

Plant Diversity Website

Cucurbita foetidissima H. B. Kunth.

Common Names: Buffalo gourd, calabazilla (Spanish), Missouri gourd, coyote gourd, wild pumpkin, fetid wild pumpkin, wild gourd, foetid gourd, stinking gourd, gueto lana (Spanish), chilicote (Spanish), Chile coyote, and mock orange (1,3,4,6,9,15,17).

Etymology: *Cucurbita* is the Latin word for “gourd.” The species name *foetidissima* comes from the Latin *foetidissimus*, meaning “very bad-smelling” (19).

Botanical synonyms (4):

Pepo foetidissima (Kunth) Britton

Cucumis perennis James

Cucurbita perennis James

Ozodykus perennis James



FAMILY: Cucurbitaceae, gourd family (1)

Quick Notable Features (10,11,14,15,17):

- Leathery leaves feel inflexible, leaf apices point upwards conspicuously
- Leaf triangular-cordate-sagittate, twice as long as wide
- Foul smell when leaf or stem is bruised
- The large flower is yellow-orange and campanulate (5cm long, 5cm wide), with 5-6 lobed corolla



Plant Height: A trailing vine whose stems are usually about 3m in length, but which can grow to 12m (18,35).

Subspecies/varieties recognized (22):

C. foetidissima var. *scabridifolia* (L.H. Bailey)

Filov

C. foetidissima var. *foetidissima* A. I. Filov

Most Likely Confused with: *Cucurbita maxima*, *Cucurbita pepo*, *Cucumis melo*, *Cucumis sativus*, *Ipomoea purpurea*, *Convolvulus arvensis*, and *Calystegia hederacea* (11,28).

Habitat Preference: *C. foetidissima* is common in dry gravel and sand, as well as disturbed soils such as farming fields and developed land (1,13,14).

Geographic Distribution in Michigan: The stinking gourd is not native to Michigan and has only been found in Berrien county (11).

Known Elevational Distribution: *C. foetidissima* can be found at lower to middle elevations, 0-2100m in Mayhill, NM (5,17,21,23).

Complete Geographic Distribution: Native to the United States, *C. foetidissima* is found in AR, AZ, CA, CO, FL, IA, IL, IN, KS, KY, MI, MO, NE, NM, NV, OH, OK, TX, UT, VA, WI, and WY. The stinking gourd is also found in northern Mexico. The species tends toward xerophytic grasslands and deserts, but it has been introduced in many Midwestern states (13,18,30).

Vegetative Plant Description: This herbaceous perennial vine bears 1-30 stems, usually 1-5m long and 1.5cm in girth, from a perennial taproot. The white taproot can grow to 70 kg in less than three years. The thick grey-green leaves (10-20cm long) are alternate borne on prostrate 3.5-13.5cm long, pubescent petioles. The leaves are twice as long as wide: 9-25cm long and 7-17.5cm broad, and bear extrafloral nectaries at the vein junctions. The base is cordate or truncate, with fine irregular teeth or slight angular lobes near the base. The apex is acute-acuminate. Leaves and stem are rough on both sides and smell foul when bruised (14, 18, 24, 30, 31,36).

Climbing Mechanism: Axillary tendrils are borne at 90 degrees from leaf node. The tendrils branch about 1cm above their junction with the stem (14) and twine around adjacent vegetation.

Flower Description: This species is gynodioecious, having both monoecious plants and female only plants. The 0.9-12cm x 5.5-7cm flowers are solitary, imperfect, borne on a long pedicel. The calyx is tubular, generally with 5 sepals. The corolla is yellow to orange, campanulate, up to 10 cm long, and generally has 5-6 lobes. The lobes are connate from the base to at least half the corolla length with a rolled or fringed margin. The staminate flower hypanthium forms a cup with a ring-like nectary, bears three stamens 1-1.2cm long, one of which has a single-loculed anther. The pistillate flowers bears a saucer-shaped hypanthium, an inferior 1-celled ovary 2-2.5cm long, and a short style (1.5-2cm) with a 3-lobed stigma, each branch ending in 2 stigmas for a total of stigmas (13,14,15,16,18,21,26,31,36).

Flowering Time: In California as well as in the central and northeastern U.S., *C. foetidissima* flowers from May to August. Flowers are open about 5 hours, opening about 4:00 AM and closing about 9:00 AM the same morning. Male flowers have 92% pollen viability when newly opened, decreasing to 10% when reopening the next day (16,17,23,26,20).

Pollinator: The squash bee genera *Peponapis* and *Xenoglossa* as well as honey bees, *Apis*, visit *C. foetidissima* (18,20).

