

# Plant Diversity Website

## ***Ipomoea pandurata* (L.) G Mey.**

**Common Names:** Man of the earth, wild sweet potato, big-root morning-glory, man-root, wild-potato, wild-sweet-potato-vine, Indian potato (2,3,9,15).

**Etymology:** The genus name *Ipomoea* is from the Greek *ips*, which means “a worm,” and *homoios* which, means “resembling,” referring to the wormlike twining habit. The epithet *pandurata* means “fiddle-like” most likely referring to the leaf shape (20).

**Botanical synonyms:** *Convolvulus panduratus* L. (15).

**FAMILY:** Convolvulaceae, the bindweed or morning glory family

**Quick Notable Features (4,8):**

- Large underground storage organ
- Simple, polymorphic leaves: cordate or fiddle-shaped on long petioles
- Large white flowers with lavender to purple centers
- Hairy seeds

**Plant Height:** Easily up to 3m in length, but occasionally growing to 4.6m (1,4).

**Subspecies/varieties recognized (5):**

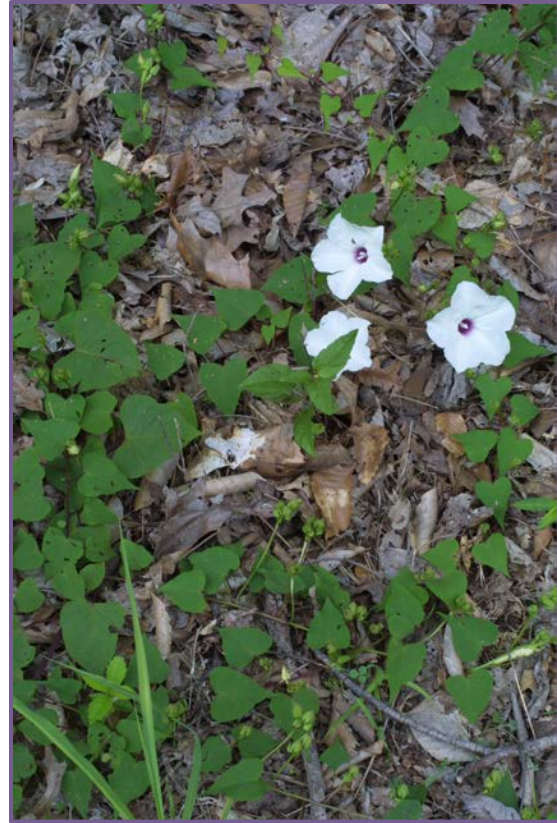
- I. pandurata* var. *candicans* Choisy
- I. pandurata* var. *rubescens* Choisy
- I. pandurata* var. *hastata* Chapm

**Most Likely Confused with:** *Ipomoea x multifida*, *I. hederacea*, *I. purpurea*, *Calystegia silvatica*, *Convolvulus arvensis*, *Dioscorea villosa*, and *Aristolochia macrophylla*.

**Habitat Preference:** *Ipomoea pandurata* is found in moist to slightly dry, disturbed habitats, such as slopes, agricultural fields, roadsides, and railway right-of-ways (7,8).

**Geographic Distribution in Michigan:** *I. pandurata* is found in Berrien, Kalamazoo, Kent, St. Clair, and Monroe counties (8).

**Known Elevational Distribution:** The species was collected at 1340m above sea level in Tejupilco, Mexico (9).



**Complete Geographic Distribution:** Native to the United States, *I. pandurata* is found in most eastern states (AL, AR, CT, DC, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, MI, MO, MS, NC, NE, NJ, NY, OH, OK, PA, SC, TN, TX, VA, WV), Canada (ON), Mexico, and Japan (2,9).

**Vegetative Plant Description:** *Ipomoea pandurata* is a perennial twinning or trailing herb with smooth to slightly pubescent, occasionally purplish stems. It forms a very large underground storage organ (up to 11kg). Sources vary in stating the morphological organ that is represented: some suggest it is a tuber (3,4,8) and some suggest it is a storage root (1,4,21). We believe it is a modified stem, but the variance in the sources is an interesting phenomenon. Each storage organ can produce 4-8 shoots. The entire leaves are simple, alternate, heart-shaped to ovate, or pandurate (contracted in the center or fiddle-shaped), 3.5-8cm long and 2.5-8cm broad, with 1-8cm long petioles. The blades are short-pubescent to glabrous on both surfaces (most commonly below), and about as wide as long (3-10cm) (1,4,14,16,17,21).

**Climbing Mechanism:** Stem twining or trailing (4,14,16,17), with dextrally oriented twining direction (R.J. Burnham, pers. obs.).

**Flower Description:** The cymose inflorescence is composed of 1-7 perfect actinomorphic flowers. The pedicel is longer than the petiole, stout, and contains extrafloral nectaries near the base of the flower. The calyx (1.3-1.9cm long) is light green, generally glabrous, imbricate, and 5-lobed, with long narrow ridges. The sepals (1.2-1.5cm long) are narrowly ovate to elliptic, the inner often longer than the outer. *I. pandurata* has a funnelform corolla that is wider (7-10cm) than long (4.5-8cm), white with violet to red-purple in the tube. The pubescent stamens are 2-3cm long, not exserted, with anthers that are 5-7mm long. The two-locular, glabrous ovary is superior, the style topped with a 2-lobed, globular stigma, surrounded by a yellow nectary, 1.5-2.3mm broad. The ovary shape is ovoid, and each ovary contains 4 ovules. Stucky & Beckmann (1982) observed that anthesis usually occurs between 2 and 4am (1,3,6,12,14,16,17).



