Bulletin 857

Multiflora Rose Control

THE OHIO STATE UNIVERSITY EXTENSION

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Multiflora rose *(Rosa multiflora* Thunb.*)* is a thorned bramble perennial plant that now infests more than 45 million acres throughout the eastern half of the United States. This plant's name is derived from the many clusters of white flowers borne during May and June. Older bushes can attain a height and a diameter of 15 feet or more, with a basal crown diameter of 8 inches.

Dense multiflora stands severely reduce pasture grazing for cattle, as well as the accessibility and usefulness of other noncultivated acres. Severe multiflora rose infestations may lower land values both for agriculture and for other uses, such as recreation and forestry.

Multiflora rose cannot be eradicated by a one-time destructive effort. Wherever multiflora rose has become naturalized, the soil near older plants soon contains a large seedbank. One plant can produce up to one-half million seeds per year, which can remain viable in the soil for many years. Birds and other animals disperse seeds across a wide area, but the relatively few seeds brought by them into a property where multiflora rose already has become established are of minor consequence. Therefore, if a pasture cleared of older plants is subsequently left untreated, multiflora rose will re-establish primarily in areas where it existed earlier.

Multiflora rose can also multiply by layering—the process whereby tips of canes that touch the ground develop roots. New plants can also arise from the shallow roots of older live plants. Several scattered multiflora roses, if left undisturbed, can form a dense thicket within a few years.

Many people have the misconception that they cannot successfully suppress multiflora rose on their property as long as their neighbors fail to expend equal effort. Although adjacent landowners are frequently implicated, birds often range over a one-half to a one-mile area, or more, enabling them to transport seed easily beyond most contiguous properties. *Rose control is possible using the methods suggested here even if adjacent landowners do nothing.* Multiflora rose can be more easily controlled within a single unit of land than some other perennial weeds, such as quackgrass or Canada thistle. Because multiflora rose has become widely naturalized, however, its control may only realistically be

Figure 1. Approximate range of multiflora rose as a noxious weed.

justified on portions of a property where its presence is detrimental to present or future land usage.

To be successful, multiflora rose control must become an integral part of each owner/operator's continuing land-management plan. Two important steps are necessary—the destruction of existing plants and the initiation of a yearly program to control seedlings as they appear. While the destruction of existing rose plants can be accomplished by either chemical or mechanical treatments, control is most effective when these two methods are combined. An alternate method of control involves managed grazing by goats or sheep.

Increasingly, three biotic agents are providing significant natural biological control—rose rosette disease, a virus; rose seed chalcid, a wasp; and the rose stem girdler, a beetle. Unfortunately, these agents have not yet sufficiently reduced multiflora stands in most areas to allow a reduction in the use of chemical, mechanical, or grazing control. Rose rosette disease and rose seed chalcid wasp are expected to intensify in future years to provide widespread biological control.

Figure 2. Multiflora rose plants on hillside.

Mechanical Control

Grubbing

Grubbing, pulling, or removing individual plants from the soil is only effective when all roots are removed, or when plants that subsequently develop from severed roots also are destroyed (Figure 3). These approaches are most applicable to lighter, scattered infestations. Bulldozing can be used to clear severe infestations, but the resulting lack of vegetation and looser ground may make the site subject to soil erosion.

Figure 3. Removal of entire multiflora rose plant by pulling with tractor.

Repeated Defoliation

Repeated defoliation will eventually kill most plant species, and multiflora rose is no exception. The single late-summer mowing often used for general weed and brush suppression in pastures and idle land may restrict topgrowth, but seldom kills multiflora rose plants (Figure 4). West Virginia University research compared various defoliation intervals over several seasons and evaluated the survival of individual multiflora rose plants. This research compared one-, two-, four-, and eight-week defoliation intervals beginning in May. One year later, 84% of the plants were dead, regardless of the defoliation interval. A subsequent experiment compared four- and eight-week defoliation intervals, which resulted in an average of 21% of plant death at the beginning of the second year, 78% by the third year, and 94% by the beginning of the fourth season. In both trials, more closely spaced clippings resulted in shorter shoot growth but no differences in the number of shoots, hardiness of thorns, or plant kill.

Figure 4. Repeated mowing of multiflora rose will eventually kill plants and reduce the population.

Smaller plants survived the longest following defoliation.

The West Virginia research, which simulated both mechanical cutting and close animal grazing, indicates that three to six mowings per season for two to three consecutive seasons are required to achieve effective plant kill. Custom rates for rotary mowing in recent years averaged about $13 per acre, with a range of $6 to $19, based on information from Purdue University and The Ohio State University.

Control With Herbicides

Table 1 (pages 8–9/centerfold) presents information about the herbicides that are most effective for control of multiflora rose. Some are labeled for application by more than one method, often at different times of the year. Table 1 indicates which herbicides are labeled for use in pastures, the recommended time of application for Ohio, and use rates. Treatment timing may be somewhat delayed in states with climates colder than Ohio. Because woody species other than rose may also need to be controlled, the table lists other species tolerant of herbicides at the rates listed for multiflora rose.