Fruit Type and Description: The fruit is a green mottled pepo with white vertical stripes. It is subglobose, with a width of 5-10cm (13,14,15,18). When mature, the fruit loses dark green coloring, becoming yellow (8,21).



Seed Description: There are many seeds in each pepo. They measure 6-14mm in length, half that in width and are flat, ovate, and cream colored, with a raised margin (14,12).

Dispersal Syndrome: Asexual reproduction occurs in the form of adventitious roots from nodes along the stem. These roots become long and tuberous, producing new vine growth if conditions are favorable. The fruits of unspecified members of *Cucurbita* are consumed by animals that spread the seeds. Based on fossil remains, the fruit of various *Cucurbita* has been proposed to

have been dispersed by mastodons. The similar fruit of *Cucurbita pepo* as well as other desert gourds are capable of water dispersal (2,18,24,27,33).

Distinguished by: *C. foetidissima* can be distinguished from *Cucumis melo* and *Cucumis sativus* by their flowers, which have smaller corollas (<4cm long and broad) and deeply lobed petals; in addition they lack a foul smell when bruised. The fruit of *C. melo* and *C. sativus* are easily recognizable, being the cantaloupe and cucumber, respectively. *C. melo* can be further distinguished by its numerous prickles on vegetative structures.

C. foetidissima can be distinguished from the leaves of *Cucurbita maxima*, which are as wide as they are long with fine teeth and no angular lobes.

The following species are placed in the morning glory family. Their inflorescences are easily distinguished from *C. foetidissima* as they are unlobed flowers, with colors ranging from white to pink to purple. When flowers are not present, *Ipomoea purpurea* is distinguished by the leaves, which are strongly cordate. The leaves do not point upward like *C. foetidissima*. Most leaves of the *Convolvulus arvensis* are rounded, smaller, and thinner, easily distinguished from the angular *Cucurbita foetidissima*. Some of the *Convolvulus arvensis* leaves have morphology similar to *Cucurbita foetidissima*, but have hastate base which the *Cucurbita foetidissima* lack. *Calystegia hederacea* leaves have hastate or sagittate bases and are <5cm broad. (10,11,14,23)

Other members of the family in Michigan (number species): *Citrullus* (1), *Cucurbita* (3), *Cucumis* (2), *Echinocystis* (1), *Sicyos* (1), *Thladiantha* (1) (source 10).

Ethnobotanical Uses: Dried fruit are shaken as a rattle instrument often used for Navajo rituals. The edible roots are sweet and starchy. Root juice is used for toothache relief and as a disinfectant. The seeds are edible and often consumed by Native Americans in Mexico and the southwest USA; their nutritional value is 35% protein and 43% oil. The oil extracted from the seeds can be used in cosmetics. Compounds in the leaves work as insecticides when crushed and could be used as an ingredient of commercial pesticides. The mature gourd can clean wooden floors, especially grease, and be modified as a ladle or utensil, as well as art. The roots are boiled and used for chest pain by the Isleta-Pueblo Indians. The flesh of the fruit is baked and rubbed on skin to alleviate rheumatism pains. Swelling can be controlled by seeds and flowers. The seeds can also be used to kill worms. A poultice made from the plant can cure ulcers, and skin sores. Soap-like foam forms when the fruit is crushed in water due to saponin glycosides and is used on laundry stains (9,21).



Phylogenetic Information: The Cucurbitaceae is part of the Cucurbitales order, which includes 7 families. Of these, Cucurbitaceae is most closely related to Tetramelaceae, Datisceae, and Begoniaceae. The order Cucurbitales belongs to the Rosids I clade of the Core Eudicots (32).

Interesting Quotation or Other Interesting Factoid not inserted above: *Cucurbita foetidissima* is a farmers' nightmare as the pollen can successfully pollinate *Cucurbita pepo*, a domesticated squash. This cross-pollination may make the flesh of the *C. pepo* fruit bitter like that of *C. foetidissima* (27). In their natural range *C. foetidissima* freely hybridizes with *C. pedatifolia* with no prezygotic barriers. This cross produces *C. scabridifolia* as well as other hybrids. The two species have maintained separate gene pools because the hybrids are sterile (28). The powder of *C. foetidissima* roots is used in the Slam/Adios and Adios AG insecticides. This gustatory stimulant negatively affects Diabrotica beetles as an insecticide. This

cucurbitacin can be used to replace toxic insecticides. A smaller amount of active pesticide ingredient is needed when used in combination with cucurbitacin (29). The species is rich in seed oil and has been explored for potential commercialization of its oil (34).

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