

Reduced Spray Drift in Vegetable Row Crops with Spot Spraying Robots

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Background

Spot spraying applications in vegetable row crops can reduce the use of plant protection products (PPPs) by up to 85% during early crop stages and by more than 50% over the entire cultivation period when compared to broadcast applications (Witsoe et al., 2024). In addition to PPP savings, typical application settings for spot sprayers may further reduce spray drift to non-target areas. This project aims to assess the potential of spot sprayers to reduce spray drift compared to traditional broadcast applications.

Experimental Setup

In 2024 and 2025, drift trials with two spot spraying robots (Figure 1) were conducted. The crop was sprayed with a fluorescent tracer and deposition was measured on filter paper targets (Figure 2).

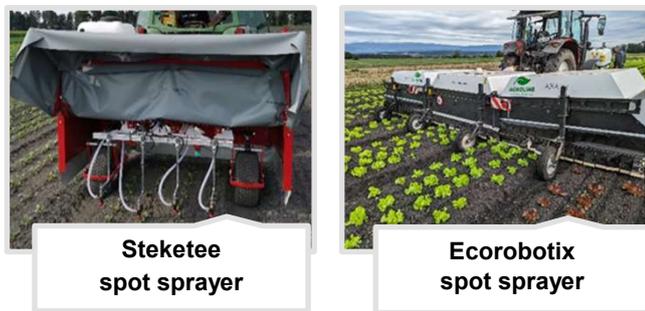


Figure 1. Tested spot spraying devices

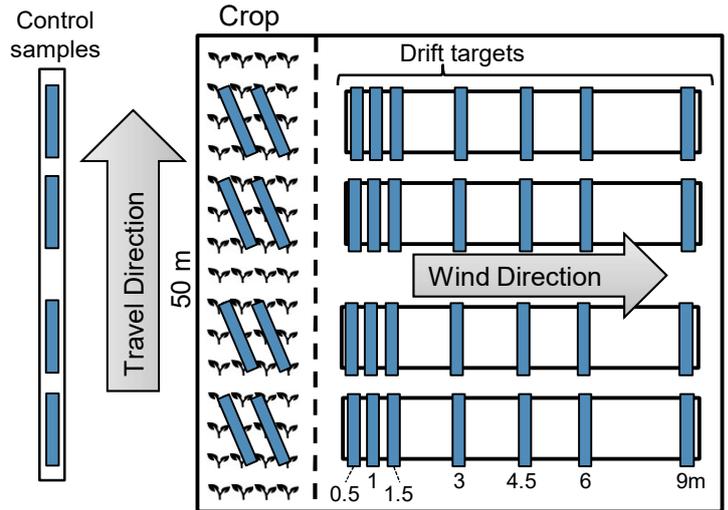


Figure 2. Drift trial design

Results

All spot spraying trials showed **very low drift deposition** with **90th percentiles < 0.01%** of the target broadcast application rate, corresponding to **> 99% drift reduction** when compared to Rautmann drift values (Figures 3 & 4).

Conclusion

Compared to conventional sprayers, the shielding and low nozzle heights of the tested spot spraying devices, together with PPP savings from the application are very effective at reducing spray drift.

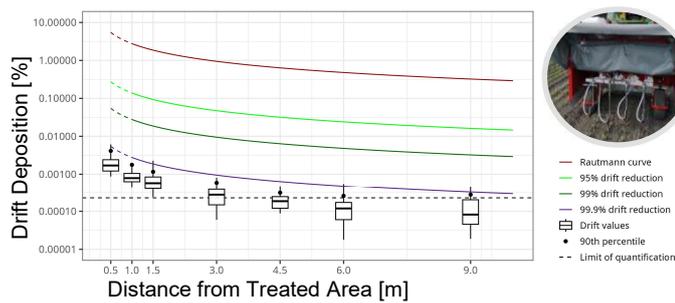


Figure 3. Drift deposition and reference curves from the Steketee spot sprayer trials. Drift deposition is in % of the target broadcast application rate over the entire plot (500 l/ha).

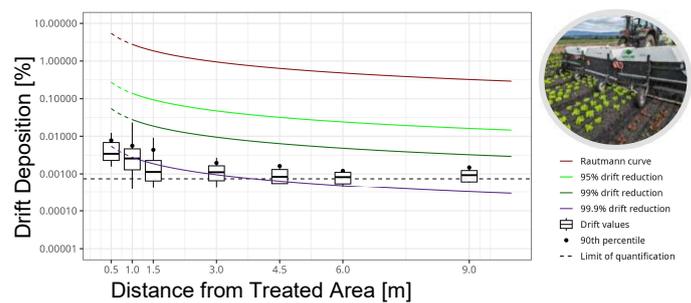


Figure 4. Drift deposition and reference curves from the Ecorobotix spot sprayer trials. Drift deposition is in % of the target broadcast application rate over the entire plot (200 l/ha).

Summary

Spot spraying technology has the potential to make significant contributions to advancing sustainable crop protection by reducing the use of plant protection products (PPPs) and minimizing environmental exposure. The knowledge gained may provide valuable data for regulatory assessments and support the broader adoption of this new technology in agricultural practice.



Link to reference:
 Witsoe et al., 2024