

CROP TOLERANCE AND WEED MANAGEMENT IN ROUNDUP READY ALFALFA.

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ABSTRACT

The development of transgenic crops such as Roundup Ready cotton, soybeans, and canola have allowed producers to manage a broad spectrum of weeds with glyphosate. The absence of tillage during the life of an alfalfa stand may allow the invasion of tough to control annual and perennial weeds, which can degrade the value and yield of the forage. To broaden the spectrum of weed control in alfalfa, research has been conducted to develop an alfalfa variety tolerant to glyphosate. The objectives of this experiment were: to determine crop safety and yield of glyphosate-tolerant alfalfa as affected by sequential glyphosate applications and to compare the efficacy of glyphosate in a glyphosate-tolerant alfalfa weed control system to a conventional alfalfa weed control system.

The tolerance experiment was located at the Texas Agricultural Experiment Station near Lubbock on an Acuff clay loam soil. The plots were 6.67 x 50 ft and were arranged in a randomized complete block design with a factorial arrangement. The test consisted of three replications. Benefin was applied at 2.0 lb ai/A preplant incorporated (PPI) was applied to the test area. Glyphosate application timings included: 0.75 lb ae/A at the 3-4 trifoliolate followed by (fb) 1.5 lb ae/A at 10, 50, or 90% regrowth after the first cutting fb 1.5 lb ae/A at all combinations of these same regrowth stages after subsequent cuttings. All herbicide applications were made at 10 GPA. Plots were harvested using a flail shredder on June 30, July 28, August 25, and October 9.

The weed control experiment was located at the Texas Agricultural Experiment Station near Plainview on an Olton clay loam soil. The trial was a randomized complete block design that was replicated four times. Plots, 6.7 x 50 ft, were planted on April 4. The glyphosate-tolerant system consisted of: benefin at 2.0 lb ai/A PPI fb a glyphosate application at 1.5 lb ae/A at the 3-4 trifoliolate fb glyphosate at 1.5 lb ae/A postemergence (PT-2). The conventional system consisted of: benefin at 2.0 lb ai/A PPI fb an application of imazethapyr + COC + AMS at 0.063 lb ae/ A + 1.0 % V/V + 15 lb/100 gal at the 3-4 trifoliolate fb 2,4-DB + NIS at 0.50 lb ae/A + 0.25% V/V PT-2. Plots were harvested June 27, July 28, and August 26.

In these trials, excellent tolerance was observed in glyphosate-tolerant alfalfa to sequential applications of glyphosate. Up to 5.25 lb ae/A of glyphosate was applied at various regrowth timings and no adverse affects on alfalfa yield were observed. Total alfalfa yield (4 cuttings) from all treatments were not different from untreated plots. In the weed control experiment, no alfalfa injury was observed from any glyphosate application compared to applications made in a conventional weed control system. Alfalfa dry weight from the first cutting in the glyphosate-tolerant system (1563 lb/A) was greater than in the conventional system (1275 lb/A), but no differences were seen at any other cutting or when the season dry weight totals were compared. Weed dry weights were slightly higher in the glyphosate-tolerant system at each cutting, but season total dry weights were not different. Benefin applied PPI combined with two in-season glyphosate applications controlled all weeds.

