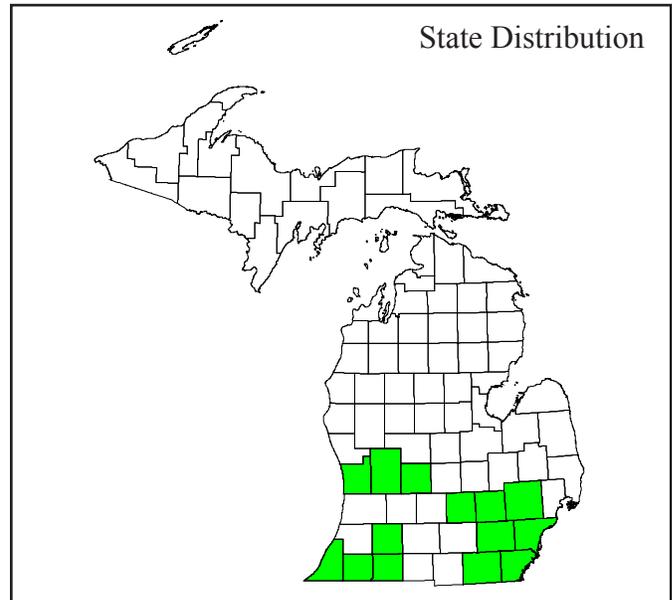
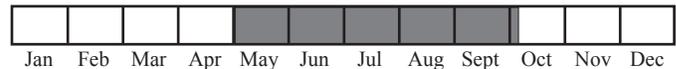




Photo by Ryan P. O'Connor



Best Survey Period



Status: State threatened

Global and state rank: G5/S2

Family: Moraceae (mulberry family)

Synonym: *Morus rubra* var. *tomentosa* (Rafinesque) Bureau

Taxonomy: Closely related to the non-native *Morus alba* (white mulberry), with which it is known to hybridize. See further comments under the conservation and management section below regarding hybridization and its potential threat to populations of red mulberry.

Range: Red mulberry is a widely distributed species of the central and eastern United States and Canada, occurring from southern Ontario to Vermont and south to Florida, and ranging to the west from South Dakota to Texas. It is considered rare in Massachusetts, Ontario, and Vermont, and is presumed extirpated in the District of Columbia (NatureServe 2007).

State distribution: This tree species is restricted to the southern Lower Peninsula, where it is known primarily from the southwest and southeast regions. Of the nearly 25 occurrences documented from a total of 13 counties, 11 sites are known only from historical records. Of the remainder, four occurrences are considered to be

extant, with no population data available, whereas 10 occurrences, the most recently documented and observed, consist primarily of small colonies of trees, typically comprised of three or fewer individuals.

Recognition: Red mulberry is a small to medium-sized tree of forested floodplains and adjacent slopes, with a rounded, dense canopy and short trunk (Barnes and Wagner 2004). The bark is a dark-reddish brown, separating into narrow, loose, flat strips and shallow, flat fissures. The leaves are alternate on delicate, zigzag branches, and are very similar in size and shape to the leaves of basswood (*Tilia*). **In contrast to basswood, the leaves of red mulberry are roundish to ovate and symmetrical (lacking the strongly lopsided leaf base in basswood), have a roughened (scabrous) upper leaf surface, and are uniformly downy-hairy beneath.** Red mulberry also produces lobed leaves, with one or two or more lobes, though such lobed leaves tend to form on strong shoots, such as from basal sprouts.

Other than a superficial resemblance to basswood, *Morus rubra* is most likely to be confused with the non-native white mulberry, with which it is closely related and may also hybridize. White mulberry is a relatively ubiquitous species that occurs in a variety of habitats, particularly in disturbed sites and in urban environments, but may occur with red mulberry. In



contrast to red mulberry, the bark of white mulberry has a markedly orange to yellowish-orange color and generally smaller leaves (which may present similarly lobed forms) with a glossy upper surface and a smooth lower surface with hairs, if present, only along the main veins.

Best survey time/phenology: Although the fruits may be helpful in identification, this species is most reliably distinguished by its leaves, and thus plants can be determined from leaf flush to leaf drop, approximately from late May through early October.

