

Plant Diversity Website

***Dioscorea villosa* L.**

Common Names: Wild yam (1), colic-root (2)

Etymology: *Dioscorea* is named after a Greek naturalist (botanist, pharmacologist, and briefly, Emperor Nero's personal physician) of the first century, Dioscorides (3); *villosa* comes from Latin, and means "shaggy" or "hairy" (9).

Botanical synonyms: *Dioscorea hirticaulis* Bartlett (1). Complete list after literature cited.

FAMILY: Dioscoreaceae (the yam family)

Quick Notable Features:

- Palmate and arcuate venation
- Heart-shaped, alternate leaves
- Three-winged capsules

Plant Height: Stems grow to 5m in length (2).



Subspecies/varieties recognized (source):

Dioscorea villosa var. *hirticaulis* Bartlett (1), *Dioscorea villosa* var. *glabrifolia* Bartlett (3).

Most Likely Confused with: Species in the genus *Smilax*, particularly *S. lasioneura*. *D. villosa* is also very similar in appearance to *Aristolochia macrophylla* and might also be confused with members of the genera *Ipomoea* (morning glory) and *Calystegia* in the Convolvulaceae.

Habitat Preference: Open thickets, roadsides, and woods. It prefers a moist habitat (2, 3).

Geographic Distribution in Michigan: Found in approximately one third of the counties of the lower peninsula; the distribution is more dense in the southwest and collections become more sparse radially. It is also found in Menominee County in the upper peninsula (1).

Known Elevational Distribution: No elevational distribution was found.

Complete Geographic Distribution: Native to North America (1). Found in approximately two-thirds of the continental United States. It is found in every state east of the Mississippi River with the exceptions of Maine and Vermont. It is also found in states bordering the Mississippi River to the west: Kansas, Nebraska, Oklahoma, and Texas. It is also found in Puerto Rico (1).

Vegetative Plant Description: Wild yam has mostly alternate leaves (completely alternate at the roots), but occasionally opposite near the apex, with either glabrous or hairy undersurfaces. The leaves are cordate to ovate (heart-shaped), 5 to 10cm long, with an "abruptly acuminate" apex. Leaves are entire and well "differentiated into a petiole and blade" (4). Leaf venation is palmate (2,3,5) and the primary veins converge at the apex of the leaf. The plant has quite thick brownish rhizomes and is always herbaceous.

Climbing Mechanism: Glabrous stems twine sinistrally (right to left) up to approximately 5m

(2). It has adventitious roots, although these are not necessarily used for climbing (11).

Flower Description: *D. villosa* is dioecious, and inflorescences are spicate or branched (5, 11). Both staminate and pistillate flowers are white to greenish yellow (7, 11, 12). Both inflorescences are 4 - 20 cm long, borne in solitary, axillary positions (12). The male and female flowers are radially symmetrical with six tepals that are often glandular (12). The male flowers



have six stamens adnate to the tepals. The female flowers have three connate carpels, and the ovary of the female flower is inferior (4). Interestingly, staminate plants, in a collection site, will often outnumber carpellate plants by three to five times (10).

Flowering Time: Wild yam flowers in Illinois from late June through July (11).

Pollinator: Because of the inconspicuous flowers, it is suggested that the genus is insect-

pollinated, more specifically by flies (4). No account was located for the species.

Fruit Type and Description: Fruits are capsulate, three-winged and broad, 7 to 11mm long (4, 11).

Seed Description: The seeds are flattened and/or winged (4); the hyaline wing is pale and obviously contrasts with the dark embryo. The seeds are 3 to 5mm long, and 'broad' (3).

Dispersal Syndrome: Dispersed by wind, evident from the winged fruits and winged seeds (4).

Distinguished by: Unlike *Smilax lasioneura*, *Dioscorea villosa* does not have pubescent stems or petiole borne tendrils, nor do the main veins of *Dioscorea* branch noticeably. *Aristolochia macrophylla* does not have arcuate venation at all; only its central vein extends to the apex. Species of the Convolvulaceae (*Ipomoea* and *Calystegia*) which might be confused with *D. villosa* from a distance, twine from left to right (instead of right to left) and usually bear white latex in the stems. Leaf venation of the Convolvulaceae is also quite clearly not arcuate.



Other members of the family in Michigan: None, although *D. quaternata* and *D. oppositifolia* are found throughout the Midwest and most of the Eastern United States (1). *D. quaternata* is thought by many to be a synonym of *D. villosa*, based on the unreliable character of 3 versus 4 leaves at a node on some plants.

