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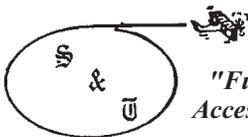
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The USDA-ARS Aerial Application Technology Group (AAT) publishes almost 20 papers a year in peer-reviewed scientific journals. The following Applied Research Summary and others like it have been boiled down to a few quick take-away messages and will be appearing regularly in Agricultural Aviation. Full reports are available at AAT's revamped website, apmru.usda.gov/aerial.

Aerial Application Methods for Increasing Spray Deposition on Wheat Heads



Original Citation: Fritz, B.K., Hoffmann, W.C., Martin, D.E., and Thomson, S.J. 205. Applied Engineering in Agriculture. 23(6):709-715.

Research Objective: To compare multiple spray application treatments to determine which provide optimum spray deposition onto wheat heads.

Research Methods: Six spray treatments consisting of ASC rotary atomizers, Spectrum electrostatics spray system, and CP Products, CP-03 nozzles, were compared for product deposition on wheat heads. The rotary atomizers delivered a very fine spray at 2 gpa while the electrostatic nozzles delivered a very fine spray at 1 gpa. The CP-03 nozzles were set up to deliver four treatments: a very fine spray at 2 and 5 gpa, and a medium spray at 2 and 5 gpa. Through a combination of water sensitive cards, tracer deposition sampling and fluorescent photography, coverage and spray deposition were determined and compared. All spray applications were made with the AAT's Air Tractor 402B operating between 100 and 150 mph, depending on the spray treatment, at a 10 ft height for rotary treatments and an 8 ft for all other treatments.

Research Results: Water sensitive cards confirmed that spray droplet sizes delivered to the wheat heads were consistent with the treatment setups. Tracer deposition analysis demonstrated that the CP-03 at 2 gpa with a medium spray delivered the most product to the wheat head, followed closely by the electrostatics and the CP-03 at 2 gpa with a very fine spray. The fluorescent images from sprayed wheat heads confirmed previous research which noted that only the upwind side of the wheat heads have spray material deposits. Visually, the best depositing spray treatment (CP-03 2 gpa medium spray) resulted in the poorest coverage, as a result of less total spray solution delivered with larger droplets.

Research Application:

- Spray deposition from treatments delivering a very fine spray, regardless of the rate, were very similar but tended to be less than that from a medium spray delivered at a low rate. The smaller droplets from the very fine sprays were more subjective to wind speed and humidity, resulting in less on-target deposition than the larger, medium spray treatments.
- Lower spray rates, while providing somewhat less visual coverage than the higher rates, resulted in overall greater product deposition on the wheat heads as a result of the lower dilution rates.
- Overall, the lower rate (2 gpa) treatment delivered with a medium droplet sized spray delivered the most spray material to wheat heads with greater control and likely with less off-target movement. ■