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Leafy spurge control under trees with various herbicides[1]

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Leafy spurge is a major problem in wooded areas, shelterbelts, and around homes. Glyphosate can be safely used under and near trees with leafy spurge control generally ranging from 80 to 90% when the herbicide is fall applied. Two disadvantages of glyphosate are its non-selectivity resulting in mostly bare ground and a retreatment with 2,4-D is required the following year to control seedlings. Picloram controls leafy spurge, but it is toxic to trees, especially shallow rooted species which are likely to absorb injurious amounts of picloram. The controlled droplet applicator (CDA) is designed to deliver herbicides in precisely measured droplets, and generally delivers less herbicide per acre than conventional sprayers. The CDA is lightweight and easier to operate compared to a conventional hand-held sprayer. The purpose of these experiments was to evaluate the CDA and compressed air (Hudson single nozzle hand pumped model) sprayers for application of picloram, dicamba and glyphosate to leafy spurge growing under trees. Also dichlobenil 10G was applied at one site as a preemergence treatment for leafy spurge control.

The experiments were established at Mandan, ND in a tree grove and at Walcott, ND in a wind break. The trees were *Populus* spp. (cotton wood and aspen) and ranged from 6 to 12 inches in diameter with some saplings intermixed. The experiment at Mandan was established on 26 August 1981 under a partly cloudy sky, 70º F and 96% humidity. The plot size was 25 by 50 feet. The experiment at Walcott was established on 17 September 1981 under a partly cloudy sky, 70º F and 35% humidity, except the dichlobenil treatments were applied on 24 November 1981 under a cloudy sky, 32º F and 87% humidity. The plots were 50 by 20 feet. All glyphosate treated plots received two 2,4-D amine retreatments in the summer of 1982 using the CDA with a solution concentration of 1:4 (2,4-D:water v:v). The treatments using the CDA and compressed air sprayers were applied with single coverage at walking speed, except some overlap occurred as the applicator tried to prevent skipped areas while walking around trees. The data are reported in the Table.

Leafy spurge control in June 1982 with glyphosate ranged from 95 to 100% using either applicator which is similar to control normally obtained with glyphosate at 1 lb/A broadcast. Leafy spurge control remained satisfactory in September 1982, with glyphosate applied at 1:1, 1:3 (v:v) by CDA and 1:7 (v:v) by compressed air sprayer.

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Picloram at 1:3 and 1:7 (v:v) applied with the CDA gave good leafy spurge control in the spring. Leafy spurge control with picloram at 1:3 (v:v) remained at 85% control at Mandan in the fall, but some saplings showed herbicide injury. The best treatment at Walcott in the fall was picloram at 1:7 (v:v) with 90% control. Picloram at 1:33 (v:v) applied with the compressed air sprayer resulted in 100% control one year after treatment, but at 1:67 (v:v) control ranged from 0 to 40%.

The treatments of picloram plus 2,4-D at 1:1:10 (v:v:v) applied with the CDA or 1:2:65 (v:v:v) applied with the compressed air sprayer resulted in 100 and 90% control, respectively after one year. The dicamba treatments provided satisfactory control only when applied using the compressed air sprayer. Dichlobenil did not provide satisfactory leafy spurge control.

Glyphosate provided good leafy spurge control when applied using the CDA or compressed air sprayer. Leafy spurge control was good when picloram was applied using the CDA at 1:3 (v:v) or the compressed air sprayer at 1:33 (v:v). The combination treatments of 2,4-D plus picloram did show some synergism in leafy spurge control. Further research is needed with both applicators to determine the risk of damage to trees at various rates and under different environmental conditions.

Table. Leafy spurge control by various herbicides applied with the controlled droplet and compressed air applicators under trees -Walcott and Mandan, ND. (Lym and Messersmith).

			Control			
			Mandan		Walcott	
Application	Herbicide	Herbicide concentration	June 82	Sept. 2	June 82	Sept. 2
		(Herbicide:water)	(%)			
CDA	Glyphosate	1:1	100	90	95	78
	Glyphosate	1:3/1:2	95	100	85	50
	Picloram	1:3	100	85[a]	98	65
	Picloram	1:7	90	70	92	90
	Dicamba	1:3	---	---	98	0
	Picloram+2,4-D	1:1:10	---	---	99	100
Compressed air		1:7	100	100	92	95
Glyphosate	Glyphosate	1:14	99	90	85	60
	Picloram	1:67	70	40	75	0
	Picloram	1:33	98	100	100	100
	Dicamba	1:33	---	---	97	95
	Picloram+2,4-D	1:2:65	80	40	90	90
	Picloram+2,4-D	1:4:63	80	20	---	---
Granular	Dichlobenil	4 lb/A	---	---	20	0
	Dichlobenil	8 lb/A			60	30

[a] Damage to saplings.