

MILE-A-MINUTE CONTROL PROJECT NEW MILFORD/BRIDGEWATER/ROXBURY CT



Project sponsored by Mad Gardeners, Inc,
working with Weantinoge Heritage Land Trust, The Towns of New Milford and Roxbury,
and the Weevil Release Team
from the Connecticut Agricultural Experiment Station and the University of Connecticut.

from Kathleen Nelson, Chairperson
Invasive Species Advisory Committee, Mad Gardeners, Inc.
knelson@madgardeners.com
updated 11/14/13

THE FOLLOWING IS A SUMMARY OF WHAT OUR CREW OF VOLUNTEERS AND PAID STUDENT INTERNS LEARNED AND HOW WE APPROACHED CONTROLLING MAM ON THE SITES WHERE WE WORKED IN NEW MILFORD, BRIDGEWATER AND ROXBURY CT FROM 2007 THROUGH 2013.

General advice for dealing with invasive plants:

- 1) Early detection, rapid response
- 2) Know your target: learn as much as you can about the biology, history, mechanism of spread, distribution, and possible control methods.
- 3) Don't believe everything you read.
- 4) Look everywhere. Find the edges of the population.
- 5) Work from the outside in.
- 6) Get as much publicity as you can. Members of the public will help spotting and reporting Mile-a-Minute (MAM) plants.

Mile-a-Minute Vine: *Persicaria perfoliata*

- 1) Annual
- 2) Germinates in early April. Probably continues to germinate throughout the month. Of 320 seeds planted in seed-starting medium in a 10 X 20 flat covered with a plastic bag and placed outdoors, 250 (78%) germinated in April, 2009, and 11 (3.4%) more germinated between April 1 and April 12, 2010. Previous studies found that most seeds germinated in the first two years, and that 99 % germinated by the end of the sixth year. In the field, the only time we saw newly germinated seedlings after May was in June, 2013, a year with a very dry April and a wet June.
- 3) Plants in some locations may be large enough for efficient pulling by late May.
- 4) The earliest seed production we've observed was June 22.
- 5) By mid August, even the tiniest plants have seeds. Plants growing on a steep bank, dry subsoil, shade, had only sewing-thread-diameter 18-inch stems and a few ½ inch diameter leaves -- and seeds! (though not many).
- 6) Reported growth of 6 inches/day late in the season is consistent with our casual observations.
- 7) A single plant can probably cover an area 30 feet in diameter and produce as many as 2000 seeds. A single plant can easily cover a shrub.
- 8) MAM plants wilt very quickly. We pull and toss or drop plants that have no sign of seed production.

