



Agronomy Facts 46

# Multiflora Rose Management in Grass Pastures (An Integrated Approach)

The weed multiflora rose (*Rosa multiflora* Thunb.) is an increasing problem in Pennsylvania pastures and noncrop-land. It thrives on idle land, fencerows, and minimally maintained, hilly pastures. Originally introduced from Asia and promoted as a “living fence” to control erosion and provide food and cover for wildlife, multiflora rose quickly spread and is considered a noxious weed in Pennsylvania and surrounding states.

Once multiflora rose is introduced, its aggressive growth can rapidly overtake desirable land, forming a dense, thorny thicket within a few years. Although the weed spreads mainly through seed dispersal by birds and other animals, it also spreads by layering. Layering occurs when the tip of the cane, or woody stem, touches the ground, forms a shallow root system, and generates a new shoot. Mature shrubs can grow 9 to 12 feet wide and 6 to 10 feet tall, producing many arching, thorny canes. Generally, the large compound leaves are each composed of seven to nine leaflets. Multiflora rose blooms during late May or June, producing up to several hundred white or pinkish flowers in clusters throughout the bush. Each flower yields a small, round fruit (hip) that changes from green to bright red upon maturity and contains seeds that can remain viable in soil for 10 to 20 years.

Noxious weed laws in Pennsylvania and other states require landowners to manage problem weeds, including multiflora rose. One-time control tactics are generally inadequate. Combinations of preventive, cultural, mechanical, biological, and chemical methods must be used to eliminate multiflora rose.

## PREVENTION AND GENERAL CULTURAL CONTROL

Although it is nearly impossible to keep birds and other animals from dispersing rose seeds into pastures and non-cropland, it is possible to prevent multiflora rose from becoming a major problem if infestations are controlled in their early stages. The following cultural or preventive practices will help keep multiflora rose from becoming established while optimizing pasture production:

- Follow soil test recommendations for lime and fertilizer.
- Plant pasture species adapted to climate, soil, field conditions, and grazing system.

- Prevent overgrazing.
- Scout pastures regularly for weeds, insects, and diseases and control them when necessary.
- Mow annually to prevent establishment of multiflora rose; however, once established it is relatively tolerant of infrequent mowings.
- Spot-treat young weeds with an effective herbicide before they become well established and set seed.
- When using equipment around older rose bushes, remove rose hips and seed from equipment to avoid introducing seeds into noninfested areas.

## MECHANICAL CONTROL

Mechanical methods of control include mowing and excavating. According to research, successful control of multiflora rose requires mowing three to six times per season for more than one year. Repeated mowing defoliates the plant, depleting its root food reserves and eventually killing it. Unfortunately, repeated mowing can become quite costly, time consuming, and laborious.

Excavating, the second type of mechanical control, involves pulling or removing individual plants from the soil using a tractor and chain, front-end loader, backhoe, or bulldozer. Excavating is only effective if all roots with shoot buds are removed, or shoots from remaining roots are controlled with follow-up tactics. Excavating with a tractor and chain works well with a limited number of rose bushes. However, dense infestations require the use of heavier equipment to dig around and below the plants to loosen and extract the root systems.

## BIOLOGICAL CONTROL

Biological control agents are natural enemies that attack the target plant at various stages of growth. The impact of these agents can range from temporary cosmetic effects to death of the entire plant. Biological control is considered safe, permanent, and economical. However, biocontrol programs are often unsuccessful, take a long time to implement, and produce inconsistent results. Potential biological control agents for multiflora rose include insects, pathogens (disease-causing organisms), and herbivores.

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## **Insects**

Most insect pests associated with multiflora rose cause only minor injury to the plant. Three insects do have the potential to reduce multiflora rose populations in the Northeast, however. They are the tortricid hip borer, which consumes parts of the flower; the rose seed chalcid, which destroys the seeds; and the raspberry cane borer, which kills the stems. The larvae in each case are responsible for the injury. In most circumstances, however, these three insects are not present in sufficient quantity to eliminate a multiflora rose infestation.

