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Absorption and translocation of ^{14}C -fluroxypyr and ^{14}C -sulfometuron in leafy spurge (*Euphorbia esula* L.)

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Leafy spurge control with fluroxypyr and sulfometuron in the field has been variable. Several studies were conducted in the greenhouse to evaluate how plant growth stage and application with auxin herbicides affect the absorption and translocation of ^{14}C -fluroxypyr and ^{14}C -sulfometuron in leafy spurge.

Leafy spurge plants from a single biotype (accession 1984 ND 001) were propagated and grown in the greenhouse. Plants were selected for both shoot and root growth uniformity. The experiments were in a randomized complete block design with four replications, were conducted three times, and were combined for statistical analyses.

Plants were oversprayed with a 2 oz/A rate of the respective herbicide. A leaf midway on the stem was protected during the whole plant treatment and then treated with the appropriate ^{14}C -herbicide solution. Enough ^{14}C -herbicide and unlabeled herbicide with 0.25% surfactant WK was applied to obtain field application rates. The plants were harvested 72 hours after treatment and sectioned into treated leaf, stem and leaves above the treated leaf, stem and leaves below the treated leaf and roots. The treated leaf was dipped in scintillation fluor to remove unabsorbed herbicide. Plant sections were dried, weighed, and combusted in a biological matter oxidizer. Radioactivity was assayed using liquid scintillation spectrometry.

^{14}C -labeled and unlabeled sulfometuron was applied to leafy spurge plants in the vegetative, flowering, and postflowering growth stages. More ^{14}C -sulfometuron was absorbed in leafy spurge at the vegetative and flowering growth stages (approx. 22%) than the postflowering growth stage (approx. 9%). ^{14}C -sulfometuron translocation was low regardless of growth stage, averaging less than 2% of applied. The majority of the ^{14}C -herbicide remained in the treated leaf. Translocation to the above-treated-leaf section was greatest during the flowering stage compared to the vegetative and postflowering growth stages. More ^{14}C -sulfometuron translocated to the root during the vegetative stage than the flowering and post-flowering stages.

When sulfometuron plus picloram or 2,4-D were applied to leafy spurge in the vegetative stage, absorption and translocation of ^{14}C -sulfometuron applied alone and in combination with picloram or 2,4-D was similar. Absorption and translocation of

¹⁴C-picloram were not affected by adding unlabeled sulfometuron. ¹⁴C-2,4-D absorption was reduced, averaging 46% of applied herbicide when applied alone compared to 30% when applied with sulfometuron.

Absorption and translocation of ¹⁴C-sulfometuron in leafy spurge was low regardless of plant growth stage or the addition of auxin-type herbicides. Most of the ¹⁴C-sulfometuron remained in the treated leaf.

¹⁴C-labeled and unlabeled fluroxypyr was applied to leafy spurge plants in the vegetative, flowering and postflowering growth stages. More ¹⁴C-fluroxypyr was absorbed in the vegetative stage (39%) as compared to the flowering and postflowering stages (24%). More ¹⁴C-fluroxypyr was translocated to the stem and roots in the vegetative stage compared to the other growth stages.

When fluroxypyr plus picloram or 2,4-D were applied to leafy spurge in the vegetative stage, absorption of ¹⁴C-fluroxypyr was reduced. ¹⁴C-fluroxypyr applied alone averaged 48% absorption compared to 35 and 24% when applied with picloram or 2,4-D, respectively. Translocation of absorbed herbicide to the above treated-leaf portion of the plant was reduced when C-fluroxypyr was applied with 2,4-D (averaged 2.8%) compared to 5% when applied alone or with picloram. In general, absorption and translocation of ¹⁴C-picloram were not affected by adding fluroxypyr.

Absorption and translocation of ¹⁴C-fluroxypyr applied alone to leafy spurge is better than ¹⁴C-picloram, ¹⁴C-2,4-D, and ¹⁴C-sulfometuron alone or in various treatment combinations. The majority of the ¹⁴C-fluroxypyr remained in the treated leaf, but the translocation of absorbed fluroxypyr was better than the commonly recommended herbicides.