



Mile-A-Minute Weed

Persicaria perfoliata L.

Buckwheat family (Polygonaceae)

NATIVE RANGE

India to Eastern Asia, China and the Islands from Japan to the Philippines, including Nepal, Burma, Manchuria, China, Korea, Taiwan and the Malay Peninsula

DESCRIPTION

Mile-a-minute weed, or Asiatic tearthumb, is an herbaceous, annual, trailing vine. Stems are armed with recurved barbs which are also present on the underside of the leaf blades. The light green colored leaves are shaped like an equilateral (equal-sided) triangle and alternate along the narrow, delicate stems. Distinctive circular, cup-shaped leafy structures, called ocreae, surround the stem at nodes, thus the name 'perfoliata.' Flower buds, and later flowers and fruits, emerge from within the ocreae. Flowers are small, white and generally inconspicuous. The fruits are attractive, deep blue and arranged in clusters at terminals. Each berry-like fruit contains a single glossy, black or reddish-black hard seed called an achene. The scientific name was recently changed from *Polygonum perfoliatum* as a result of extensive taxonomic research on the genus.



ECOLOGICAL THREAT

Mile-a-minute weed grows rapidly, scrambling over shrubs and other vegetation, blocking the foliage of covered plants from available light, and reducing their ability to photosynthesize, which stresses and weakens them. In addition, the weight and pressure of the vine causes distortion of stems and branches of covered plants. If left unchecked, reduced photosynthesis can kill a plant. Large infestations of mile-a-minute weed eventually reduce native plant species in natural areas. Small populations of extremely rare plants may be eliminated entirely. Because it can smother tree seedlings, mile-a-minute weed has a negative effect on Christmas tree farms, forestry operations on pine plantations and reforestation of natural areas. It has the potential to be a problem to nursery and horticulture crops that are not regularly tilled as a cultivation practice.

DISTRIBUTION IN THE UNITED STATES

Mile-a-minute has been found in parts of Connecticut, Delaware, Massachusetts, Maryland, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, West Virginia, and Washington, DC. This area comprises an estimated 20 percent of its likely potential range. It is considered to be a temperate species with subtropical tendencies and therefore has the potential to invade those portions of the contiguous United States that have the appropriate climate to provide a minimal eight week cold vernalization period. A temperature of 10°C or below must be sustained for an eight week period to stimulate germination. It has also been reported to be invasive in nine national parks in four mid-Atlantic states.

HABITAT IN THE UNITED STATES

Mile-a-minute weed generally colonizes open and disturbed areas, along the edges of woods, wetlands, stream banks, and roadsides, and uncultivated open fields, resulting from both natural and human causes. Natural areas such as stream banks, parks, open space, road shoulders, forest edges and fence lines are all typical areas to find mile-a-minute. It also occurs in environments that are extremely wet with poor soil structure. Available light and soil moisture are both integral to the successful colonization of this species. It will tolerate shade for a part of the day but does best in full sunlight. The ability of mile-a-minute to attach to other plants with its recurved barbs and climb over the plants to reach an area of high light intensity is a key to its survival. It can survive in areas with relatively low soil moisture, but demonstrates a preference for high soil moisture.

BACKGROUND

The first records of mile-a-minute in North America are from Portland, Oregon (1890) and Beltsville, Maryland (1937). Both of these sites were eliminated or did not establish permanent populations of the species. However, the introduction

of mile-a-minute in the late 1930's to a nursery site in York County, Pennsylvania did produce a successful population of this plant. The plant first appeared at this site when holly seeds from Japan were planted and mile-a-minute came up with the holly. The owner of the nursery was interested in the plant and allowed it to reproduce; unfortunately, subsequent efforts to eradicate it were not successful. The distribution of mile-a-minute has radiated from the York County site into neighboring states. In the past 70 years, the range for this plant in the United States has expanded more than 300 miles from its original York County, Pennsylvania site.



BIOLOGY & SPREAD

Mile-a-minute weed is primarily a self-pollinating plant (supported by its inconspicuous, closed flowers and lack of a detectable scent), with occasional out-crossing. Fruits and viable seeds are produced without assistance from pollinators. Vines generally die with the first frost. Mile-a-minute is a prolific seeder, producing many seeds on a single plant over a long season, from June until October in Virginia, and a slightly shorter season in more northern geographic areas. Seed persists in the soil for as long as 6 years, with staggered germination over the years.

