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Multiflora Rose (*Rosa multiflora*) Control with Metsulfuron¹

JEFFREY F. DERR²

Abstract. Multiflora rose was defoliated completely 320 days after spring foliar application of metsulfuron. Metsulfuron and 2,4-D plus dicamba spring foliar applied controlled multiflora rose equally. Metsulfuron applied to soil using a spotgun at 20 mg per m diam of multiflora rose in the spring resulted in 95% control 320 days later in one study but only 50% control in another. Control was less when lower rates of metsulfuron were soil-applied with a spotgun. Tebuthiuron spring soil-applied completely controlled multiflora rose. All spring-applied foliar and soil applications seemed to control multiflora rose better than fall treatments.

Nomenclature: Dicamba, 3,6-dichloro-2-methoxybenzoic acid; metsulfuron, 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino] carbonyl] amino] sulfonyl] benzoic acid; tebuthiuron, *N*-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl] -*N,N'*-dimethylurea; (2,4-dichlorophenoxy)acetic acid, multiflora rose, *Rosa multiflora* Thunb. ex Murr. #³ ROSMU.

Additional index words: Chemical control, spotgun, dicamba, tebuthiuron, 2,4-D, ROSMU.

INTRODUCTION

Multiflora rose has been planted for over 40 yr in Virginia as a living fence, for wildlife cover, and to reduce headlight glare along highways (6). The plant also has been used as a rootstock for cultivated roses and may infest new areas from sprouts developing from the rootstock after the grafted plant dies. Through spread of original plantings and through dissemination by birds, multiflora rose has spread and has become a severe weed problem along highways, in pastures, and in other areas.

Herbicides such as 2,4-D plus dicamba or triclopyr {[(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid}, applied as a foliar spray or dormant application, will selectively control multiflora rose without injuring grasses (1, 2, 3, 4, 5, 6). Picloram soil-applied also will selectively control this weed in grasses (2, 3, 4).

The disadvantage in using 2,4-D, dicamba, triclopyr, or picloram is the potential hazard to nontarget broadleaf plants, either from spray drift, volatilization, or movement in surface or ground

water (6). Glyphosate [*N*-(phosphonomethyl)glycine] as a foliar spray and tebuthiuron as a soil treatment can be used for multiflora rose control but also will kill grasses (6, 7, 8). A herbicide is needed to selectively control multiflora rose without injuring nontarget plants.

Metsulfuron is a preemergence and postemergence herbicide that has shown potential to control multiflora rose in preliminary studies. Metsulfuron at 17 g/ha, foliar and basal-bark applied, completely controlled multiflora rose (8). Metsulfuron spotgun-applied (metered applicator which applies 1- to 20-ml doses) also controlled multiflora rose (8), demonstrating that the compound can be absorbed through plant roots. The objective of these experiments was to compare the effectiveness of metsulfuron as foliar- and spotgun-applications with recommended herbicides in studies conducted in 1986 and 1987.

MATERIALS AND METHODS

General conditions. The 1986 studies were conducted in a Braddock sandy loam (clayey, mixed, mesic, Typic Hapludult) with a pH of 5.6 and 4.8% organic matter. Soil type for the spring 1987 trials was a Glenelg loam (fine-loamy, mixed, mesic, Typic Hapludult) with pH 5.7 and 4.1% organic matter. Due to insufficient multiflora rose clumps at the spring location, a different location was used for fall applications. The soil at the fall 1987 location

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³ Letters following this symbol are a WSSA-approved computer code from Composite List of Weeds, Weed Sci. 32, Suppl. 2. Available from WSSA, 309 W. Clark St., Champaign, IL 61820.

was a Frederick cherty silt loam (clayey, mixed, mesic, Typic Paleudults) with a pH of 5.4 and 4.1% organic matter.

For all studies, a randomized complete block design was used, with one multiflora rose bush comprising one plot. Individual rose bushes ranged from 1.2 to 2.4 m wide in 1986 studies and from 1.0 to 2.0 m wide in 1987 trials. Foliar treatments were made using a CO₂-pressurized backpack sprayer with 8003 flat fan nozzles⁴. No surfactant was added to foliar treatments. Soil treatments were applied with a spotgun⁵.

Percent rose defoliation was recorded 45, 90, and 320 to 390 days after treatment for spring studies and 45 and 250 to 260 days after treatment for fall studies, with 0 = no injury and 100 = complete plant death. A 90-day rating could not be taken for fall treatments due to the winter dormancy of multiflora rose. In some cases, Japanese beetle (*Popillia japonica* Newman) feeding or drought caused defoliation in check plots. Data were subjected to analysis of variance with mean separation using Fishers Least Significant Differences Test at the 5% level.