FQI Coefficient and Wetland Category: 9, FAC-

Habitat: In Michigan red mulberry is almost always found within or near riparian areas, typically in floodplain forest communities or in mesic to dry-mesic forests in close proximity to river and stream drainages, especially along fertile slopes (Barnes and Wagner 2004). Characteristic woody plant associates include such species as *Fraxinus pennsylvanica* (red ash), *Ulmus americana* (American elm), *Tilia americana* (basswood), *Quercus macrocarpa* (bur oak), *Liriodendron tulipifera* (tuliptree), *Acer negundo* (box elder), *Gymnocladus dioicus* (Kentucky coffeetree), *Acer nigrum* (black maple), *Quercus alba* (white oak), *Q. rubra* (red oak), *Celtis occidentalis* (hackberry), *Platanus occidentalis* (eastern sycamore), *Carya cordiformis* (bitternut hickory), and *Acer saccharinum* (silver maple). Common understory plants may typically include *Cercis canadensis* (redbud), *Staphylea trifoliata* (bladdernut), *Euonymus atropurpurea* (wahoo), *Asimina triloba* (pawpaw), *Carpinus caroliniana* (musclewood or bluebeech), *Toxicodendron radicans* (poison ivy), and *Vitis riparia* (riverbank grape), and groundcover species such as *Laportea canadensis* (wood nettle), *Lysimachia ciliata* (fringed loosestrife), *Euonymus obovata* (strawberry bush), *Verbesina alternifolia* (wingstem), *Asarum canadense* (wild ginger), *Eupatorium rugosum* (white snakeroot), and *Rudbeckia laciniata* (cut-leaved coneflower), among many other taxa typical of the rich diversity in southern floodplain forests.

Elsewhere within its wide range, red mulberry occurs in a variety of forest types, particularly moist forests, thickets, ravines, and bottomlands, and may also commonly occur in hedgerows and other successional habitats (Flora of North America 1997, Ambrose 1999).

Biology: *Morus rubra* is a wind-pollinated, dioecious species (i.e. consisting of male and female individuals). The fruits, which are animal-dispersed, are multiples of tiny drupes (a drupe being a fleshy fruit with a stone-like seed) consolidated into blackberry-like aggregations termed “syncarps. Stiles (1980) included red mulberry in a study of the patterns of woody plant fruit presentation and seed dispersal in the eastern deciduous forest, classifying this species as a “summer, small-seeded fruit” type. Fruit dispersal was recorded as occurring from June to August, thus occurring prior to the fall migration of frugivorous birds, with dispersal occurring principally through mammals and resident birds. In a study of forest succession in floodplains, Bellah and Hulbert (1974) reconstructed the successional sequence on exposed alluvial substrates, noting that red mulberry, along with American elm, red ash, and box elder became established within the first 10 years of alluvial soil exposure, attaining co-dominance within 60 years and reaching its optimal basal area and importance values in 30-60 year old stands.

Conservation/management: Little is known about the status of a significant number of documented sites for this species. However, several sites are protected on public land, including a state game area, a state park, and at least two southeastern Metro Parks with high quality riparian habitat. The species is also protected in at least one Nature Conservancy preserve and a Michigan Nature Association sanctuary. Despite protection within these sites, significant threats remain due to excessive and illegal off-road-vehicle (ORV) use and other human activities. There are also immediate threats due to a number of invasive plant species well known as aggressive competitors in floodplains, particularly garlic mustard (*Alliaria petiolata*), dame’s rocket (*Hesperis matronalis*), moneywort (*Lysimachia nummularia*), honeysuckles (*Lonicera* spp.), tree-of-heaven (*Ailanthus altissima*), and the non-native white mulberry.

Comments: Hybridization with white mulberry has been reported extensively in Ontario, where red mulberry occurs along a portion of the northern range edge, and according to Ambrose (1999) most Ontario sites for red mulberry co-occur with white mulberry. Genetic studies conducted by Burgess et al. (2005) confirmed a relatively high degree of hybridization, with the hybrids expressing a dominance of white mulberry markers in their genome and thus the potential (owing



to introgression, or repeated backcrossing) for the genetic dilution of red mulberry. Preliminary fitness tests between red and white mulberry and their hybrids demonstrated that red mulberry was outperformed in both sun and shade environments, corroborating the need for management to cull white mulberry (Ambrose 1999). It was also shown in a test plot that the removal of white mulberry and hybrids resulted in an increased number of true breeding red mulberry fruits. Michigan populations of red mulberry should thus be monitored to determine the presence of white mulberry and the detection of possible hybrids.

Research needs: Status surveys to determine the condition and extent of known and historical populations are perhaps the principal need at present, and should include an assessment of threats, including the proximity of white mulberry and any evidence or potential for hybridization.

Related abstracts: Floodplain forest, black rat snake, Blanding's turtle, eastern box turtle, Indiana bat, red-shouldered hawk, beak grass, goldenseal, prairie trillium, Virginia snakeroot, wahoo, yellowfumewort, and many additional species in this rich natural natural community type (see MNFI Rare Species Explorer for a comprehensive listing of associated rare plant and animal species).

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