## **Pathogens**

Several pathogens are associated with multiflora rose. The most promising pathogen for eliminating this weed is the rose rosette disease (RRD), a virus spread by a mite. Multiflora rose plants infected with the disease generally die within two years. The first disease symptom, a bright-red and dark-red mosaic pattern on new leaves, appears within 30 days of initial infection. The pattern either follows the veins in the leaf or appears as spots or blotches. Thirty to 90 days after infection, the plant begins to produce numerous lateral shoots. These shoots are usually bright red in color and form dense clusters, often called witches' brooms. During the winter months, the infected, weakened plants are susceptible to heavy frost damage. The following spring, the plants will have red lateral shoots and thick clusters of small, reddish-green leaves. Within two years of infection, the entire plant, including the root system, will die. Only certain members of the rose family are susceptible to RRD. Some ornamental rose varieties are also affected, although many appear less sensitive than multiflora rose.

RRD has spread to the East from its origins in the Midwest. Virginia, West Virginia, and southern and central Pennsylvania have reported the presence of the disease-carrying mite and associated symptoms. As with most biocontrol agents, the mite is quite sensitive to changes in the environment, so it may be some time before it spreads throughout the Northeast. Then it will take a while for plants to become infected and die. While RRD may not eradicate the multiflora rose problem, it should help reduce it over the long run.

## **Herbivores**

Goats and sheep can help control multiflora rose. They eat brush and other weedy broadleaves, allowing pastureland species to prosper and improving grazing conditions for livestock. If sufficient shrubs and broadleaf plants are available within the pasture, goats and/or sheep may graze with cattle or other compatible livestock. Research suggests that goats are superior to sheep and cattle for brush control. Unlike the others, goats destroy small woody plants by debarking them and are not deterred by thorny vegetation. They also browse higher up the weedy plants than some other types of livestock because they can stand on their hind legs to reach food.

An initial stocking rate of eight to ten mature goats and/or sheep per acre for four seasons or more should be adequate to control pastures infested with multiflora rose.

Stocking rates should be reduced later in the season as pasture growth slows. If used properly, animals, especially goats, can be good alternatives to chemical or mechanical control methods for multiflora rose and other brush species. They can also help reduce or eliminate costs associated with other control options.

## **CHEMICAL CONTROL**

Herbicides should be used when needed to supplement preventive, cultural, mechanical, or biological methods. To make herbicides as effective, safe, and economical as possible, always:

- Select the appropriate herbicide for your weed problem and crop. For additional information, refer to the *Penn State Agronomy Guide* or consult with your county extension educator.
- Read the herbicide's label carefully and follow directions. The label provides important information on safe use, application, disposal, and storage.
- Apply herbicides at the proper time.
- Apply the recommended amount to avoid injury, soil residues, and poor control.
- Calibrate application equipment several times during the season to ensure that the correct amount of herbicide is applied.
- Wear proper protective clothing.
- Learn to predict weed problems. Scout fields regularly and record the types and locations of weeds present. Use field records to plan an integrated control program.

## **Methods of Application**

Soil, foliar, thin-line, and basal bark application methods can be used to apply herbicides for multiflora rose control. To determine the most appropriate treatment method, carefully read the herbicide label.

## **Soil treatments**

Herbicides applied to the soil are usually residual. That is, they provide two months to two years of control. They are applied as liquids, granules, or pellets within the bush's dripline (ground area beneath the plant canopy). Dry herbicides are scattered underneath the bush or undiluted liquid herbicides are applied to the soil 6 to 8 inches from the base of the plant. The herbicides will move through the soil to the root zone. Once they are taken up by the roots, they will spread throughout the plant. Unfortunately, adjacent nontarget species, especially on hillsides, may be injured by these treatments if the herbicides move or if the root systems of the nontarget plants overlap the zone of application. Application timing depends on the herbicide used.

## **Foliar treatments**

Herbicides applied to the leaves and green stems during late spring or early summer (usually April to June) between the bud and bloom stages generally provide the best foliar control. Some treatments are also effective in late summer or early fall. Because good coverage of the foliage is necessary for control, it is best to apply the herbicides until they

run off the leaves. Effectiveness of the postemergence herbicides can be reduced by drought, extreme temperatures, rainfall shortly after treatment, weed growth stage, and other factors. Spray drift to nearby susceptible plants may be a concern when applying foliar treatments.

#### **Thin-line treatments**

This method works best in early spring through early summer to control small multiflora rose plants. A thin line of undiluted herbicide is applied around stems that are 0.5 inch or less in diameter. This method is less appropriate for bushes with large numbers of stems since each stem requires individual treatment.