**Flowering Time:** The species flowers from late May-September (1,17).

**Pollinator:** The flowers are visited and pollinated by insects, including long-tongued bees, *Ptilothrix bombiformis*, *Bombus pennsylvanicus*, *Melissodes* ssp., and *Melitoma taurea* (1,3,11). *Ipomoea* ssp. flowers are also known to be bat pollinated in the southwestern U.S. (10). Bat pollination may be in better agreement with anthesis time than bees.

**Fruit Type and Description:** The fruit is a glabrous, ovoid, 2-celled, dehiscent capsule, 1-1.5cm long, containing 2-4 seeds (3,13,14,17).

**Seed Description:** The oblong seeds are dull brown to red in color, and densely covered with tiny, brownish hairs. Woolly trichomes are present along the angles. Seed set has been reported to be rare, due to pollen tube failure as well as sterility mechanisms in the ovary. Highest



germination success was coincident with seed scarification (sulfuric acid or mechanical), at which point the cotyledons emerge from the ground, (e.g., epigeal germination). Axillary buds are reported to be present well below the cotyledon, allowing for resprouting if the top of the seedling is removed by herbivory (1,4,13).

**Dispersal Syndrome:** At maturity, the capsules open to expose the wind dispersed seeds, likely facilitated by the hairs surrounding the seeds. The species

can also be propagated by root cuttings (1).

**Distinguished by:** *Ipomoea pandurata* can be distinguished from other species of *Ipomoea* in Michigan using the following features. *Ipomoea x multifida* has very deeply lobed leaves and a red corolla that is salverform, not funnelform, with exserted stamens. *I. hederacea* has pubescent stems, pubescent acute sepals, and a 3-lobed stigma, while *I. pandurata* has nearly glabrous stems and rounded, essentially hairless sepals (with the exception of occasional scarce apical pubescence). In addition, *I. hederacea* leaves can be 3-lobed, the corolla is smaller (3-4.5cm long) and blue - pink - purple with a white tube. *I. pandurata* can be distinguished from the annual *I. purpurea* by the strongly reflexed hairs on the pedicels, stems, and sepals, the 3-lobed stigma, and the varied corolla pigmentation, most commonly purple-pink or white, but with no purplish tube. *Calystegia silvatica* has similar flowers, but the leaves of *C. silvatica* have a wider sinus, sometimes square, and the leaf lobes may bear large teeth. Flowering specimens of the two are differentiated by the all-white corolla and the subtending bracts enclosing the calyx in *Calystegia silvatica*, neither present in *I. pandurata*. *Convolvulus arvensis* has narrow deltoid to sagittate leaves, generally smaller (only 4cm x 3cm). The flowers have a pink corolla or a white corolla with pink radial stripes, and filiform stigmas. *Dioscorea villosa* has similar cordate leaves, however, leaves at the base of the plant are whorled, and the upper leaves alternate, all with arcuate, apically converging veins. In *I. pandurata*, all leaves are alternate and veins are not arcuate. Additionally, *D. villosa* is dioecious (pistillate and staminate flowers in different plants), bears spike or paniculate inflorescences and much smaller flowers. *Aristolochia macrophylla* has similar heart-shaped, alternate leaves, however it is a woody vine, not herbaceous as *I. pandurata*, and the leaves are usually over 8cm broad. *A. macrophylla* flowers are zygomorphic and have no corolla (6,8,14,16).

**Other members of the family in Michigan (number species):** *Calystegia* (5), *Convolvulus* (1), *Cuscuta* (9), and *Ipomoea* (4) (source 8).

**Ethnobotanical Uses:** The roots were used by Native Americans to prepare a poultice to treat rheumatism, an infusion for cholera or kidney disease, or a decoction taken for abdominal pains, coughs, and early stages of tuberculosis. The plant was powdered and used to make an infusion for headaches and upset stomachs. To keep pests away from sweet potatoes, Native Americans prepared an infusion of the whole *I. pandurata* plant and submerged the potatoes in it. The cooked roots were also used as food source (19).

**Phylogenetic Information:** The Convolvulaceae is a member of the order Solanales. Solanales forms a monophyletic group with Lamiales and belongs to the Asterid I clade. Within



Convolvulaceae there are two groups: Humbertioideae, the rare large trees, and Convolvuloideae, comprising both woody and herbaceous vines. Edible and ornamental members of this family are found worldwide, with the exception of polar regions, and the deserts of Patagonia, Sahara, and Taklimaka (18).

**Interesting Quotation or Other Interesting Factoid not inserted above:** The extrafloral nectaries attract hymenopterans (ants and wasps), which ferociously protect the plant from herbivorous insects (12). The taproot is capable of growing longer than 2 meters and over 1 meter in diameter, weighing up to 30kg (21). If ingested, the seeds of several *Ipomoea* species are poisonous to humans and livestock (21). Symptoms include: hallucinations, dilated pupils, nausea, vomiting, diarrhea, drowsiness, numbness of extremities, and muscle tightness upon ingestion (22). The species is listed as threatened in Michigan, and endangered in New York (2). The cultivated sweet potato, *Ipomoea batatas*, is a different species in the same genus as the wild sweet potato (23).

“Was it worth while to paint so fair  
Thy every leaf-to vein with faultless art  
Each petal, taking the book light and air  
Of summer so to heart?...  
Thy silence answers: “Life was mine!  
And I, who pass without regret or grief,  
Have cared the more to make my moment fine,  
Because is was so brief.”

-The Morning-Glory by Florence Earle Coates (1850-1927)

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