The challenge is to select the most appropriate herbicides to safely treat multiflora rose found in different natural settings on a property. This decision is also influenced by product label restrictions, cost, current and future expected land use, and site characteristics. Consider using the following herbicides for specific situations:

- **Grass pastures** (see labels for grazing restrictions):
  Cimarron, Cimarron Max, Crossbow, dicamba, glyphosate, Grazon P+D, Spike 20P.
- **Non-cropland** (fence rows, right-of-ways, and waste areas):
  Acme Super Brushkiller, Cimarron, Cimarron Max, Arsenal, Brushmaster, Crossbow, dicamba, Escort, glyphosate, Spike 20P.
- **Near woods or desirable trees** (where selective rose removal is desired):
  Cimarron, Escort, glyphosate.
- **Near streams or ravines** (where high intensity rainfall would result in offsite runoff):
  dicamba, glyphosate.

Applicators are expected to read, understand, and follow the directions on labels and to adhere to worker protection standards listed on the label. Wearing proper safety equipment and clothing, in addition to helping ensure safe application, conveys concern for the environment to the general public.

The recommendations presented in this publication are based on field research conducted by Ohio State University between 1971 and 1995, as well as applicable research from other states. In this research, the evaluation of plant kill eight to 17 months after application has been emphasized, rather than just the degree of short-term control of topgrowth.

Many herbicides do not consistently result in total plant kill, and best results are often obtained by combining chemical and mechanical control methods. Herbicides tend to kill rose plants from the peripheral roots inward toward the crown. Thus, subsequent mechanical mowing or pulling of treated plants often eliminates any remaining live plant parts and hastens reestablishment of grass cover. Because dead topgrowth also protects emerging rose seedlings, promptly removing it facilitates future field maintenance.

Comparative costs of different herbicides are best evaluated by determining the cost for the amount of each herbicide needed to treat an acre equivalent. These figures can then be multiplied by the average percentage of acreage infested to estimate actual treatment costs for a property. Pelleted products or herbicides applied undiluted to the soil are generally most costly.

Foliar Sprays

Foliar spraying of herbicide in a water carrier is an effective application method from spring leaf development through to plant senescence in the fall. Successful control with foliar sprays depends on thoroughly wetting all leaf and green stem tissue with a herbicide that is effective during that part of the growing season. Dense infestations in hedgerow situations are best controlled by spraying from both sides of the row.

Skid-mounted and modified field sprayers have been most commonly used for foliar applications (Figure 5). Spray units mounted on all-terrain vehicles (Figure 6) permit foliar treatment of multiflora rose growing on steeper terrain. Field sprayers powered by power take-off (PTO) or an engine can be easily and inexpensively adopted for foliar spraying. Simply attach 30 to 40 feet of pressure hose and a variable control, hand-held orchard-type gun to a coupling that carries solution to a boom section. Orchard-type guns typically propel solution 10 to 15 feet.

Foliar application of herbicide using spray gun and skid-mounted sprayer (Figure 5) and ATV-mounted sprayer (Figure 6).

Figure 5.

Figure 6.

Table 2 lists the quantities of commercial products required to mix 25 or 100 gallons of spray solution for foliar application. Foliar spray rates assume a 200-gallon-per-acre volume with about 35 psi pressure.

Ohio research has shown that foliar sprays of certain herbicides consistently provide effective control when applied

Table 2. Formulation of Foliar Sprays in Water.

		Product Needed for Spray Solution	
Product Name	**Use Rate (%)**	**25 Gallons**	**100 Gallons**
Acme SBK	2	2 qt	2 gal
Arsenal	0.5	1 pt	2 qt
Dicamba	1	1 qt	1 gal
Acme Brushmaster	1.5	1.5 qt	6 qt
Crossbow	1.5	1.5 qt	6 qt
Glyphosate	1	1 qt	1 gal
Grazon P+D	1	1 qt	1 gal
Cimarron/Escort + Surfactant	1 oz/100 gal + 0.25% v/v	0.25 oz + 0.5 pt	1 oz + 1 qt

Key to BRR Rating: 1 = All plants dead; 2 = slight regrowth; 3 = moderate regrowth; 4 = extensive regrowth.

Figure 7.

Glyphosate Foliar @ 1% Sol. (1982–94)

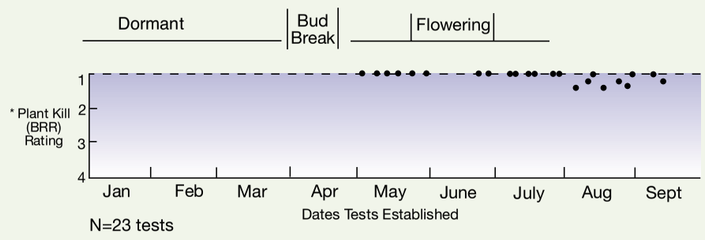


Figure 8.