Foliar treatments. Spring foliar treatments in 1986 were applied May 22 under 75% cloud cover and 13 C air temperature when multiflora rose was in bloom. Metsulfuron was applied at 13 and 39 mg/L and was compared to 2,4-D at 1.2 g plus dicamba at 0.6 g/L, with all multiflora rose foliage covered with the spray. Approximately 0.4 L were applied per multiflora rose clump, which corresponds to metsulfuron rates of approximately 22 and 67 g/ha. The first rain of 0.05 cm fell 2 days after treatment.

Fall 1986 foliar treatments were made Aug. 13 under 100% cloud cover and 21 C air temperature. Multiflora rose was in full leaf. The first rain of 1.4 cm fell 5 days after treatment.

The spring 1987 foliar treatments were applied May 14 under 30% cloud cover and 24 C air temperature. The first rain of 0.18 cm fell 2 days after application. Foliar treatments included metsulfuron at 48 and 145 mg/L and 2,4-D at 4.6 g plus dicamba

at 2.3 g/L, with all multiflora rose foliage covered with the spray. Spray volume was reduced for 1987 treatments to maintain the approximate metsulfuron rates of 22 and 67 g/ha used in 1986 trials.

The same foliar treatments were applied Aug. 11, 1987, for the fall study. Cloud cover was 25%, and the air temperature was 32 C. The first rain of 0.15 cm fell 5 days after application.

Spotgun treatments. Spring 1986 spotgun treatments were applied April 10 to multiflora rose that had fully leafed out. The first rain of 0.5 cm fell 13 days after treatment. Metsulfuron was applied to soil as a single 2.7- or 5.3-ml droplet of one of the three stock solutions per 1 m of multiflora rose canopy diameter. The stock solutions used were 0.9, 1.9, and 3.7 g/L. A 2.7-ml dose of the 0.9 g/L stock solution applied per 1 m of multiflora rose diameter was a metsulfuron rate of 16 g/ha. Tebuthiuron was applied to soil at 5.3 ml of a 187 g/L stock solution per 1 m of rose canopy diameter, which corresponds to tebuthiuron at 6.6 kg/ha.

Fall 1986 spotgun applications were made Aug. 13 under 100% cloud cover and 21 C air temperature. Multiflora rose was in full leaf. The first rain of 1.4 cm fell 5 days after treatment.

The spring 1987 spotgun treatments were applied May 14 under 30% cloud cover and 24 C air temperature. The first rain of 0.18 cm fell 2 days after application. The spotgun treatments were the same as the 1986 study except that tebuthiuron pellets containing 20% active ingredient were used instead of the wettable powder.

The same spotgun treatments were applied on Aug. 11, 1987, for the fall study. Cloud cover was 25%, and the air temperature was 32 C. The first rain of 0.15 cm fell 5 days after application.

RESULTS AND DISCUSSION

Foliar treatments. Metsulfuron foliar-applied controlled multiflora rose 95% or more 320 days after treatment at all rates tested in spring 1986 and 1987 studies (Table 1). Application volume apparently did not affect multiflora rose control in the spring. Metsulfuron controlled 95% at both rates tested in the fall 1986 study, but only 55% at 48 mg/L and 85% at 145 mg/L in the fall 1987 study when evaluated 255 days after treatment. Either the summer drought that occurred in 1987 reduced the effectiveness of -metsulfuron fall applied in

⁴TeeJet, Spraying Systems Co., North Ave., Wheaton, IL 60188.

⁵Metered spotgun applicator, Forestry Suppliers, Inc., 205 W. Rankin St., P.O. Box 8397, Jackson, MS 39204-0397.

Table 1. Percent multiflora rose defoliation as affected by herbicides applied postemergence in the spring or fall of 1986 and 1987.

Herbicide	Spray conc. (mg/L)	Rate (g/ha)	Spring			Fall	
			Days after treatment				
			45	90	320	45	255 ^a
					(% defoliation)		
1986 studies							
Untreated	...	...	0	0	28	43	8
Metsulfuron	13	22	74	98	96	94	96
Metsulfuron	39	67	100	100	100	88	95
2,4-D + dicamba	1200 + 600	2030 + 1020	93	100	98	89	40
LSD (0.05)			10	3	5	15	13
1987 studies							
Untreated	...	...	5	45	10	15	0
Metsulfuron	48	22	68	100	98	65	55
Metsulfuron	145	67	95	100	98	86	85
2,4-D + dicamba	4600 + 2300	2030 + 1020	100	100	100	93	48
LSD (0.05)			7	8	5	8	18

^a Fall 1986 and 1987 trials were evaluated 250 and 260 days after treatment, respectively.

