

FACULTY RESEARCH FUND

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Proposal Title: Demonstration of a novel agricultural spray nozzle clog detection system

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ABSTRACT

Agricultural spray nozzles are vital in crop production. They are used in sprayers to apply all types of chemicals: herbicides, fungicides, insecticides, and fertilizers. However, nozzles are prone to clogging from debris in the tank due to the small size of the orifice through which the spray solution is discharged. When nozzles become clogged, it reduces application efficiency due to under-application and/or uneven application. This can lead to significant overall reductions in efficacy of the chemical resulting in poor weed, pest, disease, and nutrient management and increased cost for re-spraying. Although some preventive measures are employed such as cleaning of the nozzle, using strainers to filter debris from flowing to the nozzle tip, and undergoing regular check of the nozzles, nozzle clogging still occurs during spray application. Hence, a system that can detect nozzle clogging during spraying is required to minimize the negative impact of clogging. An innovative nozzle clog detection system with an externally attachable device that requires no modification of the internal system of its host sprayer has recently been developed in the Precision Application Technology Lab at Arkansas State University. Ongoing laboratory test of this patent-pending technology has shown great promise. In furthering this technology, however, it is crucial to test it under typical field conditions where it would be used in order to collect crucial data to optimize its performance. The proposed study aims to demonstrate the performance this novel technology by testing one system on a research boom sprayer in field condition and demonstrating two additional ones on farmer-owned commercial sprayers to acquire feedbacks from the farmers. Meeting these objectives is expected to provide critical research data and objective feedbacks from farmers for improving this novel technology. Also, it will provide relevant knowledge for selecting appropriate instrumentation for future testing of the system.