

Application rate stability when implementing automatic section control technology on agricultural sprayers

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Automatic section control (on and off) technology of sprayer boom sections is an intelligent solution to maximize spray application efficiency during field operations. This technology can reduce over-application of products. Spray controllers available with this technology attempt to maintain the set target rate by adjusting system flow rate based on ground speed and application width. Therefore, as sections are turned on or off, the flow regulating hardware must respond to maintain the target rate. The objectives of this study were to quantify tip flow rate stability and assess system flow response consistency at different ground speed when using automatic section control. Experiments were conducted using common self-propelled sprayers equipped with automatic section control capabilities. High frequency pressure sensors were randomly mounted along the boom section to record real-time tip pressure with system flow rate also recorded. A laboratory spray table was used to develop tip flow rate versus pressure curves for converting measured tip pressure to a flow rate. Results indicated that tip flow rate decreased by up to 25% when auto-nozzle level control was activated. When the automatics section was activated (turning sections on or off), instability of tip flow was observed especially at low system flow rates. The control system took about 7-sec to adjust to the target rate when ground speed was varied with instability occurring when ground speed was under 16 kph.

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