#### **Basal bark treatments**

In comparison to other application methods, basal bark treatments have several advantages. They are relatively inexpensive, have a low risk of injury to adjacent plants from drift or root uptake, and provide more consistent control than foliar treatments. In addition, the best application timing for this treatment, late December to early April before leaf bud expansion, is a slow time of year for other field work. Basal bark treatments are applied to the lower or base areas of the plant around the crown region. They usually include a petroleum base (diesel fuel, kerosene, etc.) and a water carrier to improve penetration through the bark. Applications should be made with a single-nozzle spray wand when the bark is dry to improve spray retention. A disadvantage of these treatments is that it is difficult to apply the herbicide without being scratched by rose thorns.

#### **Herbicides for Control of Multiflora Rose**

Several herbicides are available for controlling multiflora rose in grass pastures. A brief outline of suggested herbicides and their application methods follows. Table 1 provides a summary of each herbicide and should be used in addition to the following comments and product labels.

**2,4-D (4 pounds per gallon)** is a growth regulator herbicide (group 4). Like dicamba, it causes twisting, cupping, and leaf malformations on the plant. Foliar treatments (broadcast or spot) of 2,4-D can be applied when the plant is actively growing. Application rates for broadcast treatments are 1 to 4 pints per acre. Use 3 fluid ounces per 3 gallons of water for spot treatments. Generally, treatments of 2,4-D alone are not recommended for multiflora rose control because of ineffective kill.

**Banvel 4S/Clarity 4S (dicamba)** is a growth regulator herbicide (group 4) that causes twisting, cupping, and crinkling in leaves and stems. Banvel/Clarity may be applied using basal bark, foliar, or dormant spot-concentrated soil application methods. Several generic products contain dicamba. Check with your local dealer for other options.

**Basal bark application:** Apply a Lo-Oil Banvel/Clarity mixture (Banvel/Clarity + emulsifier + diesel + water) to the basal stem region from the ground line up to a height of 12 to 18 inches. Using a single-nozzle spray wand, spray until runoff, with special emphasis on covering the root

crown. For best results, apply herbicide when the plant is dormant (before bud break), from late December through early April. Do not apply when snow or water prevents herbicide solution from contacting the soil. For 2 gallons of a Lo-Oil spray mixture, combine 1.5 gallons water + 1 ounce emulsifier + 1 pint Banvel/Clarity + 2.5 pints of no. 2 diesel fuel. Adjust the amounts of materials used proportionately to the amount of final spray solution desired. Do not exceed 8 gallons of spray solution mix applied per acre per year.

**Foliar application:** Apply 1 pint to 2 gallons of Banvel/Clarity per acre for broadcast applications or a 1 percent solution (1 quart Banvel/Clarity per 25 gallons of water) until runoff for spot treatments. These treatments work best early in the season.

**Spot-concentrated soil application:** Apply a measured quantity of undiluted herbicide directly to the ground within 6 to 8 inches of the plant crown using a hand-operated spot applicator. The use rate of Banvel/Clarity depends on the canopy diameter of the multiflora rose. For example, apply 0.25, 1.0, or 2.25 fluid ounces of Banvel/Clarity for 5-, 10-, or 15-foot canopy diameters, respectively. Do not exceed 2 gallons of Banvel/Clarity herbicide per acre per year. Banvel/Clarity should be applied in this way only from late December through early April prior to plant leaf-out. On sloping terrain, apply the herbicide on the uphill side of the crown. Do not use this method when snow or water prevents application directly to the soil. Specialized spot applicators can be purchased through a farm supply retailer.

**Crossbow 3E (2,4-D LVE + triclopyr)** is a mixture of two growth regulator herbicides (group 4). Like dicamba, it causes twisting, cupping, and leaf malformations on the plant. Crossbow is applied using thin-line basal, foliar, or dormant (stem or basal bark) application methods. A few generic products contain the combination of triclopyr + 2,4-D. Check with your local dealer for these options.

**Thin-line basal application:** Apply a horizontal ring of undiluted Crossbow (about 20 milliliters or 4 teaspoons per bush) around all the stems at the height where the stems are less than 0.5 inch in diameter. Apply in early spring to early summer, when plants are breaking dormancy and beginning active growth. Treat when the bark is dry and no rain is in the immediate forecast. Coverage may be difficult if bushes have a large number of stems (more than three or four). In these cases, dormant basal bark treatments or foliar applications may be more appropriate.