Imazapyr (Arsenal) Foliar @ 0.5% Sol. for Arsenal, (1988–94)

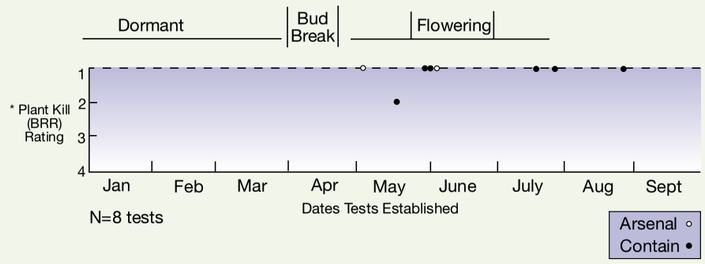


Figure 9.

Metsulfuron Methyl (Cimarron/Escort) Foliar

60% DF@ 1.0 oz/100 gal water + .25% v/v Surf. (1983–94)

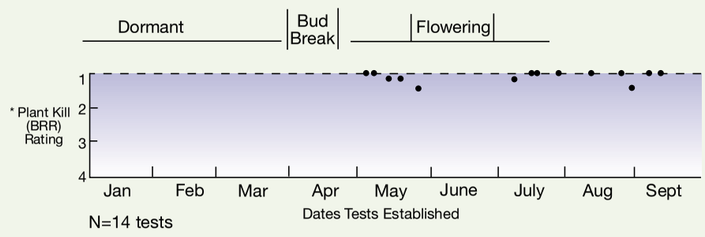


Figure 10.

Dicamba Foliar @ 1% Sol. (1979–94)

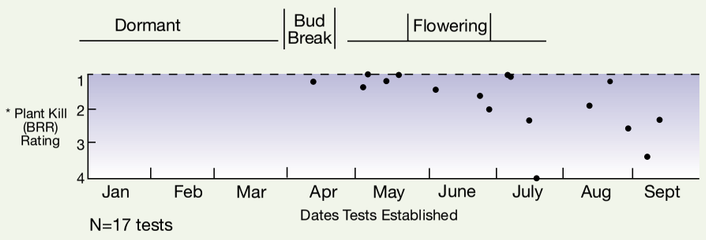


Figure 11.

Triclopyr + 2,4-D (Crossbow) Foliar @ 1.5% Sol. (1981–94)

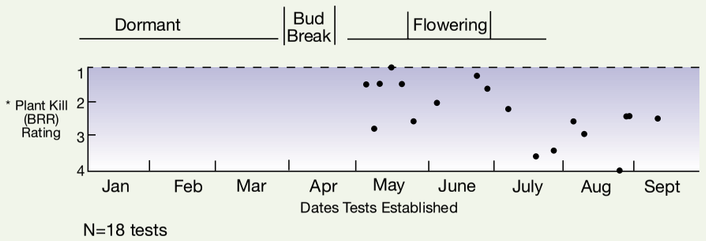
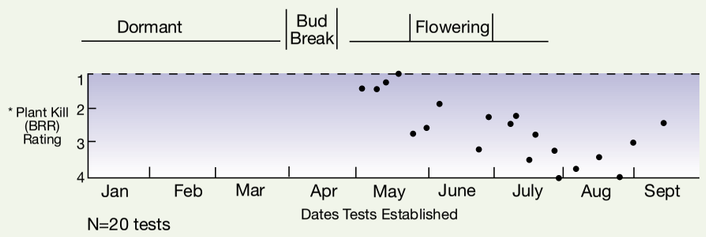


Figure 12.

2,4-DP, 2,4-D + Dicamba (Acme Super Brush Killer) Foliar @ 2% Sol. (1982–1994)



throughout the growing season, while others provide acceptable control only when applied early in the season. The herbicide effectiveness charts, shown in Figures 7 through 12, summarize plant kill based on basal resprout rating (BRR) data from experiments conducted over a number of years, where the herbicide was applied at the labeled rate known to provide optimal control under Ohio conditions. The dots on these charts represent the date each trial was established, or when herbicide was applied. The charts thus show herbicide effectiveness over a range of application timings, sites, soils, and climatic conditions. The resprout ratings are from evaluations made in late May or early June of the year following treatment. This interval provides ample opportunity for treated plants to show basal regrowth if not completely killed by the herbicide.

Although only BRR is presented here, Ohio State research has also included simultaneous collection of data on the control of topgrowth. This is important because past experience has shown that 85% or greater topkill must be achieved to force basal resprouting, which must occur for BRR data to be considered valid. Only resprout ratings are presented here, because control of topgrowth was consistently more than 85%, and generally closer to 100%.

Each dot in Figures 7 through 12 represents the mean (or average) BRR from a group of five test plants using the following scale: 1-Total plant kill (all test plants dead and no new resprouts noted); 2-Slight regrowth (one or two resprouts per plant); 3-Moderate regrowth (three to five resprouts per plant); and 4-Extensive regrowth (six or more resprouts per plant).

Although a rating of 1 (no regrowth) is most desirable, a rating of 2 is also acceptable. These values represent substantial herbicide effectiveness, especially considering that some retreatment of natural rose infestations is usually necessary. Because of stand density, properly spraying all plants with herbicide is often impossible. Mechanical removal of treated plants the following season will often complete the kill of plants exhibiting slight regrowth.

