

# A Study of the Natural History of Naturally Occurring Populations of *Magnolia tripetala* L. in Indiana

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## Introduction

A single location for *Magnolia tripetala* L. (umbrella magnolia) was reported for Indiana by Charles Deam in 1945 (3). Currently, the known distribution of *M. tripetala* in Indiana is confined to seven sites in a few ravines near the Ohio River in Crawford County. The current status of *M. tripetala* and the surrounding plant community was evaluated to aid in future study, protection and management of this species, which is endangered in Indiana.

## Location

The study site is located in Crawford County, Indiana (Figure 1). The seven known locations of *M. tripetala* occurrence are located at the following coordinates:

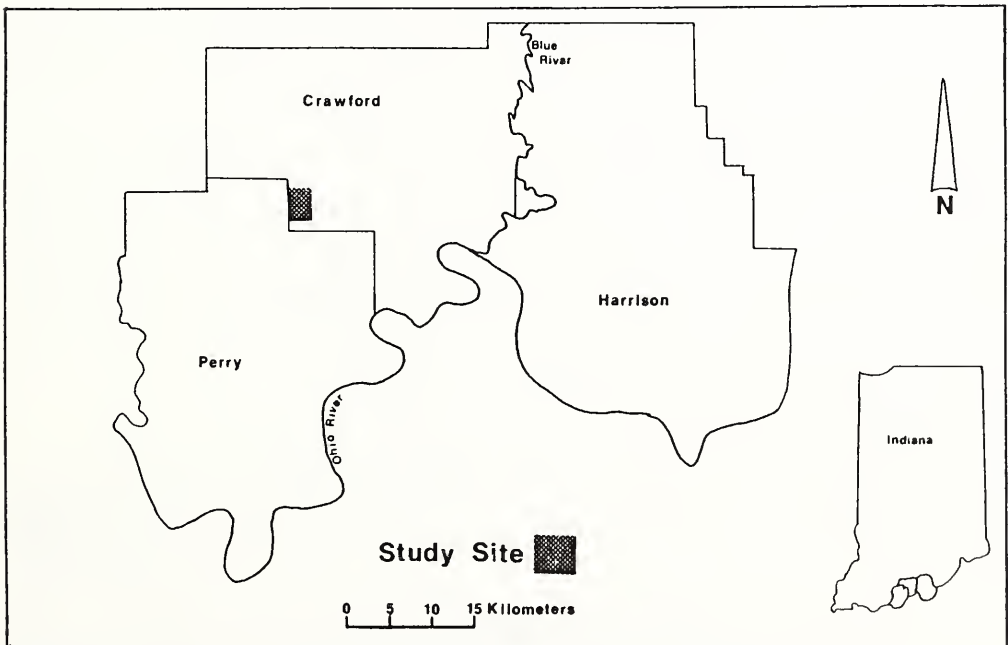


FIGURE 1. Location of study area.

### *Branchville 7 1/2-minute Topographic Quadrangle*

- 1) Stinking Fork Ravine, NW 1/4, Sec. 20 and NE 1/4, Sec. 19, T3S, R1W. (Hoosier National Forest)
- 2) Box Canyon Magnolia Area, NE 1/4, Sec. 30, T3S, R1W (Private Ownership)
- 3) I-64 Site, SE 1/4, Sec. 19 and SW 1/4, Sec. 20, T3S, R1W (Private Ownership)
- 4) Potts Creek Magnolia Stand, SW 1/4 Sec. 30, T3S, R1W (Hoosier National Forest)

*Taswell 7 1/2-minute Topographic Quadrangle*

- 1) Keysacker Magnolia Site, SE 1/4, Sec. 17, and NE 1/4, Sec. 20, T3S, R1W (Hoosier National Forest and Private Ownership)
- 2) Russell Branch Site, NW 1/4, Sec. 17, T3S, R1W (Hoosier National Forest)
- 3) Magnolia Hollow, SW 1/4, Sec. 17, T3S, R1W (Private Ownership)

**Plant Community**

There was evidence of selective harvesting of timber in all the ravines where *M. tripetala* occurred. The severity and history of disturbance has varied between each ravine. The most severe human-induced disturbances appeared to be Interstate 64 bisecting the I-64 site and very heavy timber harvesting at Magnolia Hollow. The Magnolia Hollow site was the location originally described by Deam (4) and further detailed by Lindsey, Schmelz and Nichols (6).

The tree stratum was found to be dominated by *Acer saccharum* Marsh., *Fagus grandifolia* Ehrh., *M. tripetala* and *Acer rubrum* L. The sapling and seedling strata were predominantly composed of *A. saccharum* and *A. rubrum*.

There were 157 species of vascular plants identified from the study area. Voucher specimens were collected and deposited in the Indiana State University herbarium. Several species of special concern were found within the study site. Species given special status by Bacone and Hedge (1) are listed in Table 1. All nomenclature follows Kartesz and Kartesz (5).

