

BIOLOGY OF MULTIFLORA ROSE. Jerry D. Doll, Weed Scientist Emeritus, University of Wisconsin, Department of Agronomy, Madison, WI 53706.

While native to eastern Asia (Korea, Japan and China), multiflora rose (*Rosa multiflora*) is certainly adapted to many North American habitats. Introduced in the late 1800s for use as an ornamental rose root stock and promoted in the 1930s through 1950s for conservation and wildlife benefits and as a living fence (“horse high, bull tough and hog tight”). West Virginia planted more than 14 million multiflora rose plants in the 1940s to 1960s (Dugan, 1960). The original plantings soon gave rise to seeds that were disseminated well beyond these sites. Estimates are that multiflora rose now infests more than 45 million acres in the eastern half of the USA (Loux et al. 2005). Nearly every state with multiflora rose is now working to contain this weed and regain infested land. Understanding the biology of this plant is important in developing prevention, management and control strategies.

Plant description

The easiest way to distinguish multiflora rose from nearly all the wild roses is its large size and the fact that it is one of the “thorniest” of roses. The canes of multiflora rose arise from the root crown and are generally vertical until they are 4 to 5 feet tall at which time they become arching or trailing. Plants in full sunlight may reach heights of 8 to 10 feet and in shaded conditions, canes can grow through and on other trees to lengths in excess of 20 feet. The tips of some canes may touch the soil and under certain conditions roots may form. Stems are flexible, green to reddish with many recurved thorns with a wide base that tear flesh and clothing mercilessly. Multiflora rose leaves are pinnately compound with 5 to 11 leaflets. Prominent and fringed stipules are found at the base of the leaf petiole.

Flowering occurs from late May to June and pollination is accomplished by insects. The inflorescence has 25 to 100 flowers borne in terminal clusters (hence both the common and specific names of “multiflora”). Flowers are fragrant with five white to whitish-pink petals. The pistils form single-seeded achenes with hard seed coats that are resistant to damage. The fleshy, berry-like fruits (known as hips, the aggregate fruits of the rose plant) become bright red. Hips do not split open to release seeds but become leathery and uneaten hips often remain on bushes through the winter.

Habitat and habit

Multiflora rose is adapted to many nondisturbed habitats including hillside pastures, fence rows, right-of-ways, stream banks, recreational lands, Conservation Reserve fields, edges of woods and thin woodlots, especially grazed woodlots. Multiflora rose seems particularly adapted to steep hillsides. Infestations are found in most states except in the Rocky Mountain region with the most serious problems from the Corn Belt to the eastern seaboard. Perhaps the only condition plants do not tolerate is flooding. Plants thrive in full sunlight and endure shade. Multiflora rose is described as moderately winter hardy (USDA hardiness zones 5 to 8) and indeed cold winters kill some plants in northern regions, defeating the purpose of plantings made as living fences.

Multiflora rose grows as isolated plants (particularly in open areas) and as dense, impenetrable thickets, especially on sloping sites and in partially shaded areas. Unless killed by human or natural means, plants live indefinitely. No data were found on how long individual multiflora rose bushes might live.

Seed biology

Each multiflora rose hip contains 7 to 8 seeds [1 to 22 seeds each in W. Virginia (Amrine, 2002) and 5 to 11 seeds each in Wisconsin (Doll, unpublished data), respectively]. Robust multiflora rose bushes in the southeastern region of the USA form an average of 50 panicles (flower clusters) per cane; each panicle has with nearly 50 fruits each with seven seeds, potentially resulting in 17,500 seeds per cane

and up to 500,000 seeds per plant (Amrine, 2002). In Wisconsin, multiflora rose is less prolific in flowering as not all canes flower each year (Doll, personal observation) but more than a sufficient “seed crop” is produced to propagate the species within and well beyond currently infested locations.