Figures 7, 8, and 9 show the control of multiflora rose with the recommended rates of glyphosate, imazapyr (Arsenal), and metsulfuron methyl (Cimarron, Cimarron Max, and Escort). These herbicides result in near-complete, season-long plant kill when applied throughout most of the growing season. Control sometimes decreased slightly when applied during July through early September, but compared with other herbicides, these are the products of choice for mid- to late-summer foliar applications in Ohio and nearby states.

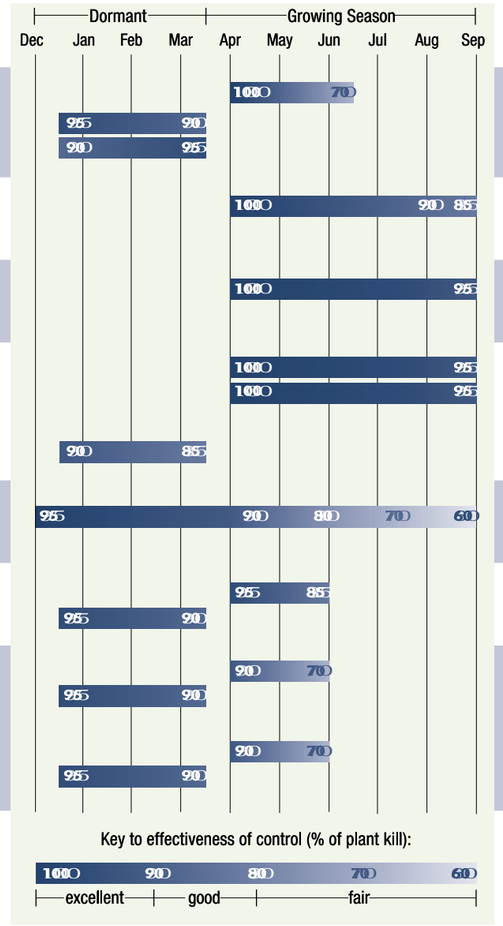
Glyphosate, Cimarron, and Cimarron Max are the products most commonly available to farmers, while Arsenal and Escort are primarily marketed for industrial vegetation control. Glyphosate, Cimarron, and Cimarron Max are labeled for pasture use. Glyphosate applied as a 1% solution by volume provides the broadest control of other associated brushy species, but also kills pasture grasses. Cimarron, applied at the rate of one ounce per 100 gallons, controls multiflora rose, but has minimal effect on other brushy species and pasture grasses. Cimarron Max, which contains growth regulator herbicides in addition to metsulfuron, is more active than Cimarron on other brushy species.

Applied as a 1% solution by volume, dicamba provided effective control from leafout through late June, but control tended to decrease to unsatisfactory levels with later applications (Figure 10). A few instances of total or near total plant kill, however, were achieved with July and August applications.

Foliar application of triclopyr plus 2,4-D (Crossbow) as a 1.5% solution by volume resulted in a more erratic, but generally satisfactory pattern of plant kill through June (Figure 11). Later application of Crossbow resulted in greatly reduced control. Research at Pennsylvania State University, West Virginia, Purdue, and Kentucky has also shown less effective control from late-summer applications of Crossbow and other phenoxy-containing herbicides. However, research at Iowa State and the University of Wisconsin showed acceptable control with Crossbow into late summer. This suggests that phenoxy-containing herbicides—such as Crossbow, Acme Super Brushkiller, and Brushmaster—may provide more effective season-long control of multiflora rose in western parts of the North Central region than in areas from Indiana and Kentucky eastward.

Table 1. Labeled Herbicides and Recommended Application Methods and Timings for Control of Multiflora Rose.

Herbicide Names	Trade Name	Pasture Label	Application Method	Application Interval in Ohio	Product Use Rate and Carrier	Tolerant Woody Species At Use Rate	Special Remarks
Dicamba	Banvel, Sterling, Oracle, others	Yes	Foliar Basal bark Spot concentrate		1% in water 6.6% Lo-Oil* undiluted to soil	Greenbrier, hawthorn	Best foliar activity during April through June after full leafout.
Glyphosate	Roundup, Touchdown, Glyphomax, others	Yes	Foliar		1% in water	Red maple, oaks	Use clean water source. May be used near wooded areas if spray is kept off foliage of desirable plants.
Imazapyr	Arsenal	No	Foliar		0.5% in water	Black locust, elms	Nearby plants including forages can be adversely affected from runoff or spray drift.
Metsulfuron-methyl	Cimarron Escort	Yes No	Foliar Foliar		1.0 oz per 100 gal of water	Most not affected.	Include 0.25% nonionic surfactant (1 qt/100 gallons) in foliar spray mix. Slow acting.
	Escort	No	Spot concentrate		1 oz per 1 gal of water	Most not affected.	Prepare fresh solution daily and agitate spray mix periodically.
Tebuthiuron	Spike 20P	Yes	Soil-applied pellets		1/4 oz per 22 sq ft	Sassafras, persimmon	Can move on sloping ground and affect desirable plant species.
Triclopyr + 2,4-D	Crossbow	Yes	Foliar Basal bark		1.5% in water 4% in diesel fuel**	Greenbrier, red cedar	Best foliar activity—April through mid-June.
2,4-DP + 2,4-D + dicamba	Acme Super Brush Killer	No	Foliar Basal bark		2% in water 5% in diesel fuel**	Red and sugar maple, osage orange	Best foliar activity—April through mid-May.
	Acme Brushmaster	No	Foliar Basal bark		2% in water 5% in diesel fuel**		



* See Table 4 on page 10 for Lo-Oil formulation information.

