# TANK MIXING ELEVORE AND QUELEX WITH LOW RATES OF 2,4-D AND DICAMBA FOR BROADER WEED CONTROL

**J. Hurry**
**C. W. Cahoon**
**G.D Collins**
**R. Vann**
**Z. Taylor**
**A. C. York**
**North Carolina State University**
**Raleigh, NC**

## Abstract

Adoption of no-till and reduce-till systems as well as widespread herbicide resistance have put greater emphasis on controlling weeds preplant. In response to glyphosate- and ALS-resistant horseweed, cotton producers have turned to Group 4, synthetic auxin, herbicides to control this troublesome weed preplant. In 2017, halauxifen-methyl (Elevore) a new Group 4 herbicide, received a label for preplant burndown applications in cotton for the control of annual broadleaf weeds including herbicide-resistant horseweed. Previous research determined Elevore controlled horseweed well. However, previous research in NC reported the herbicide did not effectively control many commonly found winter weeds including cutleaf evening-primrose, curly dock, chickweed, cudweed, or field pansy. To overcome these shortfalls, it was proposed that tank mixtures of Elevore with low rates of 2,4-D or dicamba would achieve broader preplant weed control. Therefore, this research was conducted to evaluate the efficacy of Elevore and Quelex (halauxifen + florasulam) mixed with 2,4-D and dicamba for control of cutleaf evening-primrose. Experiments were established at private farms near Pine Level and Lumber Bridge, NC and consisted of RCBD with four replications. Herbicide treatments included Elevore (1 fl oz/A), Quelex (0.75 oz wt/A), 2,4-D low rate (LR) (6 fl oz/A), 2,4-D high rate (HR) (12 fl oz/A), dicamba (4 fl oz/A), Elevore + 2,4-D LR, Elevore + 2,4-D HR, Elevore +dicamba, Quelex + 2,4-D LR, Quelex + 2,4-D HR, and Quelex + dicamba. All herbicide treatments included crop oil concentrate at 1% V/V. Herbicides were applied when cutleaf evening-primrose averaged 4.5 and 6 inches in diameter at Pine Level and Lumber Bridge, respectively. Data collected included visual estimates of weed control at 14, 28, and 42 days after treatment (DAT) and weed density 42 DAT. Analysis of variance was completed using PROC GLIMMIX (SAS 9.4) and treatment means were separated using Fisher's Protected LSD at $p<0.05$ when appropriate.

Cutleaf evening-primrose was denser, however individual plants were smaller, at Pine Level compared to Lumber Bridge. Similar to previous results, Elevore alone did not control cutleaf evening-primrose. Similarly, control of cutleaf evening-primrose by Quelex was inadequate. The low and high rate of 2,4-D controlled cutleaf evening-primrose 96% or greater 42 DAT whereas dicamba controlled the weed 45%. Elevore plus 2,4-D (94 to 100%) controlled cutleaf evening-primrose similar to 2,4-D alone (96 to 98%). Interestingly, Quelex seemed to antagonize cutleaf evening-primrose control by 2,4-D. At Pine Level, Quelex + 2,4-D LR was 21% less effective than 2,4-D LR alone. Additionally, at Lumber Bridge, where cutleaf evening-primrose was larger in diameter, the effect was more exaggerated. Quelex + 2,4-D LR (67%) and Quelex + 2,4-D HR (72%) were 26 and 29% less effective than 2,4-D LR (96%) and 2,4-D HR (98%), respectively. In general, cutleaf evening-primrose density 42 DAT was similar to visual estimates of control. Cutleaf evening-primrose density averaged 18 and 5 plants per $m^{-2}$ at Pine Level and Lumber Bridge, respectively. At Pine Level, compared to the nontreated check, all treatments, except Elevore, reduced cutleaf evening-primrose density 61 to 94%. At Lumber Bridge, like visual ratings, cutleaf evening-primrose density was greater in plots treated with Quelex + 2,4-D (2 plants per $m^{-2}$) compared to 2,4-D alone (0 plants per $m^{-2}$). In conclusion, as previously reported, 2,4-D controlled cutleaf evening-primrose well. Adding 2,4-D to Elevore greatly improved cutleaf evening-primrose control compared to Elevore alone. However, Quelex seemed to antagonize cutleaf evening-primrose activity by 2,4-D. Therefore, in fields where herbicide-resistant horseweed and cutleaf evening-primrose are problematic, Elevore + 2,4-D would be recommended for preplant burndown whereas Quelex + 2,4-D may not be suitable.