Ethnobotanical Uses: The Meskwaski Indians used the root during childbirth as pain relief. Native Hawaiians used tubers from the genus as food (and also as a drink for the sick), and

scrapings from the tuber as relief of over-heating excessive sweating (6). Research has demonstrated that wild yam (specifically, its diosgenin) chemical has excellent anti-inflammatory qualities, and many have referenced it as an aid to spleen, intestinal, and kidney function (8).

Phylogenetic Information: Taccaceae and Stemonaceae were once considered distinct from Dioscoreaceae; however, the former have recently been reclassified into Dioscoreaceae (4, 5). The most similar family, then, seems to be the Burmanniaceae, which consists of “mycoparasitic herbs with scale-like leaves” (4). While Dioscoreaceae species are widespread in the tropics, the family includes temperate species; Burmanniaceae in contrast, is a more specifically tropical family than Dioscoreaceae: more densely concentrated in the equatorial zone (4).

Interesting Quotation or Other Interesting Factoid not inserted above: Used in some cultures as a coffee substitute (8). The rhizomes and roots of *Dioscorea villosa* are also used in biomedical engineering to synthesize progesterone (a female hormone) (10).

Literature and websites used:

- 1) USDA Plants Profile: *Dioscorea villosa*. <http://plants.usda.gov/java/profile?symbol=DIVI>
- 2) Gleason, H.A. and A. Cronquist. 1991. *Manual of Vascular Plants of the Northeastern United States and Adjacent Canada*. Bronx, New York, USA: New York Botanical Garden Press.
- 3) Fernald, M. L. 1950. *Gray's Manual of Botany*, 8th ed. New York, USA: American Book Company.
- 4) Judd, W.S., C.S. Campbell, E.A. Kellogg and P.F. Stevens. 1999. *Plant Systematics: A Phylogenetic Approach*. Sunderland, Massachusetts, USA: Sinauer Associates, Inc.
- 5) Stevens, P. F. Angiosperm Phylogeny Website. Version 7, May 2006. <http://www.mobot.org/MOBOT/research/APweb/>.
- 6) Moerman, D.E. 1998. Native American Ethnobotany. Timber Press: Portland, OR. Access online via University of Michigan Dearborn. <http://herb.umd.umich.edu/>
- 7) Gleason, H.A. 1963. The new Britton and Brown illustrated flora of the Northeastern United States and Adjacent Canada. New York, New York, USA: Hafner Publishing..
- 8) Rain-Tree Nutrition Tropical Plant Database <http://www.rain-tree.com/dioscorea.htm>
- 9) Dictionary of Botanical Epithets. December 30 2005, <http://www.winternet.com/~chuckg/dictionary.html>
- 10) Albrecht, M.A. and B.C. McCarthy 2006. Seed germination and dormancy in the medicinal woodland herbs *Collinsonia canadense* and *Dioscorea villosa*. *Flora* 201(1): 24-31.
- 11) Illinois Plant Information Network (ILPIN) <http://www.fs.fed.us/ne/delaware/ilpin/ilpin.html>
- 12) Raz, L. 2003. Dioscoreaceae. In: *Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico*. New York and Oxford. Vol. 26.

Complete list of synonyms from reference 12:

Dioscorea cliffortiana Lamarck; *D. glauca* Muhlenberg ex Bartlett; *D. hexaphylla* Rafinesque; *D. hirticaulis* Bartlett; *D. longifolia* Rafinesque; *D. lloydiana* E. H. L. Krause; *D. megaptera* Rafinesque; *D. paniculata* Michaux; *D. paniculata* var. *glabrifolia* Bartlett; *D. pruinosa* Kunth; *D. quaternata* (Walt.) J. F. Gmelin; *D. quaternata* var. *glauca* (Muhlenberg ex Bartlett) Fernald; *D. quinata* J. F. Gmelin; *D. repanda* Rafinesque; *D. villosa* var. *glabra* Lloyd; *D. villosa* subsp. *glabrifolia* (Bartlett) W. Stone; *D. villosa* var. *glabrifolia* (Bartlett) S. F. Blake; *D. villosa* subsp. *glauca* (Muhlenberg ex Bartlett) R. Knuth; *D. villosa* subsp. *hirticaulis* (Bartlett) R. Knuth; *D. villosa* var. *hirticaulis* (Bartlett) H. E. Ahles; *D. villosa* subsp. *paniculata* (Michaux) R. Knuth; *D. villosa* subsp. *quaternata* (J. F. Gmelin) R. Knuth; *D. villosa* var. *vera* Prain & Burkill; *D. waltheri* Desfontaines

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