** No. 2 diesel fuel or kerosene.

Figure 12 shows effectiveness of the pre-mix formulation of 2,4-DP, 2,4-D, and dicamba (Acme Super Brush Killer) applied as a 2% solution by volume. In Ohio, it provided acceptable control only when applied from leafout in April through mid-May, after which time effectiveness decreased to unacceptable levels. This pattern also typifies the effectiveness of Brushmaster, another premix formulation of these same herbicides with a different solvent-surfactant system.

Weed scientists at West Virginia University have conducted limited research with Grazon P+D, a premix of picloram and 2,4-D. This product is approved for pasture use in West Virginia, but not in most other Midwestern states. Grazon P+D effectively controlled multiflora rose when applied in June at the rate of 2 quarts per acre. Grazon P+D is a restricted-use pesticide due to its mobility in soil and the risk of injury to sensitive crops, especially when it contaminates irrigation water.

Basal Bark Sprays

The basal bark method (Figure 13) is primarily used during the dormant season to apply a mixture of herbicide in a diesel fuel or kerosene carrier to the lowest 18 to 24 inches of stem and crown of plants. This carrier also acts as a penetrant to help move the herbicide into the cambium. Most low-pressure hand sprayers are suitable for basal treatments when fitted with a single-nozzle spray wand. Where possible, treat multiflora rose bushes from more than one side. Adding a wand extension is helpful when working near thorny multiflora rose plants. Use of an adjustable cone nozzle is recommended.

Basal bark treatments use lighter, less costly, and more portable spray equipment compared to foliar applications. This equipment is well adapted for use on steeper terrain where multiflora rose frequently occurs. If a light covering of snow is present, footprints can assist in identifying treated plants. Follow individual herbicide labels; applications are generally permitted when ground is frozen, provided there is not excessive snow or surface water or ice to prevent proper application to plant stems and crown. Do not apply in a manner that will directly contaminate water. The basal bark method uses a relatively low spray volume and is targeted only to the lower portion of bushes. This procedure reduces the potential for off-site herbicide movement. Injury to sensitive crops is generally minimized since they are not present in adjacent areas in the wintertime.

Figure 13. Basal bark application of herbicide to lower 18 to 24 inches of plant.

Table 3 shows the mean effectiveness ratings for four

Table 3. Herbicides for Dormant Basal Bark Application Using No. 2 Diesel Fuel or Kerosene Carrier.

Product	Use rate (%)	Pasture label	Product needed for 1 gallon solution		Mean plant kill (BRR 1-4)[1]	Number of trials
			Ounces	Milliliters		
Acme SBK	5	No	6.4	189	1.4	12
Dicamba	6.6	Yes	8.4	250	1.4 (Lo-Oil)	17
Brushmaster	5	No	6.4	189	1.2	6
Crossbow	4	Yes	5.1	151	1.4	8

[1]BRR (basal resprout rating) scale: 1 = none, 2 = slight, 3 = moderate, and 4 = extensive basal regrowth 8 to 15 months after application.

Table 4. Mixing Various Quantities of Dicamba Lo-Oil Basal Bark Solution.

Spray solution dicamba (4 lb/gal)						Surfactant[1]			Kerosene or No. 2 Diesel					Water				
English or Metric						English or Metric			English or Metric					English or Metric				
(gal)	(oz)	=	(pt/qt)	=	(ml)	(oz)	=	(ml)	(oz)	=	(qt)	=	(ml)	(oz)	=	(qt/gal)	=	(ml)
1	8	=	0.5 pt	=	237	0.5	=	15	20	=	0.6	=	592	100	=	3.12 qt	=	2960
2	16	=	1 pt	=	474	1	=	30	40	=	1.2	=	1183	200	=	6.25 qt	=	5920
5	40	=	1.2 qt	=	1184	2.5	=	74	100	=	3.12	=	2960	500	=	3.9 gal	=	14800
10	80	=	2.5 qt	=	2368	5	=	148	200	=	6.25	=	5920	1000	=	7.8 gal	=	29600

[1]Acutrol emulsifier or nonionic surfactant.

herbicides labeled for dormant basal bark applications. Dicamba and Crossbow are labeled for use in pastures. This table also lists herbicide rates and the amount of product to mix with approximately one gallon of No. 2 Diesel or Kerosene carrier. Dicamba can also be formulated at lower cost as an oil-in-water emulsion with water and nonionic surfactant substituted for about 85% of the petroleum carrier. See Table 4 for information on mixing various quantities of dicamba Lo-Oil basal spray. Dicamba data in Table 3 are from trials using the Lo-Oil mixture.

