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*Published by: Department of Agronomy, North Dakota State University, Fargo, ND.*

# Plant growth regulators in combination with herbicides for leafy spurge control

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3M Company has reported that the plant growth regulator (PGR) mefluidide in combination with bentazon results in synergistic weed control of some broadleaf plants including some *Euphorbia* spp. The PGR may increase translocation of bentazon in the plant. Greenhouse and field studies were initiated to evaluate mefluidide in combination with bentazon, picloram 14 and dicamba for leafy spurge control. Also translocation of $^{14}$C-picloram and $^{14}$C-dicamba following pretreatments of mefluidide or a cytokinin hormone mixture (Cytex from Atlantic and Pacific Research, N. Palm Beach, FL) was evaluated.

In the first experiment mefluidide or the cytokinin mixture at 0.25 lb/A were applied 24 hour prior to herbicide treatments using a moving nozzle pot sprayer. The leafy spurge was approximately 4 inches tall and in a vegetative stage of growth. Approximately 100,000 dpm of $^{14}$C-picloram or $^{14}$C-dicamba were applied to one leaf of the leafy spurge plant. Enough unlabeled herbicide was applied to equal picloram at 2.0 lb/A or dicamba at 8.0 lb/A. Plants were harvested after one week and divided into treated leaf, stem and leaves, and roots, and then frozen, oven-dried and combusted for determination of $^{14}$C present. There were eight replications in a completely random design and data are shown in the table.

| | | $^{14}$C translocation | | |
|---|---|---|---|---|
| Treatments | Rate | Stem & leaves | Roots | Treat leaf |
| | (lb/A) | (% of total $^{14}$C applied) | | |
| C-picloram | 2.0 | 0.4 | 0 | 52.5 |
| C-dicamba | 8.0 | 2.6 | 0 | 44.2 |
| Mefluidide + C-picloram | 0.25+2.0 | 0.1 | 0 | 61.9 |
| Mefluidide + C-dicamba | 0.25+8.0 | 2.7 | 0 | 54.9 |
| Cytokinin + C-picloram | 0.25+2.0 | 0.4 | 0.6 | 86.3 |
| Cytokinin + C-dicamba | 0.25+8.0 | 0.3 | 0.1 | 70.1 |

Most of the $^{14}$C-picloram remained in the treated leaf. No $^{14}$C was translocated to the root system except in the plant that received a cytokinin pretreatment. The mefluidide pretreatment did not affect herbicide translocation.

In the second experiment the morphological effects of PGR's followed by herbicide treatments were observed. Leafy spurge plants were treated with mefluidide or cytokinin at 0.25 lb/A followed in 48 hours by treatments of acifluorfen at 0.25 lb/A or picloram at

0.125 lb/A using a moving nozzle pot sprayer delivering 17.5 gpa at 35 psi. The experiment was a randomized complete block with six replications. The plants were observed for six weeks and then separated into topgrowth or roots, oven dried and weighed.

Acifluorfen at 0.25 lb caused severe leaf burn similar to paraquat damage after one week. Plants treated with picloram at 0.125 lb/A alone looked similar to the control; however, plants pretreated with mefluidide and then picloram at 0.125 lb/A showed leaf curling typical of picloram damage. Leaf curling also occurred on some plants pretreated with cytokinin followed by picloram. After two weeks plants treated with acifluorfen were chlorotic and most leaves had senesced, even when a PGR pretreatment had not been applied. Plants pretreated with mefluidide and then picloram or dicamba showed leaf curling while plants treated with picloram alone were similar to the control.

Four to six weeks after treatment the plants pretreated with mefluidide or cytokinin and then picloram had twisted, chlorotic stems and leaves while plants treated with picloram alone showed only slight leaf distortion. All topgrowth of plants treated with acifluorfen was dead. There were no differences among treatments when the plants were weighed (data not shown).

In summary, pretreatments of cytokinin resulted in more $^{14}C$ labeled picloram translocation to the roots of leafy spurge compared to no pretreatment. Also, leafy spurge topgrowth control was increased when picloram was preceded by a pretreatment of mefluidide or cytokinin compared to picloram applied alone.