Birds are probably the primary long-distance dispersal agents of mile-a-minute weed. Transport along powerlines and other utility rights-of-way can provide an important dispersal corridor for mile-a-minute. Transport of seeds short distances by at least one ant species has been observed and may play a role in the survival and germination of mile-a-minute seeds but further investigation is needed. The tip of the seeds bear an elaiosome (nutritious food body) which may be attractive to the ants. Local bird populations are important for dispersal under utility lines, bird feeders, fence lines and other perching locations. Other animals observed eating mile-a-minute weed fruits are chipmunks, squirrels

and deer and viable seeds have been found in deer scat.

Water is an important mode of dispersal for mile-a-minute weed. Its fruits can remain buoyant for 7-9 days giving it the ability to disperse long distances in stream and river environments. Where long vines hang over waterways, fruits that detach are easily carried away in the water current. Storm events increase the likelihood of spread by seed throughout watersheds.

MANAGEMENT OPTIONS

A variety of control measures can be used for management of mile-a-minute weed depending on the level of infestation and resources available. Remember that even if all plants are removed, efforts must continue for several years to exhaust any remaining seed bank.

Biological

A biological control program targeting mile-a-minute weed was initiated by the US Forest Service in 1996, with field surveys in China and subsequent host specificity testing in quarantine in the US. A small weevil, *Rhinoncomimus latipes* Korotyaev, was found to be host-specific to mile-a-minute weed, and field release was approved by USDA-APHIS in 2004. Weevil adults feed on mile-a-minute foliage, and larvae feed within nodes and can suppress growth and reduce seed production. The weevils are active from early spring through the fall, completing multiple generations. Weevils released in Delaware, Maryland, New Jersey, Pennsylvania, and West Virginia between 2004 and 2007 established at 54/56 (96.4%) of sites where they had been released. Standardized monitoring showed reductions in spring densities to 25% or less of what they had been at the start within 2-3 years following release. Weevils recorded at non-release sites indicated dispersal at an average rate of 4.3 km (2.7 miles) per year. Weevils are being reared at the Phillip Alampi Beneficial Insects Lab in Trenton, NJ, but are not generally available. In 2009, new releases were conducted in New York, Connecticut, Rhode Island, and Virginia.

Chemical

Mile-a-minute is sensitive to moderate rates of widely used herbicides. However, because it can begin setting seed by mid-June, and will grow onto and over desirable vegetation, selective control with herbicides is difficult. Extensive infestations in high-priority areas can be treated with a pre-emergence herbicide to kill plants as they germinate in the early spring, with follow-up applications using post-emergence herbicides to eliminate escapees. Sparse populations are better treated with post-emergence herbicides. Pre-emergent and post-emergent herbicides are available to treat mile-a-

minute effectively depending on the site value and extent of infestation. For most situations, the post-emergent herbicides triclopyr (Garlon 3A) and glyphosate (Glyphomate 41), with little to no soil activity respectively, are the best choice. Both products are labeled for aquatic use and pose little threat to other organisms.

Cultural

Cultural methods can be utilized to discourage the introduction of mile-a-minute to an area. It is important to maintain vegetative community stability and to avoid creating gaps or openings in existing vegetation. Maintaining broad vegetative buffers along streams and forest edges will help to shade out and prevent establishment of mile-a-minute weed. This will also help to reduce the dispersal of fruits by water.

Manual

Hand pulling of seedlings is best done before the recurved barbs on the stem and leaves harden, but may be done afterwards with the help of thick gloves. Long pants and a long-sleeved shirt will help prevent skin abrasion. Manual removal of vines may be conducted throughout the summer but use caution once seeds have developed to prevent spread to new areas. The delicate vines can be reeled in fairly easily, balled up and placed in large piles that can be left to desiccate for several days or longer. Try to pull up the whole plant including its roots. Depending on the site and situation, piles can either be incinerated or burned, left in place until the following year and monitored for emergence of new seedlings or, if necessary, bagged and disposed of in a landfill (not the best option if seeds are present). Previously infested sites need to be rechecked several times each year, and new plants removed until the seed germination period is complete (roughly early April until early July in the middle Atlantic states).

Mechanical

For low growing infestations that cover the ground, repeated mowing or weed whipping of vines will reduce the plants reserves and prevent or reduce flowering which in turn reduces fruit and seed production.

USE PESTICIDES WISELY: Always read the entire pesticide label carefully, follow all mixing and application instructions and wear all recommended personal protective gear and clothing. Contact your state department of agriculture for any additional pesticide use requirements, restrictions or recommendations.

NOTICE: mention of pesticide products on this page does not constitute endorsement of any material.