Important Note

Dedicating a hand sprayer exclusively to basal bark treatments is desirable, because it is very difficult to properly clean any hand sprayer used for basal bark applications for later applications of any pesticide to tobacco, vegetable, ornamental, or other sensitive crops.

Basal bark treatments were effective throughout the December 20 to April 10 dormant season when experiments were conducted in southern Ohio. All four herbicides provided similar and very effective multiflora rose control. In more than 50% of the experiments, complete plant kill occurred. All of these herbicides except dicamba contain the phenoxy herbicides 2,4-D and/or 2,4-DP. It is apparent from this research that phenoxy-containing herbicides control multiflora rose in Ohio more consistently and effectively when applied as dormant basal bark treatments, compared with foliar sprays. While dormant basal bark results were acceptable overall, a few unexplained instances of less than acceptable plant kill were encountered with the most extensively tested products.

Soil Applications

Dormant Spot Concentrate

This treatment method uses a hand-held spot applicator to apply a measured quantity of herbicide to the ground beneath plants within 6 to 8 inches of plant crowns. The amount of herbicide applied depends on the estimated diameter of individual multiflora rose plants or plant clumps. This technique is especially useful for control of scattered roses growing on steeper terrain and for follow-up applications to control regrowth from prior herbicide treatment. Spot applicators are sold for $50 or less through veterinary and farm supply houses. They can usually be set to deliver 4 or 8 milliliters per trigger squeeze.

The applicator carries the light pistol-type spot gun in one hand (Figure 14). The gun is attached by plastic tubing to a one-gallon, hand-held container. As with basal dormant spraying, selection of a winter day with a light dusting of snow allows foot tracks to help determine which bushes have been treated. Labels allow application to frozen ground as long as snow or water does not prevent proper contact with the soil surface. On sloping ground, the herbicide should be placed upslope from the plant crown wherever possible. With larger plants, divide the herbicide between two or more places near crowns to intercept more roots.

Two herbicides are labeled for dormant spot concentrate applications—dicamba and metsulfuron methyl (Escort only). Dicamba is labeled for use in pastures. Both of these herbicides should be applied after soil temperatures drop below 40°F and before multiflora plants initiate significant spring leafout. Application when soil temperatures are low is especially important with dicamba to reduce degradation of herbicide by soil microorganisms and ensure adequate root uptake by rose plants. Reduced effectiveness of Escort when applied after leafout suggests that degradation in soil is a concern with this herbicide also. Dicamba is applied undiluted, based on plant canopy diameter (see Table 5). Do not exceed two gallons of dicamba per acre with this technique.

Escort solution is prepared by mixing 1 ounce (29.6 gms) of Escort 60% DF with 0.3 ounce (10 milliliters) of nonionic surfactant in 1 gallon (3,785 milliliters) of water. Agitate the container occasionally during application to keep the herbicide in suspension. Apply this solution to the base of plants at the rate of 8 milliliters for each two feet of plant canopy diameter. Prepare fresh mixture daily because metsulfuron methyl gradually breaks down in water by hydrolysis.

While acceptable results generally occur with application of these herbicides to dormant rose plants, control has occasionally been unacceptable in Ohio State University research (see Table 6). Because root uptake is involved, lack of precipitation after application may occasionally inhibit herbicide movement into soil and reduce efficacy.

Soil Treatment with Pellets

Spike 20P is currently the only herbicide pellet labeled for multiflora rose control. It is applied at the rate of 1/4 ounce per 22 square feet of plant canopy area and should be placed near the base of the plant for most effective control. The active ingredient, tebuthiuron, is an extremely active, total vegetation control herbicide. It kills multiflora rose and other woody plants, grasses, and weeds by root uptake.

Figure 14. Dormant spot concentrate application of herbicide to soil at base of multiflora rose plant.

Spike is most effective when applied in the winter months (Figure 15). Initial defoliation often is followed by several cycles of leafout and subsequent defoliation. The presence of yellowish tissue in the tips of stem growth indicates that further leafout and defoliation cycles should occur. Spike will kill trees, bushes, forages, and other desirable plants if their roots extend into treated areas. Remember that feeder roots of desirable species may extend beyond the dripline of topgrowth. Also, the tebuthiuron in Spike 20P can readily leach downslope 10 feet or more if sudden heavy precipitation occurs before the herbicide has moved down into the soil profile.

Table 5. Dicamba Spot Concentrate Application Rates.

Plant Canopy Diameter	Dicamba (4 lb/gal) Needed
	English or Metric
5 feet	1/4 oz = 7.4 ml
10 feet	1 oz = 30 ml
15 feet	2 1/2 oz = 74 ml

Table 6. Multiflora Rose Control in Ohio Winter Field Trials of Dormant Spot-Applied Herbicides.

Number % of Trials With	Product of Trials	Mean BRR Rating[1]	Complete Plant Kill
Dicamba	16	1.5	56%
Escort	10	1.2	60%

[1]BRR (basal resprout rating) where: 1 = none, 2 = slight, 3 = moderate, and 4 = extensive basal regrowth 8 to 15 months after application.