- 9) MAM can be grown from cuttings. We do not make piles of pulled plants, since those at the bottom of the pile may stay moist enough to root.
- 10) Seedlings are recognizable very early by triangular leaves, tiny bristles, and a petiole that is attached under the edge of the leaf. The two native tearthumbs have petioles attached to the edge of the leaf.
- 11) MAM loves moist locations, stream banks, and wetlands, but has a limited tolerance to flooding. We have not observed MAM in flooded locations. Around a spring-flooded detention pond with gradually sloping edges, all MAM seedlings were above a certain contour, while the two native tearthumbs, both obligate wetland species, germinated in mud right to the water's edge. In areas subject to flooding, there were few to no MAM plants after the heavy rains of 2009 in places where plants had grown in previous years. The few remaining plants appeared to be growing on the slightly elevated mounds found at the base of shrubs.
- 12) MAM seeds germinate in huge quantities, and seem surprisingly able to tolerate competition. We've identified as many as 60 young plants in a 2-inch diameter handful in late May, and as many as 40 plants, each a scrawny vine about 4 feet long, in a 2-inch diameter handful in August.
- 13) MAM stems can be thick and fat by the end of the season, and the root system can be heavy and difficult to remove. However, during most of the growing season stems are very thin, often almost like sewing thread, and roots are surprisingly puny.
- 14) MAM is usually very easy to pull. Our primary control method is pulling.
- 15) Timing of pulling is critical. Our goal is to pull all plants in known MAM locations before June 20. The earliest we've seen seeds is June 22.
- 16) We plan to return to each location to pull plants every two weeks (sun) or three weeks (shade). There are always more to pull. We probably miss some plants each round. Maybe new stems grow from roots if the stem breaks. However, except in June of 2013, we've never observed any summer plants that looked like newly-germinated seedlings.
- 17) Most seeds germinate right under the parent plant. We mark locations and keep records so we know just where to look for plants in May and June. Starting in mid-July, we search areas where we haven't seen plants before. We search other parts of properties with known patches, we search downstream areas, and we search nearby properties.
- 18) We pull until a killing frost, generally mid-October. Plants that might contain seeds are bagged and sent for incineration with the town kitchen waste. Because fruit-eating birds feed primarily in trees/shrubs above ground level, while ground-feeders generally crack and digest seeds, we make every attempt to remove late season vines, even though they may be dead, and even though seeds will drop on the ground when we pull the plants.
- 19) MAM is killed by many herbicides. Some pre-emergent herbicides, including Preen, are effective. We've used the pre-emergent Pendulum in a few areas where dense growth of multiflora rose makes access very difficult. It appeared to reduce but not eliminate MAM germination, possibly because of the difficulty of getting good ground coverage of the herbicide through thick shrubbery.
- 20) Although general purpose herbicides may kill MAM, they are not always 100% effective. In addition they kill nearby vegetation that may compete with MAM. They do not kill seeds that may be present. They may harm other plants, and they may harm you. Our group does not recommend general-purpose herbicides for MAM control. Pulling is easy and very effective.
- 21) MAM will germinate in lawn, but will not survive regular lawn mowing. Several of our homeowners have eradicated patches of MAM by expanding their lawn area.
- 22) We did not notice any reduction in plant numbers after rough mowing/brush-hogging. However, rough mowing is an important tool for brush control and worker access.

- 23) Literature reports that MAM does not grow in shade. We have found dense populations in light woodlands and scattered smaller plants in normal woodland but generally do not find MAM growing in very dense shade.
- 24) Some people recommend planting shrubs for MAM control. We have found shrubs to be our greatest enemy. MAM growing in the shade under shrubs may not reach sunlight at the top of the shrubs until late in the season, but it can then spread quickly to cover the top of the shrub and produce huge quantities of seeds. We recommend removing all non-native shrubs, especially multiflora rose. Our preference is that native shrubs be pruned in such a way that workers can access the ground below. The only shrub we've found easy to work with is the native spicebush *Lindera benzoin*. It has an open form so MAM is easy to spot.
- 25) Our experience suggests that meadows may be better able to compete with MAM than are shrublands. A disturbed hillside that was close to 100 % MAM in 2006 is now dominated by one of the tall aggressive species of goldenrod with scattered MAM. MAM does not appear to have invaded the adjacent hayfield. Portions of the meadow at New Milford High School were invaded by multiflora rose and autumn olive before MAM arrived. The MAM is almost exclusively associated with these and other shrubs. MAM was able to grow in the goldenrod and meadow grasses after the shrubs were brush-hogged. We GPS'd the shrub locations before brush-hogging so we would know where to look in the future. We have not found much MAM in the portions of the meadow dominated by goldenrod. MAM grows well with Joe Pye Weed, Pokeweed, and Phragmites, which provide germination space between stems plus a place to climb.
- 26) The literature indicates that MAM is spread by a number of animals, including birds and deer, and by water. Spread by water-borne seeds has occurred in Newtown and New Milford. Many people have reported deer browse. We have not seen much indication of deer browse, but that may be because we pull most plants while they are small.
- 27) Newer (smaller) patches of MAM are almost always in "bird places", including perching places and areas with bird food - multiflora rose, autumn olive, and *Cornus amomum* - suggesting birds as the major vectors. New patches are also found on woodland edges and under free-standing trees and shrubs. We've been impressed by the relatively small number of satellite patches surrounding large old patches - we don't think birds love MAM fruit. We are still exploring how far birds carry seeds. We have seen a few patches in bird places at least half a mile from a seed source.
- 28) In woodland areas MAM plants are often scattered over short distances. We'll find a plant or small clump of plants, then walk 20 feet or so and find another, but eventually seem to get to the "edge" of this scattered spread. We suspect chipmunks and mice of carrying seeds fairly short distances and burying them.
- 29) We have been working on 3 populations, one on the New Milford/Bridgewater line with large and small patches scattered over an area about a mile in diameter, another in southern New Milford scattered over an area half a mile in diameter, and another of about the same size in Roxbury.
- 30) The largest population was reported in 2004. A group of volunteers began pulling in late 2005. Volunteer pulls continued in 2006. Our volunteer crew started too late, and volunteers were hard to find. Seeds were flying everywhere. In 2007 we formed a committee, joined a non-profit organization, raised money, and found a local environmental group willing to be the official employer of a small crew of college students.
- 31) From 2007 - 2013 our crew generally consisted of 2 regular volunteers working 6-20 hours a week and 2-5 paid college students, most working half-time in the summer.
- 32) Since 2007, we've inspected between 200 and 300 properties in and near the center of these populations and found MAM on almost half of them.
- 33) We start pulling MAM in late May or early June, pulling plants by the end of June in all the places previously known to have MAM. We revisit each site every 2-3 weeks until a killing frost, usually mid-October.

