weeds that the herbicide targeted at the time of application.

The challenges
This unusual study posed several challenges in terms of finding and maintaining fields that contained appropriate weeds, complex and intensive sampling requirements, as well as subsequent data modelling to calculate degradation.

• Finding and maintaining a healthy 'crop' of weeds:
  The herbicide targeted dicotyledons, so the study fields needed to have abundant levels of multiple types of these weeds. In addition, high levels of weeds needed to be available throughout the study to ensure enough test material was available over the period of the field trial.

• Monitoring individual weed species for as long as possible:
  The herbicide’s onset of action varied in each weed species, but samples of healthy weeds were required over the entire study period for the residue testing. This, therefore, required a specialized sampling approach to offset the impact of the different rates of weed species death.

• Post-study analytics and modeling for degradation kinetics:
  As part of the study, degradation kinetics had to be evaluated, so DT50 and DT90 values for each different weed species needed to be calculated from the data, in time for a regulatory submission deadline.
The solutions
The agricultural knowledge, study design expertise and well-integrated working practices of Envigo’s Field Trials, Residue Analytics and Regulatory teams were key to completing this complex and unusual study. At the heart of its success was a deep, multifaceted understanding of the nature of the scientific questions to be answered.

Agricultural insight was leveraged to ensure a productive weed crop
Most farmers do not cultivate fields of weeds, but the on-the-ground knowledge of its Field Trials team allowed Envigo to identify farms where such fields existed. The team’s agricultural insight was further employed to run a preliminary study to characterize weed types and to devise a field management approach that involved drilling maize in the weed fields and providing suitable agronomic conditions (e.g., irrigation) to ensure good weed growth.

Complex and intensive sampling methodology delivered consistent test material
Because of the herbicide’s onset of action, frequent, closely spaced sampling intervals were required. A sampling strategy was devised that divided each field into three subplots and specified sampling rules to ensure random sampling, the avoidance of repeat sampling in any area and the provision of sample replicates of live weeds of all species at each sampling timepoint.

Integration of in-house residue analytics and modelers delivered timely data analysis and degradation kinetics
The residue analytics requirements were reasonably standard but required rapid processing to meet the regulatory submission deadline. Envigo was also required to calculate herbicide degradation kinetics in each weed species; this was undertaken by the in-house modelers and expedited thanks to existing working practices.

Conclusions
This case study underlines the value of agricultural insight when running field studies and the importance of working with an experienced team with a problem-solving attitude and the on-site capabilities to conduct complex studies.

Want to find out more?
Have you got a field trial or residue analysis challenge you need help with? Click here and we’ll be in touch to discuss your requirements.