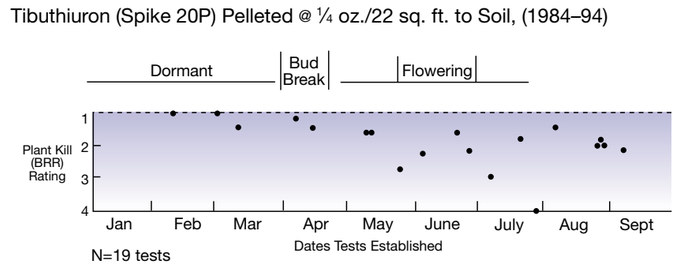


Figure 15. Control of multiflora rose with Spike 20P applied to soil.

Cut-Stump Treatments

Cut-stump herbicide treatments with picloram (Pathway), imazapyr (Arsenal, Stalker), triclopyr (Pathfinder II), etc., can be used to kill the roots and crown after large rose plants are cut near ground level. These may be most useful when only a small number of multiflora rose and other brushy species need to be removed from a property. Research at Purdue University has shown these treatments to be very effective.

Control by Animal Grazing

Goats or sheep or a combination of both, with or without cattle, can be used to control multiflora rose (Figures 16 and 17). This method is especially appropriate on steeper terrain. Herbicide application or rotary mowing is suggested prior to grazing to weaken brush, if topography permits. In West Virginia University research, goats successfully opened severely brush-covered pasture in one season. Several more seasons of managed grazing were required to achieve near complete control of multiflora rose and the other brush species present.

Figure 16. Goats are effective for defoliation of multiflora rose plants.

Goats, unlike sheep or cattle, will destroy many brush, saplings, and small trees by defoliation and debarking. Goats are not deterred by thorny vegetation. They defoliate higher up on brush and trees than sheep, by standing on their hind legs. Goats will generally defoliate multiflora rose stems to a height of about 5 feet.

In West Virginia University research comparing goats and sheep, goats reduced brush cover in pasture from 45% to less than 15% in one season. Sheep required three seasons to accomplish the same reduction. Goats were able to clear mixed species of brush regardless of whether a herbicide or mowing was used initially. With sheep, the inclusion of a mowing or herbicide application made them as effective as goats in their initial clearing of rose plants.

Spring and early summer proved to be the critical times for control of brush with goats or sheep. Grazing after the beginning of August was of negligible value. Eight to 10 mature goats or sheep per acre may be required early in the season, but this stocking rate must be reduced later in the summer when pasture growth slows.

Even though goats can significantly reduce brush from a pasture in one season, complete kill of brush species required continued grazing management for several seasons. Brush cover was reduced to 2% of pasture after five years of grazing by goats.

Proper rotational grazing management is more difficult with mixed animal species. Having enough animals for early grazing to defoliate brush rapidly without overgrazing the grasses is important. Overgrazing of pasture grasses is more of a problem with sheep because they prefer and consume grass first, then they browse the brush. Goats have the opposite preference.

West Virginia University research suggests that the most effective clearing and subsequent complete kill of multiflora rose in pastures could result from grazing a mixture of goats, sheep, and cattle. Higher goat numbers would be used at the beginning, then reduced after three to four seasons. Inclusion of some sheep or goats with cattle is required to ensure long-term control by animals of multiflora rose in pastures. Cattle serve a useful mechanical function when grazed with goats or sheep even from the beginning of land clearance. They make pathways and trample the brush killed or partially killed by the goats or sheep. West Virginia research studied only goats alone or sheep alone during the first three years. Sheep and goats were combined in some treatments during the final two years of research.

Some eastern Ohio farmers have satisfactorily used Angora goats for brush cleanup in place of dairy or meat-type goats. Angoras are easier to control, because they do not jump as high, and they remain within fences. Also, sale of wool offers the potential for additional income. The horned Angora goats use their horns to pull down multiflora stems for feeding. They normally are sheared twice a year (September and March). For about two weeks following shearing, they need to be protected from cold rains.

Successful brush control with grazing animals depends on both good fencing and a good pasture use and development plan. Keys to pasture management include good fences, rotational grazing, enough animals to defoliate brush in the spring without severely overgrazing the grasses, and maintenance of proper pasture fertility to improve grass cover and minimize soil erosion as brushy species decrease in the pasture.

Biological Control Agents

Prior to the 1980s, multiflora rose grew essentially "pest free" throughout most of its area of establishment in the eastern half of the United States. This freedom from destructive diseases, insects, or other kinds of biological pests enhanced its rapid spread following initial use as a rootstock in propagating ornamental roses and conservation plantings made in the 1940s and 1950s.

Presently, three biotic agents have become destructive pests on multiflora rose and show potential to eventually provide significant biological control. They are rose rosette disease (RRD), a mite-vectored virus; rose seed chalcid, a torymid wasp that infests and kills developing rose seeds; and rose stem girdler, a beetle whose larvae girdles and kills plant canes.

Most attention to date has focused on rose rosette disease, but the rose seed chalcid also may have major future impact in biocontrol.