**Foliar application:** For spot treatments, use 4 to 6 ounces of Crossbow in 3 gallons of water (1 to 1.5 percent solution) and spray until foliage is uniformly wet. For broadcast applications, use 1.5 to 4 gallons of Crossbow in enough water to deliver 10 to 30 gallons of spray per acre. Early to mid-June, during full leaf-out, is an excellent time to make these applications. Follow-up foliar or basal treatments may be necessary to achieve total plant kill.

**Dormant-type application:** Mix a 4 percent solution (4 gallons per 100 gallons of carrier) of Crossbow in diesel, no. 1 or 2 fuel oil, or kerosene to make 100 gallons of spray mixture. For basal bark treatments, spray basal parts of the

**Table 1. Herbicides for grass pastures.**

HERBICIDE	CONTROL RATING <sup>a</sup>	APPLICATION METHOD	PRODUCT RATE	APPLICATION AND GRAZING INTERVAL	REMARKS
2,4-D	6	Broadcast	1–4 pt/A 3 fl oz/3 gal water	7 days	2,4-D treatments have resulted in poor control of multiflora rose. Apply to rose that is actively growing and only to grasses during the boot to milk stage. Be cautious of drift.
Banvel 4/S Clarity 4S (dicamba)	6–8	Foliar: spot or broadcast  Dormant: basal bark or spot concen- trate	1 pt/25 gal water 1 pt–2 gal/A  1 pt/2 gal carrier oz/canopy (ft) 0.25 oz/5 ft 1 oz/10 ft 2.25 oz/15 ft	None, except lactating dairy: 7 days if <1 pt 21 days if 1–2 pt 40 days if 2–4 pt 60 days if 4–6 pt  Remove meat animals from treated area 30 days before slaughter.	Foliar applications have the best results when applied early in the spring following full leaf-out. Delay applications until grasses are well established. Be cautious of drift. Dormant Banvel/Clarity treatments (basal bark) tend to be more effective than foliar applications. Do not apply if snow or water prevents proper application.
Crossbow 3E (2,4-D LVE+ triclopyr)	8+	Foliar: spot or broadcast  Dormant: basal bark or stem  Thinline basal	0.25 pt/3 gal water 1.5 gal/A  4 gal/100 gal carrier 1–4 gal/100 carrier 20 ml/bush	Lactating dairy: Do not graze until next season. Other livestock: None Remove meat ani- mals from treated area 3 days before slaughter.	Apply foliar treatments to plant when actively growing (bud to bloom stage). Do not apply to desirable legume-containing stands. Be cautious of drift. Dormant applications should be applied during late winter to early spring. Do not apply if snow or water prevents proper application. Thinline basal treatments work best when applied during early spring to early summer. This method may be difficult for large infestations of multiflora rose.
Glyphosate (Roundup and other glyphosate products)	8	Spot	1.5–2 qt/25 gal water (depending on glyphosate formulation)	7 days	Include a nonionic surfactant at 2–4 qt/100 gal of solution. Apply to plants when fully leafed-out, during bud to bloom stage. Later applications may be made at 30-day intervals. Avoid contact with desirable vegetation. Use clean water source.
Metsulfuron 60DF (metsulfuron- methyl)	8+	Broadcast or spot	0.3 oz/A or 1 oz/100 gal water or 0.5–1 oz/A or 1 oz/100 gal water	None	Include a nonionic surfactant at 1 qt/100 gal of solution (if fescue pasture, 0.5–1 pt/100 gal), unless applying in liquid fertilizer. Apply when bush is fully leafed-out, during bud to bloom stage. Apply to grasses that are established for at least 6 months (12 mo for timothy and 24 mo for fescue). Do not apply to desirable legume-containing stands. Metsulfuron is persistent in soil, and crop rotation guidelines must be followed.
Spike 20P (tebuthiuron)	8	Spot	0.22 oz/bush or 22 ft <sup>2</sup> or 0.75 oz/100 ft <sup>2</sup>	Grazing: Up to 20 lb/A—none Haying: Up to 20 lb/A— 1 year	Apply anytime, except when soil is frozen or saturated. Grass injury is minimized during dormant season. Pellets require rainfall to activate. May kill or injure desirable species. Spike is persistent in soil.