1987 or metsulfuron provides better control with spring than fall applications. The summer drought was more severe in 1987 than 1986.

The 2,4-D plus dicamba treatments controlled multiflora rose 98% or more in spring 1986 and

1987 studies but controlled only 40 to 48% when fall applied and evaluated the next growing season (Table 1). Metsulfuron provided equivalent multiflora rose control as 2,4-D plus dicamba in spring applications. Metsulfuron at both rates provided

Table 2. Percent multiflora rose (ROSMU) defoliation as affected by herbicides spotgun applied in the spring or fall of 1986 and 1987.

Herbicide	Stock solution		Herbicide per m ROSMU diam. (mg)	Spring			Fall		
	Conc. (g/L)	ml/m ROSMU diam. (ml)		Days after treatment					
				45	90	390	40	250	
					(% defoliation)				
1986 studies									
Untreated	...	...	...	0	6	8	43	8
Metsulfuron	0.9	2.7	2.4	20	25	18	33	5	
Metsulfuron	0.9	5.3	4.8	38	40	43	78	20	
Metsulfuron	1.9	2.7	4.8	23	30	15	60	30	
Metsulfuron	1.9	5.3	10	58	75	60	69	45	
Metsulfuron	3.7	2.7	10	48	75	76	55	16	
Metsulfuron	3.7	5.3	20	78	95	93	78	58	
Tebuthiuron	187	5.3	1000	65	98	100	78	55	
LSD (0.05)				27	25	24	22	29	
1987 studies									
Untreated	...	...	...	5	45	10	15	25
Metsulfuron	0.9	2.7	2.4	5	40	13	20	10	
Metsulfuron	0.9	5.3	4.8	23	63	30	20	3	
Metsulfuron	1.9	2.7	4.8	20	53	13	38	18	
Metsulfuron	1.9	5.3	10	18	61	45	43	28	
Metsulfuron	3.7	2.7	10	30	53	33	60	60	
Metsulfuron	3.7	5.3	20	38	80	50	53	63	
Tebuthiuron ^a	...	...	1000	32	90	98	23	68
LSD (0.05)				12	22	21	17	23	

^a Tebuthiuron pellets (20% active ingredient) were used in this study and were applied at 1.0 g ai/m multiflora rose diameter.

greater control in fall 1986 tests and the higher rate provided greater control in fall 1987 applications when compared to 2,4-D plus dicamba. Fick et al. (7) reported that early leaf stages before flowering were the most susceptible growth stage of multiflora rose to postemergence herbicides. Injury symptom developed faster on 2,4-D plus dicamba-treated plants than those treated with metsulfuron (8).

Spotgun treatments. Metsulfuron at 20 mg/m canopy diam applied with a spotgun controlled 93% multiflora rose 390 days after the spring 1986 treatment (Table 2). Metsulfuron at 10 mg/m canopy diam controlled 76% multiflora rose. With multiflora rose, however, acceptable control must be about 95% or greater to reduce or to eliminate the need for retreatment in the following growing season. If a significant number of bushes recover from injury, the infestation will quickly build back to pretreatment levels.

Poorer multiflora rose control was observed with lower rates of metsulfuron spotgun applied in the spring 1986 study (Table 2). Generally poor control were seen with metsulfuron spotgun applied in the fall 1986 study and the two 1987 studies. The maximum injury in the next growing season was approximately 60%. Increasing the metsulfuron rate may be required for more consistent control from spotgun applications.

The drought in both 1986 and 1987 may have reduced the effectiveness of metsulfuron spotgun applied to soil compared to foliar applications. Applying the single spot as multiple 1- or 2-ml drops also may increase effectiveness since, in some cases, one stem on the bush closest to the spot

would die completely while other stems on the shrub would only be partially affected. This suggests that separate roots may supply separate stems on the bush. Applying multiple spots per bush would increase the amount of root tissue exposed to the chemical.

Tebuthiuron completely controlled multiflora rose in spring 1986 and 1987 studies but resulted in unacceptable control when fall applied (Table 2).

Metsulfuron effectively controlled multiflora rose when applied to the foliage in the spring. Multiflora rose can be damaged by metsulfuron soil spotgun-applied, but more work is needed to maximize control with spotgun applications. Spring foliar or spotgun treatments seemed more effective than the same treatment applied in the fall.

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