Rose Rosette Disease

Symptoms of rose rosette disease (RRD) on multiflora rose include red and purplish veins, production of bright red lateral shoots, dwarfed foliage, and proliferated development of compact lateral branches to form "witches brooms" (Figures 18 and 19). The disease is transmitted by a tiny eriophyid mite *(Phyllocoptes fructiphilus)* that is widely and naturally found on roses throughout most of the country. RRD-infected plants die within two to five years of infection.

Figure 17. Sheep grazing on multiflora rose foliage.

This virus disease is now found within an area roughly bounded by Iowa and Wisconsin on the north; Texas on the south; California, Utah, and Wyoming on the west; and Maryland, Pennsylvania, Virginia, and Delaware on the east. Rose rosette disease is much more prevalent in some areas than others. The disease might eventually kill much of the multiflora rose in the eastern United States as it spreads further eastward. West Virginia researchers, however, have identified several insect and fungal predators of the RRD-vectoring mite. These, along with drought, low plant density, and extreme temperature changes, all can adversely influence the rate of spread and intensification of RRD.

RRD is less prevalent on multiflora rose plants growing in shade than on plants growing in full sun. In a survey of the incidence of RRD in Iowa, multiflora rose growing in wooded areas had the lowest incidence of RRD, and less than 25% of these sites had the disease present. Nearly 80% of the prairie/pasture sites were infested.

RRD has been successfully transmitted by grafting infected stems onto healthy plants, but efforts to introduce rose rosette disease into non-infested areas by grafting have proved difficult. A significant incidence of new RRD infestations cannot be expected until the second or third year following grafting.

Figure 18. Symptoms of rose rosette disease on multiflora rose.

Rose rosette disease can also infect most but not all types of domesticated ornamental roses. The risk of movement of RRD from multiflora rose to cultivated roses is thought to be low due to the greater tolerance of cultivated roses to RRD and the general lack of proximity between locations where cultivated roses and multiflora rose grow. However, introduction of RRD on multiflora rose

Figure 19. Multiflora rose plants showing symptoms of rose rosette disease.

near areas where cultivated roses are grown should be avoided.

Rose rosette was first found in Ohio in 1987 and by 1993 was detected widely across the state. Where RRD is present, it is not necessary to refrain from chemical or mechanical controls to rapidly reclaim property for other purposes. Ample RRD-infected plants exist nearby to perpetuate local intensification of this rose pathogen.

Rose Seed Chalcid

The **rose seed chalcid** *(Megastigmus aculeatus var. nigroflavus)* has been shown to be widely distributed where multiflora rose is found in the United States. The chalcid, most prevalent in eastern states, is spread by birds and is catching up to the widespread distribution of multiflora rose. The small torymid wasp lays eggs within seeds, which are devoured by the resulting larvae. This biological agent is likely to spread and colonize many stands in the future, eventually destroying the viability of seeds produced by affected plants. This would become an effective biological control, especially where rose rosette is also present.

Figure 20. Multiflora rose plants will reinfest previously treated areas unless annual preventive measures are implemented.

Figure 21. Relocation of fencing to allow treatment of areas infested with multiflora rose.

Rose Stem Girdler

The **rose stem girdler** *[Agrilus aurichalceus* (Coleoptera: Buprestidae)] may be of lesser importance, but in concert with the others should further enhance biocontrol. The larvae girdle and can kill individual canes, but not whole plants. Developing rose hips (fruits) and seeds above the girdling will die. West Virginia University researchers have found an abundance of rose stem girdler at sites in Indiana, Ohio, Pennsylvania, and West Virginia, which is providing some degree of control.

Follow-Up Maintenance

A successful multiflora rose control program requires some yearly re-treatment or proper grazing management. Unless the landowner is willing to adopt a long-term program, any success achieved in one year will be largely negated by reinfestation within the next two or three years.

Dead shrubs should be removed by the next season. Incompletely killed plants should be either treated with an appropriate herbicide or mechanically removed. Rotary mowing is an effective way to rid a pasture of small to moderately-sized dead shrubs. Rotary mowing shatters and scatters the brittle topgrowth to hasten decomposition. Size of equipment will determine the maximum size of plants that can be removed by mowing. Extremely large shrubs with 6- to 8-inch diameter basal crowns often may have to be removed by a bulldozer, front-end loader, or tractor and chain. Burning is one method for removing dead topgrowth in a hedgerow or piled dead plants from a pasture, provided it can be done safely and in conformity with local ordinances.

If possible, relocate fencing so the previously infested area can be reseeded and mowed regularly. If this is not possible, reseed and be prepared to remove chemically or mechanically any new shrubs that develop near the new fence (Figures 20 and 21).

Within pastures, remove any rolls of old fencing, abandoned equipment, or piles of debris that can shelter rose plants, so that the entire area can be mowed periodically. Continue to treat escaped plants or newly emerging seedlings one or several times annually, or use goats/sheep for control in steeper pastures where mowing is not possible. Similarly, use herbicide or mechanical removal to control new seedlings that appear in wooded or semi-wooded noncrop areas.

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Additional information was obtained through personal communications with land-grant university weed-control specialists in the states of Pennsylvania, Indiana, Iowa, Kentucky, and West Virginia.


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