CONTACTS

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OTHER LINKS

- <http://www.invasive.org/search/action.cfm?q=Polygonum%20perfoliatum>
- <http://nbii-nin.ciesin.columbia.edu/ipane/icat/browse.do?specied=13>
- <http://ag.udel.edu/enwc/research/biocontrol/index.htm>
- http://www.dcnr.state.pa.us/FORESTRY/invasivetutorial/mile_a_minute.htm
- <http://www.invasiveplantatlas.org/subject.html?sub=3065#maps>

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REFERENCES

- Colpetzer, K., J. Hough-Goldstein, J. Ding, and W. Fu. 2004. Host specificity of the Asian weevil, *Rhinoncomimus latipes* Korotyaev (Coleoptera: Curculionidae), a potential biological control agent of mile-a-minute weed, *Polygonum perfoliatum* L. (Polygonales: Polygonaceae). *Biol. Control* 30: 511-522.
- Ding, J., W. Fu, R. Reardon, Y. Wu, and G. Zhang. 2004. Exploratory survey in China for potential insect biocontrol agents of mile-a-minute weed, *Polygonum perfoliatum* L. in Eastern USA. *Biol. Control* 30: 487-495.
- Gover, A., J. Johnson, K. Lloyd, and J. Sellmer. 2008. Invasive plant species management Quick Sheet 7, Mile-a-minute (*Polygonum perfoliatum*). http://vm.cas.psu.edu/Publications/ISM_QS_7_POLPF.pdf
- Hinds, H. R. and C. C. Freeman. 2005. *Persicaria*. *Flora of North America*, vol. 5. www.efloras.org.
- Hough-Goldstein, J., E. Lake, R. Reardon, and Y. Wu. 2008a. Biology and Biological Control of Mile-a-Minute Weed. USDA Forest Service Forest Health Technology Enterprise Team, Morgantown, WV, FHTET-2008-10. 65 pp.
- Hough-Goldstein, J., M. Schiff, E. Lake, and B. Butterworth. 2008b. Impact of the biological control agent *Rhinoncomimus latipes* (Coleoptera: Curculionidae) on mile-a-minute weed, *Persicaria perfoliata*, in field cages. *Biological Control* 46: 417-423.
- Hough-Goldstein, J., M. A. Mayer, W. Hudson, G. Robbins, P. Morrison, and R. Reardon. 2009. Monitored releases of *Rhinoncomimus latipes* (Coleoptera: Curculionidae), a biological control agent of mile-a-minute weed (*Persicaria perfoliata*), 2004–2008. *Biological Control* 51: 450–457.
- Invasive Plant Atlas of the U.S. 2010. The University of Georgia Center for Invasive Species and Ecosystem Health and the National Park Service. Available online at www.invasiveplantatlas.org/; last accessed February 23, 2010.
- Lake, E.C. 2007. Dispersal, establishment, and impact of the mile-a-minute weevil, *Rhinoncomimus latipes* Korotyaev (Coleoptera: Curculionidae): a two-year study in Southeastern Pennsylvania. MS Thesis, University of Delaware, Newark, DE.
- McCormick, L.H. and N.L. Hartwig. 1995. Control of the noxious weed mile-a-minute (*Polygonum perfoliatum*) in reforestation. *Northern Journal of Applied Forestry* 12: 127-132.
- Moul, E.T. 1948. A Dangerous Weedy Polygonum in Pennsylvania. *Rhodora* 50:64-66.
- Mountain, W.L., 1989. Mile-a-minute (*Polygonum perfoliatum* L.) update – distribution, biology, and control suggestions. *Regulatory Horticulture* 15, 21-24.
- Mountain, W. L. 1995. Mile-a-minute – History, Distribution and Habitat. Mile-a-minute (*Polygonum perfoliatum*) Conference. York, Pennsylvania, July.
- Okay, J.A. Gerlach. 1997. *Polygonum perfoliatum*: A Study of Biological and Ecological Features Leading to the Formation of a Management Policy. Ph.D. Dissertation. George Mason University Fairfax, VA.
- Price, D. L., J. Hough-Goldstein, and M. T. Smith. 2003 . Biology, Rearing, and Preliminary Evaluation of Host Range of Two Potential Biological Control Agents for Mile-a-minute Weed, *Polygonum perfoliatum* L. *Environ. Entomol.* 32: 229-236.
- Swearingen, J. 2008. Survey of Invasive Plants Affecting National Parks in the United States. <http://www.invasiveplantatlas.org/parksurvey.pdf>
- Swearingen, J. 1991. Seed Dispersal by Ants. *The Maryland Natural Naturalist*, vol. 35, no.1-4. pp. 31-39.
- Wu, Y., Reardon, R.C., Ding, J., 2002. Mile-a-minute weed. In: Van Driesche, R., Lyon, S., Blossey, B., Hoddle, M., Reardon, R. (Eds.), *Biological Control of Invasive Plants in the Eastern United States*. USDA Forest Service Publication FHTET-2002-04.