Improving Multi-Point Direct Chemical Injection For Boom Sprayers

This year’s AGCO SCOPE team developed a method for quick chemical changeover on boom sprayers to improve pesticide targeting in fields. Most current boom sprayers restrict farmers to spraying a single pesticide cocktail over a large area. This method wastes water, chemicals and time while potentially exposing the operator to dangerous active ingredients during refilling. Furthermore, due to increased pesticide resistances, a single pesticide cocktail is no longer effective against all pests and may in fact be detrimental to crops. Existing direct injection systems have serious latency issues that have prevented widespread adoption. The 2014-2015 AGCO SCOPE team addressed this by designing, building and analyzing a proof-of-concept for a multi-point direct chemical injection system.

Other Pesticides

Glyphosate, as a single chemical compound, has constant fluid properties. Pesticides as a whole, however, are incredibly varied in their chemical makeup, behavior, and optimal application rate. Developing a system that is capable of handling orders of magnitude across pesticide application rates and fluid properties requires careful analysis. It was not feasible to test every pesticide permutation that could be used. The team had to instead pick critical properties to examine and test across the range of to validate our system.

ACKNOWLEDGEMENTS

The team would like to thank: Tracy Tully, Ruth Nair, and Akate Ssona-Ssemwisom for all their work to keep the SCOPE program running.

Jeff Zimmerman, for his help

Brian Storey, for his advice throughout the semester

Dave Burnett, Andrew Burnett, and Jason Tong, for their many years of expertise made available during design reviews

THE TEAM

Morgan Bassford
Nick Eyre
Ingrid Hagen-Keith
Chris Joyce

Advisor: Brian Storey
Liaison: Jeff Zimmerman