<sup>a</sup>10=95–100%, 9=85–95%, 8=75–85%, 7=65–75%, 6=55–65%. Ratings based on foliar applications at optimal timing.

plant to a height of 15 to 20 inches from the ground. Thoroughly wet the entire basal bark area, including crown buds and ground sprouts. For dormant stem applications, uniformly wet upper and lower stems, including the root collar and any ground sprouts. Best results have been obtained with late winter to early spring applications, when the bush is dormant. Apply with a single-nozzle sprayer while the bark is dry. Do not treat when snow or water prevents spraying to the ground line.

**Glyphosate (Roundup and other glyphosate products)** is a nonselective, systemic herbicide (group 9) that can be used for spot treatment of isolated patches of multiflora rose. Apply 1.5 to 2 quarts per acre (depending on glyphosate product formulation) or a 1 percent solution (1 quart per 25 gallons of water) of glyphosate plus surfactant with a hand-held sprayer. For best results, uniformly wet leaves and green stems. Avoid runoff to minimize damage to desirable vegetation. Application should be made in late summer or fall when the plants are actively growing. Apply after fruit formation but before leaf defoliation by leaf-feeding insects.

**Metsulfuron-methyl 60DF** is a sulfonylurea herbicide (group 2) that inhibits ALS enzyme activity and subsequent amino acid biosynthesis, stopping cell division and growth in young developing leaves. Symptoms of injury appear 14 to 21 days following application. Metsulfuron is persistent in the soil, so recropping restrictions must be observed. Metsulfuron is most commonly applied to the foliage using broadcast or spot application methods. Cimarron Plus is a common metsulfuron-containing product from DuPont; however, there are several generic products (e.g., Accurate, Ciramet, and PureStand) that contain metsulfuron. Check with your local dealer for other generic options.

**Broadcast application:** Apply metsulfuron at a rate of 0.3 ounce per acre, plus crop oil concentrate or nonionic surfactant. Application should be made in the spring, soon after the plants are fully leafed-out. Multiflora rose must be less than 3 feet tall for broadcast treatment to be effective.

**Spot treatment:** Apply metsulfuron at the rate of 1.0 ounce per 100 gallons of water, plus crop oil concentrate or nonionic surfactant. Application should be made after the bushes are fully leafed-out. Complete coverage of all

foliage and stems is required for control. It is often necessary to spray tall, dense stands from several sides to obtain adequate control.

**Spike 20P (tebuthiuron)** is a soil-applied, nonselective, photosynthesis inhibitor herbicide (group 7) that is absorbed by the roots of plants. Apply Spike at 10 to 20 pounds per acre or at 0.75 ounces per 100 square feet (which equals 20 pounds per acre). Some Spike containers are designed with a dispenser that measures 0.25 ounce of pellets or one dose. Scatter one dose per 1 to 2 inches of stem diameter around the base of individual shrubs. Within multistemmed clumps or stands of rose, hand-broadcast Spike evenly beneath the plant canopy at a rate of one dose per 22 square feet. Applications can be made anytime except when the ground is frozen or the soil is saturated with moisture, but only once per year. Spike pellets require rainfall to move the herbicide into the root zone and may take more than one season to achieve plant kill. Do not apply close to desirable trees and other vegetation. To minimize injury to grass, apply the herbicide during the dormant season. Spike is persistent in the soil, so watch recropping restrictions.

#### **FOLLOW-UP MAINTENANCE PRACTICES**

Following the initial control effort, establish an annual maintenance program consisting of a follow-up herbicide treatment or some type of mechanical control measure. Removal of dead brush encourages grass reestablishment and allows for more successful follow-up control tactics. Rotary mowing is an effective way to remove small to moderate-size bushes. Heavier equipment must be used to pull out or crush the thick crowns and stems of larger plants. Burning can remove dead top growth once in piles or hedgerows; however, this must be done safely and in compliance with local burning regulations.

Annual maintenance practices within and around pastures are necessary for control of multiflora rose. If not annually monitored, multiflora rose and other species will move in and quickly eliminate any gains from initial control efforts. Use management practices that favor the establishment and maintenance of desirable pasture vegetation, such as rotational grazing (once grasses are 3 to 6 inches tall), adequate soil fertility, appropriate fencing, and erosion control.

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