

DROPLET DEPOSITION PATTERN OF TRACER (SPINOSAD) APPLIED WITH AND WITHOUT ADJUVANTS

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Abstract

Field studies were conducted to determine the effect of adjuvant and nozzle on droplet size, distribution and coverage. Tracer™ was applied in water alone, or in water with the addition of one of the following adjuvants: Crop oil concentrate (COC), wetter/spreader (X-77), or a combination product (an organo-silicone and methylated crop oil). Spray distribution patterns were evaluated using water sensitive cards. Analyses of the water sensitive cards revealed no significant differences using Tracer alone or with adjuvants. Of the 18 trials, statistical analyses found no significant trends on the following variables - ground vs. air applications, temperatures, humidity levels, or nozzle types. In most cases, the addition of an adjuvant is not that important, however, in cases with low volumes it can provide some benefit. Given the wide range of available adjuvants and pest/crop situations, these products should be used based on local experience. Further, the addition of an adjuvant does not appear to hurt the penetration, coverage or residual of Tracer.

Introduction

Tracer™ Naturalyte™ insect control is a fermentation-derived agent for Lepidoptera management in cotton. The active ingredient is spinosad. Tracer controls all major cotton worm-pests, and is less detrimental than current chemistries to most beneficial insects.

Current label recommendations suggest that for ground application, a minimum spray volume of five gallons of water per acre is recommended, with a minimum spray pressure of 40 psi. For aerial applications, a total spray volume of two to five gallons per acre using a medium-sized droplet (200 to 300 microns) was used. Limited studies in previous years suggested that the addition of a spray adjuvant would increase canopy penetration and deposition.

Many users prefer to use an adjuvant with other products and with a high amount of tank-mixes, finding the effect of an adjuvant would be beneficial.

Particularly in rank cotton, increasing the penetration and coverage is critical. Practical experience suggests that increases in water volume, water pressure, and/or adjuvants should improve coverage. This study was conducted to see if commercially applied Tracer would benefit from the addition of adjuvant and if so, under what conditions?

Methods and Materials

Each trial consisted of three treatments (Tracer, Tracer/Additive, Standard) and an untreated check. Because of space constraints, not all locations had a standard and/or a check. Tracer was applied in water alone, or in water with the addition of one of the following standard adjuvants: crop oil concentrate (COC), wetter/spreader (X-77), or a combination product (an organo-silicone and methylated crop oil). Nozzles tested included: TX6 (hollowcone) @ 60 psi; TX18 (hollowcone) @ 60 psi; 8003 (flat fan) @ 40 psi; TG1; and TX8. These trials were conducted at 18 locations (Figure 1) by both aerial and ground applications. There were two spray rate options based on cotton canopy and pest pressure. Low rate and volume was used for open canopy cotton with low but treatable worm pressure. The higher rate and volume was used for closed canopy and high worm counts.

Water-sensitive cards (1x3 inch) were used to record the spray deposition patterns. Using thin rubber gloves, the water-sensitive cards were bent in-half and secured onto the cotton leaf with a straight pin after the dew was dry (Figure 3). Four plants in three locations were sampled. Twelve cards were positioned in the top and twelve cards in the mid-portion of the canopy of 4-5 foot tall closed canopy cotton. The cards were positioned in a diagonal line across the center portion of three fifty to sixty foot sections. After each plot was treated, the cards were collected and allowed to dry (Figure 4). The number and size of water drops and the percentage of the card covered was recorded.

Results and Discussion

Of the eighteen trial locations, three reported better results with the use of the adjuvants; four reported Tracer alone performed better; and, nine trials reported no differences in treatments. In the analysis of the water-sensitive cards eight trials found no significant difference in treatments, five found Tracer performed better, and one revealed the adjuvant COC performed better. When the water alone performed better, the trend was to higher volumes (10-12 GPA) and high psi. When adjuvants performed better, application volume was lower (3-5 GPA). In the comparisons between the top and mid-portions of the plants, three trials showed no significant difference; one trial

showed the mid-portion had better coverage; and, ten showed the top-portion had better coverage.

Different variables were also tested, including Heliothine counts (Figure 2), ground vs. air, temperature (Figure 3), humidity (Figure 4), nozzle type and psi. The trial of air versus ground application revealed ground application obtained slightly better coverage than air. The temperatures ranged from 76 F to 101 F. Humidity ranged from 25% to 90%. Even with this range of temperature and humidity, no significant difference in the performance of Tracer was noted. In a comparison of TG1 versus the TX8 nozzle, the TG1 performed slightly better.