- 34) We almost eliminated seed production in our known MAM patches from 2007 through 2013. MAM loved the 2011 weather. Seed production was early. Plants thrived all season. Although we were able to almost eliminate seed production, there were more escapees than usual.
- 35) We begin searching nearby properties where MAM has not been previously reported starting mid-July in most years. The MAM season was late in 2013 – in many locations plants were too small for efficient spotting until mid-August.
- 36) When searching for MAM, watch for triangles and upward-reaching stems.
- 37) MAM stems reach straight up, while most other vines arch. It is often possible to spot a bit of MAM sticking straight up in tall meadow vegetation or above a shrub.
- 38) The color is also fairly easy to recognize. It is the same color as jewelweed. Nobody seems to agree how to name the color, but we all agree that it is easy to recognize. Plants are often so lush in the fall that single plants can be spotted by their color from a distance, with the ID verified with binoculars.
- 39) We pay special attention to watercourses to prevent seeds dropping into water. Many watercourses are difficult to access primarily due to the presence of multiflora rose.
- 40) We re-evaluate each year. For several years it appeared that we had prevented the spread of MAM to new locations. We were not finding new patches on the properties we were pulling MAM. Our searching of adjacent properties revealed an occasional plant or small patch, but once these were pulled, no new patches appeared in subsequent years.
- 41) One year we found half a dozen single plants scattered in new places on properties where we do regular inspections for very small known patches of MAM. This was unexpected – we almost never find new patches in our work areas. Eventually we discovered that a homeowner had dumped brush and debris from a serious MAM area onto a back lot that had been free of MAM two years previously when we had last inspected it. It doesn't take long for MAM to spread.
- 42) Several of the smaller MAM patches have been eradicated. We have been able to almost – but not quite - eradicate patches in most of the brushy areas. Without continuing control efforts, areas where some seeds remain will return to their original condition and worse within a year or two.
- 43) We broadened our search area every year. A single patch was found in 2009 almost half a mile from a possible seed source. The size of the patch suggested it is from a seed dropped in 2006, although it could have been as late as 2007.
- 44) Late in the 2011 season we finally found the center of the larger Roxbury population. In 2012 we realized that there would be no way to control it, that the best we could do is concentrate on the periphery of the population in the hope of keeping it from spreading.
- 45) In 2013 we found that MAM had escaped from all three of the populations into areas that could not be physically accessed.
- 46) In 2009, 500 weevils, *Rhinoncomimus latipes*, were released for biocontrol in each of our two main populations and at five other locations in CT. Weevils have been released at many other sites in CT since then. The weevils are raised at a USDA laboratory in New Jersey and were first released in New Jersey and Delaware in 2004. A team of Connecticut scientists is collecting data to be analyzed by the team from the University of Delaware and USDA.
- 47) The weevils feed almost exclusively on MAM and reproduce exclusively on MAM. The larvae live in MAM stems.
- 48) Weevils are reproducing and moving everywhere. Weevils reached Roxbury and Woodbury on their own - probably from release sites in Newtown or Bridgewater. There are now weevils everywhere we go.

