

# Tracing spray to the soil, plant targets and as drift

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## ABSTRACT

Spray formulations are often traced in the environment by fluorescent tracers. Spray drift and overall spray distribution is often measured by sampling spray onto artificial targets. More realistic measurements of the distribution of the spray in plant canopies can be determined by measuring the volume collected onto leaf surfaces by elution and fluorescent spectroscopy. If measurements are carried out at differing levels within the plant canopy this can be used to target sprays. However, the efficacy of pesticides can be strongly influenced by the form of the deposit on the plant. For this reason it is desirable to develop methods of tracing sprays which can be used to assess not only the volume deposited, but also the form of the deposit in-situ.

Techniques have been developed to use Tinopal as a tracer to measure spray deposits on artificial targets, natural targets, and in the soil. Tinopal is soluble in water and fluoresces both in the dry state and in solution. Its stability to light, and compatibility with pesticides have been investigated and found to be satisfactory (Smith & Brown, 2004). The form of leaf deposits has been measured in-situ using image analysis and the volume deposited measured using elution and fluorescence spectroscopy. These techniques should allow differences in the performance of application techniques to be determined and could assist with the determining which techniques could be safely used at lower pesticide dose rates.

To date most estimates of the quantity of spray collected on surfaces below crops have relied on measurements on artificial targets such as flat plates. Although the surfaces beneath crops are largely horizontal, and the collection of drops is dominated by sedimentation, there is a possible bias in the positioning of the samplers because of the physical constraints caused by the crop. Most artificial samplers are positioned between plant rows or within tramlines. A technique has been developed for measuring the volume deposited to soil beneath a growing crop that does not rely on artificial targets or samplers. Tinopal is extracted from the soil surface and the volume deposited assessed using partitioning techniques. This should allow for more accurate measurements and improve spray accountancy.

## References

Smith J, Brown S. 2004. *Annals of Applied Biology* **456**:123–135.

## PLEASE NOTE:

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ABSTRACT BOLD.

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