Plant Diversity Website

Lygodium palmatum (Bernh.) Swartz

Common Names: American Climbing Fern, Hartford Climbing Fern, Creeping Fern, Windsor Fern, Thoreau's Climbing Fern

Etymology: *Lygos* means "willow-like" or "pliant" in Greek, perhaps referring to the vining stems (13), whereas "palmatum" refers to the hand-like shape of the pinnules, and is derived from a Greek root (15).

Botanical synonyms:
Gisopteris palmata Bernhardi (8)
Cteisium palmatum Michx. (19)
Hydroglossum palmatum Willd (19)

FAMILY: Schizaeaceae (the climbing fern family).

Quick Notable Features:
¬ a climbing fern
¬ thin wiry stems with palmately lobed leaves
¬ pinnae are wide and palmate at the base of fronds, but narrow with almost no lamina at the apex where you will find sporangia.

Plant Height: Can climb at least to 2.5 m (4)

Subspecies/varieties recognized: None found.

Most Likely Confused with: *Lygodium microphyllum* and *L. japonicum*, both invasives in the eastern United States (1). Other vines in Michigan bearing palmate leaves are *Mikania scandens* and two species in the genus *Humulus.*

Habitat Preference: Moist acid soil of thickets, bogs, marshes, and open and closed woods (7, 9, 10). It is reported as intolerant of shading (14).

Geographic Distribution in Michigan: A county-by-county assessment is not yet available. While the USDA maps (5) plots the species as occurring in both the Upper and Lower Peninsulas of Michigan, this is indicative of the general nature of the reporting, not the accurate distribution. The species is known in Michigan from Kalamazoo (17,18). The Natural

Resources Conservation Service of the USDA lists the species as Endangered in Michigan (5). However, the distribution map in Flora of North America does not include Michigan in the species' range (8, 14).

Known Elevational Distribution: Nothing specific found, although the species is listed as inhabiting mountains in Tennessee as well as the Coastal Plain of North Carolina (12).

Complete Geographic Distribution: Although native to the eastern United States in Massachusetts, New Hampshire, Vermont, and New York, its occurrence there is quite patchy and limited. In Connecticut *Lygodium palmatum* is listed as requiring special concern for rarity. However it is found more frequently south to the Carolinas, Mississippi, Georgia and Kentucky, especially associated with Appalachian foothills (2, 3, 5, 10). The USDA distribution map shows a distribution of the species in all of the eastern states, from New Hampshire to Florida, and west to the Mississippi River, excluding Illinois and Wisconsin, but the detailed map shows patchy distribution in most states (1, 5, 9).

Vegetative Plant Description: A perennial climbing fern with fronds up to 3 m long (4, 9). Apical sections of the frond are fertile while proximal portions are sterile. The sterile portions have alternate pinnae, each composed of only two pinnules each, The pinnules have 5-10 lobes arranged palmately, appearing hand-like (see image). These hand-like pinnae are 1-4 cm long and 2-6 cm long with a cordate base. The lobes of the pinnae are each 1-2 cm long and 8-12 mm wide. The veins within each lobe branch dichotomously. The fertile portions are similarly arranged but much more finely divided with each segment much more narrow than in sterile pinnae (1-2 mm long and 3-7 mm wide). The rhizome is black, long (length not specified) but only 1mm in diameter, and is hairy, but lacks scales typical of many ferns. Some characterize the fronds as "indeterminate" because of their vining habit (9, 10, 11).

Climbing Mechanism: The plant twines with the fronds using the rachis of the frond apparently (9). Thus this might be best called a 'leaf' twiner.

Sporangium Description: Sporangia are covered by an outgrowth of the leaf lamina that looks like an indusium (9). There is usually no leaf lamina on the fertile portions at all – just sporangia covered by the leaf outgrowth. There are generally 6-10 sporangia to a pinnule segment (10).

Sporangium Producing Period: Likely July to September (11).

Type of Gametophyte: thalloid (10).

Dispersal Syndrome: no information reported in the literature, but as a climbing species this fern no doubt reproduces vegetatively (via rhizome growth) as well as with spores.

Distinguished by: *Lygodium palmatum* is distinguished from *L. microphyllum* by the deeply palmately lobed sterile pinnae (which are oblong and unlobed in *L. microphyllum*) and from *L. japonicum* by the presence of triangular unlobed sterile pinnae with basal lobes (3). Other twining plants in Michigan with palmate leaves are *Humulus japonicus* and *H. lupulus*, which have serrate margins (and are, of course, dicotyledonous angiosperms). *Mikania scandens* a very rare climber reported only once in 1894 in Michigan, can be distinguished by the unlobed leaves and the three strong basal veins that ascend to the apex, unlike *L. palmatum.*

Other members of the family in Michigan none. A related terrestrial non-climbing fern, *Schizaea pusilla,* occurs further north but has not been reported to our knowledge in Michigan.

Ethnobotanical Uses: In New England, the fronds were picked to ornament Christmas decorations. However declining populations led Connecticut to pass a law banning picking – it is cited as the first plant-protection law in the United States (4).

Phylogenetic Information: *Lygodium* belongs to the family Schizaeaceae, which includes 5 genera that are largely tropical and subtropical in distribution. The family is grouped within the Schizaeidae based on rhizome and sporangial characteristics and is thought to be an ancestral group within the Schizaeidae (9). It is also listed as belonging to the order Schizaeales, part of the Polypodiopsida, Monilophyta (ferns) (20). The genus can be found in some texts listed as belonging to the Lygodiaceae, a family of ferns that has been included in the Schizaeaceae.

Interesting Quotation or Other Interesting Factoid not inserted above:

Henry David Thoreau wrote about this climbing fern in his journal, “It is a most beautiful slender and delicate fern, twining like [a] vine about the stem of the meadow-sweet, panicled andromeda, foldernrods, etc., to the height of three feet or more, and difficult to detach from them” (16)

The closely related exotic, *Lygodium microphyllum* is an aggressive invasive species, especially in Florida. There, it can form entire skirts around tree trunks and when it is set on fire can “kite” off to other areas, spreading the fire (3). In 1998, this species was noted as far north as 28 degrees N latitude (northern Florida).

L. palmatum is listed as either rare, endangered, of special concerned, or threatened in all the following states: CT, IN, MD, MA, MI NY, PE, VT (5).

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5) USDA Website for *Lygodium palmatum* http://plants.usda.gov/java/profile?symbol=LYPA3
6) Pacific Island Ecosystems at Risk by Institute of Pacific Islands Forestry Last updated February 3, 2007. http://www.hear.org/pier/species/lygodium_palmatum.htm
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Image Credits (all used with permission):

1) The sterile fronds are courtesy of Tom Barnes University of Kentucky.
2) The image of sterile and fertile fronds together is from Jim McCormac, shot in Scioto County, Ohio.
3) The image of the climbing habit of *Lygodium palmatum* is by Ray Angelo published on the Botanical Index to the Journal of Henry David Thoreau website http://neatlas.huh.harvard.edu/ThoreauBotIdx/
4) The first image of the fertile fronds is from Jim McCormac, shot in Scioto County, Ohio ambrosia@columbus.rr.com
5) The even closer image of fertile fronds is courtesy of Janet Novak, from the Connecticut Botanical Society Website http://www.ct-botanical-society.org/ferns/lygodiumpalm.html

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