- 49) It is not yet clear what effect the weevils will have on the spread of MAM. I personally do not think weevils will be able to reduce MAM to just another annoying weed, but I hope that they can slow the spread at least a bit.
- 50) By August 13, 2010, a year after weevil release, the MAM plants at the sunny New Milford weevil release site were large, but there was no seed production and only a few flower buds. MAM in similar nearby sites produced seeds in late June. At the slightly shady Bridgewater release site, MAM plants were large, there were fewer holes in the leaves, and plants had set large quantities of seed. By the end of the season plants in both sites were covered with seeds. We estimate that seed production was delayed by about 6 weeks in the sunny New Milford release site. In both weevil release sites there was more MAM cover in 2011 than when the weevils were introduced. We are told that we should be patient, that the weevil populations will increase each year.
- 51) MAM continues to spread and increase in density at the weevil release sites even though plants look like they've been hit with a shotgun blast. Seed production is delayed probably by about 6 weeks. However, by the end of the season, the plants are covered with seeds. It is a terrifying sight.
- 52) Through 2013 we continued pulling MAM everywhere except on the weevil release sites.
- 53) We do not anticipate having a paid student crew in 2014. We hope affected property owners will continue our work. We will be available for advice and a limited amount of field work in critical areas.
- 54) Strangest of all: after wandering thru multiflora rose and stinging nettle, with poison ivy wrapped around our ankles, constantly watching for ticks and yellow jacket nests, when we get to the end of a day, we realize that we've enjoyed it.

Recommended Reading and Websites:

Kumar, V., and DiTommaso, A. *Mile-a-Minute (Polygonum perfoliatum): An Increasingly Problematic Invasive Species*, Weed Technology. 2005, Volume 19: 1071-1077.
<http://www.madgardeners.com/kumar.pdf>

Hough-Goldstein, J., Lake, E., Reardon, R., and Wu, Y. *Biology and Biological Control of Mile-a-Minute Weed*. FHTET-2008-10. .
<http://ag.udel.edu/enwc/research/biocontrol/pdf/FHTETMAMpub2008.pdf>

<http://ag.udel.edu/enwc/research/biocontrol/mileamminute.htm>

<http://www.hort.uconn.edu/mam/>

http://www.hort.uconn.edu/CIPWG/pdfs/2012_Report_MAM_Vine.pdf

<http://www.madgardeners.com>

Tallamy, Douglas; *Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens*. Timber Press, 2007

<http://copland.udel.edu/~dtallamy/host/index.html>

Garlic mustard identification and control, video: <http://vimeo.com/2855779>

Earthworms: <http://www.nrri.umn.edu/worms/>

Project funding provided by gifts from many generous individuals, organizations, and foundations, including: the Connecticut Association of Wetland Scientists (2012), Connecticut Community Foundation (2007), Connecticut Department of Environmental Protection (DEP) (2010, 2011), Ellen Knowles Harcourt Foundation (2007, 2009, 2011, 2013), Meserve Memorial Fund (2007, 2012), and Patagonia Westport (2009).