TABLE 1. *Species of special concern occurring in study site. Status is that given by Bacone and Hedge (1).*

SPECIES	STATUS
<i>Antennaria solitaria</i> Rydb.	State Threatened
<i>Dodecatheon frenchii</i> (Vasey) Rydb.	State Endangered
<i>Heuchera parviflora</i> Bartl.	State Endangered
<i>Hydrastis canadensis</i> L.	Special Concern-Federal
<i>Kalmia latifolia</i> L.	State Threatened
<i>Lycopodium selago</i> L. var. <i>selago</i> (Beauv.) Desv.	State Endangered
<i>Magnolia tripetala</i> L.	State Endangered
<i>Panax quinquefolius</i> L.	Special Concern-Federal
<i>Platanthera peramoena</i> (Gray) Gray	Special Concern-Federal
<i>Solidago hispida</i> Muhl.	State Threatened
<i>Synandra hispidula</i> (Michx.) Baill	Special Concern-Federal

*Ailanthus altissima* (Mill.) Swingle has become naturalized in all of the ravines where *M. tripetala* occurs. This species has usually been associated with the secondary growth of waste areas (7). There is some evidence that *A. altissima* is directly competing with *M. tripetala*.

**Permanent Plots**

A total of ten permanent plots were located in four of the ravines, where *M. tripetala* occurs. Circular plots were laid out, each with a radius of 9 m. The center of each plot was marked by an 18-inch brass-coated stake. The stakes were driven completely into the ground, to avoid problems with vandalism and to maintain the natural character of the areas. Future relocation of the center markers would be aided

by the use of a metal detector. A detailed description of the permanent plots and a location map are located in the Indiana State University Library (2).

The permanent plots were located at sites of good *M. tripetala* growth and reproduction. This will enable future monitoring of what is currently prime habitat for *M. tripetala*. The permanent plots were also placed to include sites where *A. altissima* has become established.

### Management Recommendations

Currently, *M. tripetala* populations appear to be stable in Indiana. Reproduction by runners and seeds seems to be adequate to maintain or even expand the populations. However, the limited distribution and the species low tolerance to disturbance warrants the protection of all sites of natural occurrence.

The steep slopes and associated soils of the ravines are highly susceptible to damage by human traffic. There has been increasing visitation to the *M. tripetala* sites in recent years. If feasible, consideration should be given to a managed trail system, which avoids sensitive areas.

Efforts should be maintained to monitor *M. tripetala* and the other species of special concern. The naturalization of *A. altissima* should be closely followed. If trends continue, *A. altissima* should be eliminated as a competitor with *M. tripetala*. *Lycopodium selago* var. *selago*, *Dodecatheon frenchii* and *Heuchera parviflora* are all found in shallow soil deposits on the sandstone cliffs. These species are extremely sensitive to human disturbance and increased human traffic along the cliff faces may cause irreparable damage.

The majority of *M. tripetala* sites are on Hoosier National Forest property. It is important that these sites and a surrounding buffer zone be given a protected status by the U.S. Forest Service. Voluntary landowner protection or acquisition of sites in private ownership should also be given priority. The proximity, similar species composition and similar geological history of the *M. tripetala* sites, Hemlock Cliffs and Yellow Birch Ravine suggest the possibility of a management plan that would encompass all three sites.

### Acknowledgments

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### Literature Cited

1. Bacone, John A. and Cloyce L. Hedge 1980. A preliminary list of endangered and threatened vascular plants in Indiana. Proc. Indiana Acad. Sci. 89: 359-371.
2. Badger, Kemuel. 1984. An evaluation of naturally occurring populations of *Magnolia tripetala* L. in Indiana, M.A. thesis. Indiana State University Life Sciences Department. 105 p.
3. Deam, Charles, Ralph Kriebel, T. G. Yuncker and Ray C. Friesner 1945. Indiana plant distribution records VI. Proc. Indiana Acad. Sci. 55: 50-58.
4. Deam, Charles 1953. Trees of Indiana. 3rd ed. Indiana Dept. of Conservation. Indianapolis, Indiana. 330 p.

5. Kartesz, John T. and Rosemarie Kartesz. 1980. A synonymized checklist of the vascular flora and United States, Canada and Greenland, Volume II, The biota of North America. U.N. Carolina Press. Chapel Hill, N.C. 498 p.
6. Lindsey, A. A., D. V. Schmelz and S. A. Nichols. 1970. Natural areas in Indiana and their preservation. American Midland Naturalist. Notre Dame, Indiana. 594 p.
7. Little, Elbert L. 1980. The Audubon society field guide to North American trees, eastern region. Alfred A. Knopf Inc., New York, N.Y. 714 p.