Single multiflora rose seeds weigh 6 to 9 mg resulting in 50,000 to 80,000 seeds per pound (Meyer, 2006). Meyer also states that the germination of rose seeds in general is a “complex process that may involve changes at the pericarp, testa and embryo levels. The degree of dormancy and the principal level of dormancy control vary among species, cultivars, seedlots, and even among hips within a single bush.” Stratification (chilling of seeds under moist conditions) may stimulate fresh seeds to germinate. The Association of Official Seed Analysts (1993) suggests that storing seeds in a wet medium at 3 to 5 C for 28 days induces germination but much longer periods (90 to 180 days) were cited by Meyer (2006). My efforts to germinate multiflora rose seeds were not rigorous (seeds kept at room temperature or refrigerated for 1 to 5 months) but completely failed to achieve germination (Doll, unpublished data). Cold stratification from Feb. 1 to April was recommended by Steavenson (1946) to enhance germination. Under natural conditions, it would seem that a single winter season would be sufficient to break multiflora rose seed dormancy.

No data on seed longevity in either storage or natural conditions were found. Several authors note that seeds can live for many years and some state that seeds can last for 20 years in the soil. Longevity and germination studies under field conditions are needed.

The fruits (hips) of multiflora rose offer wildlife benefits. They are consumed by many bird species, particularly American robins and cedar waxwings but also by grouse, pheasants, wild turkeys, (Evans, 1983; White and Stiles, 1992). Mice, rabbits, white-tail deer, chipmunks and other animals also eat multiflora rose hips, especially in the winter when other food sources are scarce. Seed consumption by animal inevitably leads to seed dissemination and “instant fertilization” as they pass through and leave the digestive system. The tough seed coat of multiflora rose seeds is somewhat scarified as seeds pass through the digestive tract of birds, promoting seed germination (Wyman 1940; Lincoln, 1978). Multiflora rose fruits contain 9.2% crude protein, 4.2% crude fat and 4.4 kcal/g of gross energy (Dekker et al. 1991). Fruits are rich in carotene and ascorbic acid and both fruits and seed can be used as a laxative and diuretic (Duke and Ayensu, 1985).

Multiflora rose seedlings grow inconspicuously for the first year or two (Schery 1977) but quickly become well anchored. Once established, it is difficult to dislodge plants by pulling as stems usually break off, leaving the root crown in tact and capable of resprouting.

Root survival

As with all perennial species, multiflora rose longevity requires the accumulation and storage of sufficient quantities of carbohydrates to survive winter. No data on root carbohydrate levels under natural or managed conditions were found. In particular, the impact of defoliation by mowing, burning or other means on root reserves needs to be studied. These practices, alone or in combination, may weaken multiflora rose plants sufficiently so that they do not survive winter. Trials in West Virginia found that mowing bushes to a 3-inch height and then repeatedly cutting them back to this height at 2- and 4-week intervals killed most plants at the end of two years (Bryan and Mills, 1988). Subsequent studies compared 4- and 8-week defoliations during the entire growing season for 2 years. At the start of the second year, 21% of the plants were dead and at the start of the fourth season, 94% were dead. Interestingly, small multiflora rose plants survived the longest. Plant kill did not differ between defoliation frequencies so if defoliation via mowing or close animal grazing could be done at least three or four times annually for at least 3 years, many multiflora rose plants would be killed (Bryan 1994).

Infrequent mowing of multiflora rose seldom kills plants but if done before viable seeds are formed, even a single mowing would greatly reduce seed production. Unfortunately, many infestations are on sites that are difficult at best to mow.

Burning studies in Texas on a native rose species found that burning alone reduced the plant's biomass but did not eradicate it (Gordon and Scifres, 1977). Burning gave more than 90% topkill of McCartney rose; however regrowth began within 2 weeks of burning with an average cane elongation of nearly 2 inches a month resulting in canopy cover replacement of 10 to 15% per month. They recommend a practice we are seeing in Wisconsin, namely using fire 12 to 18 months after applying herbicide to destroy the dead canes and rejuvenate grasses

Multiflora rose may form new plants via layering of the stems (stems root when in contact with the soil). However, this is not a common phenomenon. Some believe that multiflora rose has a spreading root system. This is not true. Nevertheless, multiple stems arise from the root crown and to ensure that no regrowth occurs when plants are physically removed from the soil, the entire root crown must be excavated. This usually means digging to remove roots to at least a 6- to 8-inch depth.

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Helpful web sites

<http://plants.usda.gov/>

http://www.fs.fed.us/database/feis/plants/shrub/rosmul/management_considerations.html