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Effect of imazapyr, glyphosate, and naphthalene acetic acid (NAA) on leafy spurge adventitious shoot bud growth and development

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Leafy spurge maintains established stands through vegetative reproduction from adventitious shoots buds located on the crown and roots. The ability to manipulate these buds is essential to the development of long-term management strategies. Glyphosate can induce release of adventitious shoot buds from dormancy. Imazapyr has been observed under field conditions to have a similar effect. This study was conducted to evaluate the effects of Imazapyr and glyphosate on leafy spurge adventitious shoot bud growth and determine if they can overcome the effect of naphthalene acetic acid (NAA). NAA, a synthetic auxin, is an excellent inhibitor of leafy spurge adventitious shoot bud elongation and is not metabolized as easily as its endogenous counterpart, indole acetic acid (IAA). Six month old flowering plants growing in 6" diameter by 30" tall tubes were sprayed with either 1.12 kg ha⁻¹ glyphosate/X-77, 0.84 kg ha⁻¹ Imazapyr/X-77, or 0.25% v/v X-77 alone. Plants were allowed to grow in the greenhouse for 8 DAT. Top growth was removed and root systems were chilled for 14 d at 5°C to simulate overwintering. The roots were then dissected into 10 cm segments, each containing five buds. Secondary treatments (water or NAA) were applied through solutions in microfuge tubes placed on the proximal end of the segment. Mean bud growth after 12 d was 0.6, 3.3, and 14.2 mm for Imazapyr, glyphosate, and control segments treated with water. Treatment with NAA reduced average bud growth to 0.5, 1.0, and 3.5 mm, respectively. Differences were seen in the distribution of growth along the segments. The first bud closest to the proximal end of the segments from control plants averaged 61.0 mm growth at 12 d, while the other four buds averaged 6.2, 1.7, 0.8, and 1.2 mm bud growth at 12 d. Bud growth for glyphosate treated plants was 7.6, 3.1, 2.7, 2.0, and 1.2 mm at 12 d for buds 1 to 5 respectively. Glyphosate reduced total bud growth and evenly distributed growth among the five buds. Buds originating from plants treated with Imazapyr did not elongate, regardless of secondary treatment. Glyphosate delays or reduces total bud elongation, but also released more buds from their quiescent state.