

ROUNDUP APPLIED BY HOODED SPRAYER VERSUS CULTIVATION IN COTTON

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Abstract

The use of Roundup (*glyphosate*) applied by hooded sprayer has found utility in many cotton growing areas of the United States. A question commonly asked by growers is whether Roundup hooded sprayer applications will substitute for the use of cultivation in cotton. Reports in the literature generally suggest that the main purpose for cultivation is weed control. The data obtained in these field trials indicate that Roundup applied by the hooded sprayer provided weed control equal to or better than a cultivated standard.

In 3 of 4 trials, Roundup hooded sprayer applications provided significantly greater cotton yields than comparable cultivated treatments. Since weed control was similar in hooded sprayer and cultivated treatments, indications are that other factors, such as root pruning and/or soil moisture loss with cultivation, may be contributing factors in cotton yields.

Materials and Methods

Trials were conducted in Florida and Georgia in 1994 and 1995. The Florida trials conducted at the North Florida Research and Education Center at Quincy, Florida utilized a Brown Ro-Till and KMC planters in a strip-till operation. Roundup was applied preplant to control existing weed species. DP5409 cotton was planted into a Dothan sandy loam soil and followed by a broadcast application of Prowl (*pendimethalin*) at 1 lb ai/A and a banded application of Cotoran (*fluometuron*) at 1.5 lb ai/A on a broadcast basis. Four row plots, 20 feet in length with 4 replications in a randomized complete block design were used. A two row Red Ball hooded sprayer was used for the Roundup applications. The hooded sprayer was equipped with three 95015 T-jet tips per hood with the hood skirts running on the ground. Ground speed, spray pressure and spray volume were 5 mph, 30 psi and 15 gpa, respectively. Cultivated treatments utilized a chiselvator and left 50 to 60% of the vegetative residue on the soil surface.

The conventionally tilled Georgia trials were located near Bainbridge, Georgia in 1994 and at Sasser, Georgia in 1995. Both sites had sandy loam soils with less than 1% organic matter. Treflan (*trifluralin*) at 0.75 lb ai/A or Prowl at 1 lb ai/A was applied PPI to all plots. DPL 5415

cotton was planted in plots of 6 rows x 50 feet in length using 4 replications in a randomized complete block design. Half of the hooded sprayer and cultivated plots had a banded application of Cotoran at 1.5 lb ai/A with the remaining plots receiving no preemergence treatment. A Red Ball hooded sprayer equipped with three 95015 T-jet nozzle tips per hood was used for the Roundup treatments. A speed of 4.5 mph at 30 psi delivered 15 gpa finished spray. A conventional three-point hitch mounted cultivator with sweeps was used to cultivate the cultivated plots.

In some cases, in both Florida and Georgia, a post-directed application of MSMA at 2 lb ai/A + Bladex (*cyanazine*) at 0.6 lb ai/A was needed for weed control in the row. In such cases, the identical treatments were made for both the Roundup hooded sprayer plots and the cultivated plots. All Roundup applications were made at 0.75 lb ae/A plus 0.5% v/v non-ionic surfactant with hoods on the ground.

Visual ratings of weed control and crop injury along with lint yields per acre were obtained for each plot.

Results and Discussion

Primary weeds at the Bainbridge, Georgia location in 1994 were Florida beggarweed (*Desmodium tortuosum* [SW] DC), smallflower morningglory (*Jacquemontia tamnifolia* [L.] Griseb) and yellow nutsedge (*Cyperus esculentus* L.). One and two Roundup hooded sprayer applications were compared to one and two cultivations. Commercial levels of weed control were obtained for all treatments and little difference was seen between comparable treatments. In this trial, no cotton yield differences were obtained between Roundup hooded sprayer and cultivated treatments. Abundant rainfall throughout the growing season at this location may have masked any treatment differences between hooded sprayer and cultivated treatments.

In a follow-up plot in Sasser, Georgia in 1995, dry to drought conditions prevailed much of the summer. Once again, excellent weed control was obtained with Roundup hooded sprayer and cultivated treatments under heavy pressure from common cocklebur (*Xanthum strumarium* L.), sicklepod (*Cassia obtusifolia* L.) and yellow nutsedge. However, there were significant yield differences in this trial. In each case, whether one or two Roundup hooded sprayer applications or cultivations were used, the hooded sprayer provided significantly better yields than the comparable cultivated treatments. Cultivation may have pruned cotton roots and caused a loss of soil moisture which was critical under the environmental conditions.

In both years with the the strip-till trials at Quincy, Florida, significantly better cotton yields were obtained with the Roundup hooded sprayer applications than with cultivated treatments. It also was noted that annual grass and broadleaf weed control was superior with Roundup hooded sprayer applications when compared to cultivated

treatments. Primary weeds at the Florida site were Texas panicum (*Panicum texanum* Buckl.), pigweed species (*Amaranthus* spp.), morningglory species (*Ipomoea* spp.) and purple nutsedge (*Cyperus rotundus* L.).

No cotton phytotoxicity was noted in any of the trials from any treatment. It is suggested that the yield differences noted between Roundup hooded sprayer application and cultivation are a result of the mechanical disruption caused by cultivation and certain environmental conditions.