EFFICACY OF PESTICIDES USED IN COTTON WHEN APPLIED AT SPECIFIC DROPLET SIZES

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Abstract

Over the last several decades, application technologies (sprayers) have improved across farms allowing growers the ability to apply pesticides to row crops with precision and in a timely manner. With fewer agrichemical compounds and molecules being discovered by private industry, new innovative ways of using current modes of action and application equipment are not only necessary, but imperative to maintain and improve our pest management strategies in South Carolina. Research on optimizing application technologies to improve product efficacy is needed to assist growers throughout the Southeast on their farming operations.

This research was conducted in 2020 at the Edisto Research and Education Center in Blackville, SC to determine if the effect of sprayer droplet size (150-900 µm) has an impact on the efficacy of insecticides used to control tobacco thrips, *Frankliniella fusca* (Hinds) in cotton. Two separate fields were utilized for this test where applications targeting thrips were applied at 150, 300, 450, 600, 750, and 900µm droplets. The thrips application was applied at 1-2 leaf cotton and consisted of Orthene 97SG (Acephate) at 210 g/ha of product. All applications were made at 93.5 L/ha carrier volume. A Mudmaster plot sprayer equipped with Capstan Ag Pinpoint II blended pulse width modulation was used to spray all treatments. Prior to all applications, specific nozzle types and pressure settings were determined at the University of Nebraska PAT Lab in North Platte, NE. Plots were sampled and rated at 0, 3, 7, and 14 days after treatment (DAT) for thrips counts and injury ratings. Droplet size and spray coverage data were also collected using water sensitive paper in both trials. Droplet size data were analyzed using a program developed at Clemson University to quantify spray coverage and actual mean droplet size from images of the water sensitive paper. All data were subjected to analysis of variance using PROC Glimmix procedure in SAS 9.4 and means separated using multiple pairwise t-tests at $\alpha = 0.05$.

In 2020, there was no significant differences in thrips injury ratings, plant heights, total nodes, or node above cracked boll among droplet size treatments at any rating. Acephate applied at a droplet size of 150 microns resulted in the lowest number of thrips on cotton 14 DAT when compared to all other droplet sizes. Droplet size of 300 microns did result in the greatest number of thrips on cotton for both fields 14 DAT when compared to all other droplet sizes. Even with significant difference in thrips counts 14 DAT this research resulted in no yield difference between any of the droplet size treatments or between the untreated check. No significant differences were observed in thrips counts or injury ratings that were collected at the 0, 3, or 7 DAT samplings. Overall, spray coverage decreased as droplet size increased from 150 to 900 microns. Furthermore, as droplet size treatment increased, droplets measured on the target surface (water sensitive paper) increased as well. South Carolina growers may have more flexibility in nozzle selection and droplet size ranges when using acephate to control thrips in cotton. Continued research on application technologies, droplet size, and the efficacy of products is needed in cotton growing regions of the United States.