In most cases, the addition of an adjuvant is not significant. However, in cases with low volumes it may provide some benefit. Given the wide range of available adjuvants and pest/crop situations, these products should be used based on local experience. Further, the addition of an adjuvant does not appear to hurt the penetration, coverage, or residual of Tracer.

Acknowledgments

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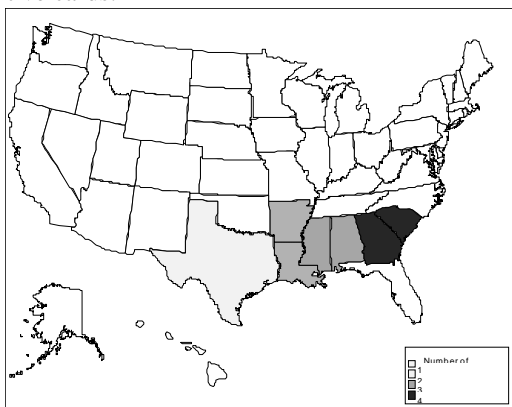


Figure 1. Tracer Adjuvant Trial Locations

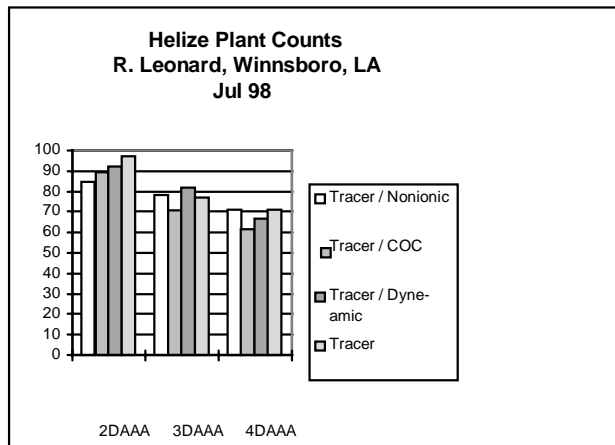


Figure 2: Heliothine counts made with Tracer alone and mixed with different adjuvants.

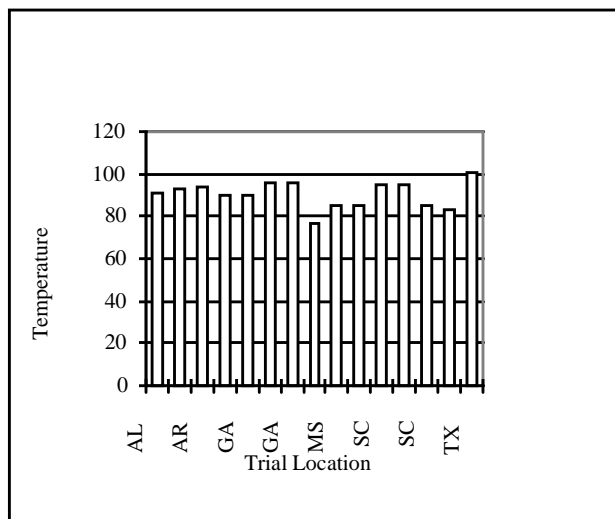


Figure 3: Temperatures during application of adjuvant trials. Variation in temperature did not seem to affect deposition.

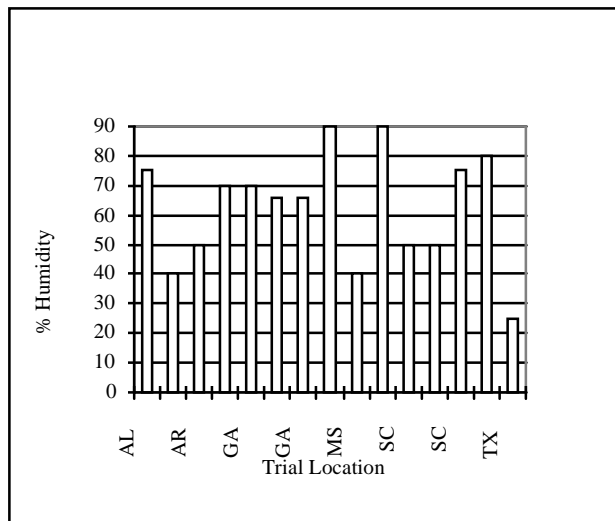


Figure 4: Humidity during application of adjuvant trials. Variation in humidity did not seem to affect deposition of Tracer.