

Plant Diversity Website

Citrullus lanatus (Thunb.) Matsum. & Nakai

Common Names: Watermelon, wild watermelon, egusi melon, West African watermelon, dessert watermelon, cooking melon, fodder melon, preserving melon, citron, *melancia* (Portuguese), *pastèque* (French) (1,6,8,9).

Etymology: The word *Citrullus* is the diminutive of the Greek word *citrus*, referring to the fruit sometimes called 'citron'. The species name *lanatus* in Latin means "woolly", referring to the plant's pubescence (4,5).

Botanical synonyms (2):

Citrullus caffer Schrad.,
C. citrullus (L.) H. Karst.,
C. colocynthis var. *lanatus* (Thunb.) Matsum. & Nakai,
C. edulis Spach,
C. pasteca Sageret,
C. vulgaris Schrad.,
Colocynthis amarissima Schldl.,
Colocynthis amarissima Schrad.,
Colocynthis citrullus (L.) Kuntze,
Colocynthis citrullus Fritsch,
Cucumis citrullus (L.) Ser.,
Cucumis colocynthis Thunb.,
Cucumis lacinosus Eckl. ex Schrad.,
Cucurbita anguria Duchesne ex Lam.,
Cucurbita caffra Eckl. & Zeyh.,
Cucurbita citrullus L.,
Momordica lanata Thunb.



FAMILY: Cucurbitaceae (the Gourd family)

Quick Notable Features (8,11):

- Trailing, pubescent, monoecious plant
- Simple toothed leaves, alternate, pinnately lobed
- Male and female flowers solitary, with a villous calyx and yellow corolla
- Large, round to oblong fleshy berries, most commonly green



Plant Height: Watermelons grow to 0.5m tall (7).

Subspecies/varieties recognized (2): *C. lanatus* var. *albidus* Maheshw., *C. lanatus* var. *caffer* (Schrad.) Mansf. ex Fursa, *C. lanatus* var. *cafferorum* (Alef.) Fosberg, *C. lanatus* var. *capensis* (Alef.) Fursa, *C. lanatus* var. *citroides* (L.H. Bailey) Mansf., *C. lanatus* var. *cordophanus* (Ter-Avan.) Fursa, *C. lanatus* var. *fistulosus* Babu, *C. lanatus* var. *minor* Maheshw., *C. lanatus* var. *oblongus* Maheshw., *C. lanatus* var. *pulcherrimus* Maheshw., *C. lanatus* var. *pumilus* Maheshw., *C. lanatus* var. *rotundus* Maheshw., *C. lanatus* var. *senegalicus* Fursa, *C. lanatus*

var. *shami* Maheshw., *C. lanatus* var. *variegates* Maheshw., *C. lanatus* var. *virgatus* Maheshw., *C. lanatus* var. *viridis* Maheshw., *C. lanatus* subsp. *colocynthoides*, *C. lanatus* subsp. *cordophanus* Ter-Avan., *C. lanatus* subsp. *lanatus*, *C. lanatus* subsp. *mucosospermus* Fursa, *C. lanatus* subsp. *vulgaris* (Schrad.) Fursa.

Most Likely Confused with: *Cucurbita foetidissima*, *Cucurbita maxima*, *Cucurbita pepo*, *Cucumis melo*, *Cucumis sativus*.

Habitat Preference: Aside from cultivated land, *C. lanatus* grows on disturbed sites, landfills, shores, and sewage plant fill. It thrives in well-drained, sandy loam soils and is shade intolerant (1,7,8).

Geographic Distribution in Michigan: The watermelon was collected mostly in coastal counties: Alpena, Baraga, Berrien, Cheboygan, Monroe, Wayne, and Oakland (1).

Known Elevational Distribution: *C. lanatus* grows up to 2000m above sea level in Africa (8).

Complete Geographic Distribution: Native to southern Africa (1,8), *C. lanatus* was introduced to Mediterranean Africa, the Middle East, West Asia, and possibly India before 1000 BC. It arrived in China ca. 900 AD and Japan in the 1500's (8). It was taken to Brazil by Africans in the 1700's (14). In the United States it was introduced after colonization (8), and is currently found escaped from cultivation in AL, AR, AZ, CA, CT, FL, GA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, NJ, NM, NV, NY, OH, PA, RI, SC, TN, TX, UT, VA, VT, WI, WV, and also in Puerto Rico and the Virgin Islands (6). The species is cultivated worldwide in tropical and subtropical regions (8).



Vegetative Plant Description: *C. lanatus*

is an annual plant with long pubescent, trailing, branched stems that grow up to 5m long, from a deep taproot. Stipules are absent, and the plant bears axillary tendrils that are bifid, puberulent, and coiled. The alternate, simple leaves are 5-7cm apart on the stems and have pubescent petioles 2-14cm long. Each leaf is pinnately lobed at least to half its length, long pubescent, glaucous, ovate to deltoid, basally cordate, 4-25cm long and 3-19cm broad. The sinuses of the lobes are rounded, and the margins are toothed (1,8,10,11,18).



Climbing Mechanism: The watermelon uses its tendrils to climb over structures or other vegetation (8,11).

Flower Description: *C. lanatus* is monoecious (separate male and female flowers on the same plant) and its axillary flowers are solitary and actinomorphic, on 1.5-4cm long pedicels. Both staminate and pistillate flowers have a villous campanulate calyx with 5 narrow lobes 0.2-0.3cm long, and a 5-parted yellow corolla 2-

3.5cm across. Pistillate flowers are slightly larger than staminate. Staminate flowers bear three nearly free stamens and a gland resembling an ovary. Pistillate flowers have 3 staminodes, a villous, ovoid, unilocular inferior ovary 0.5-0.8cm long, topped by a short style with 3 stigmas (8,10,11).

Flowering Time: The blooming period of the watermelon is July-August (7). Each flower only remains open only for a few hours, from dawn to early afternoon (9).

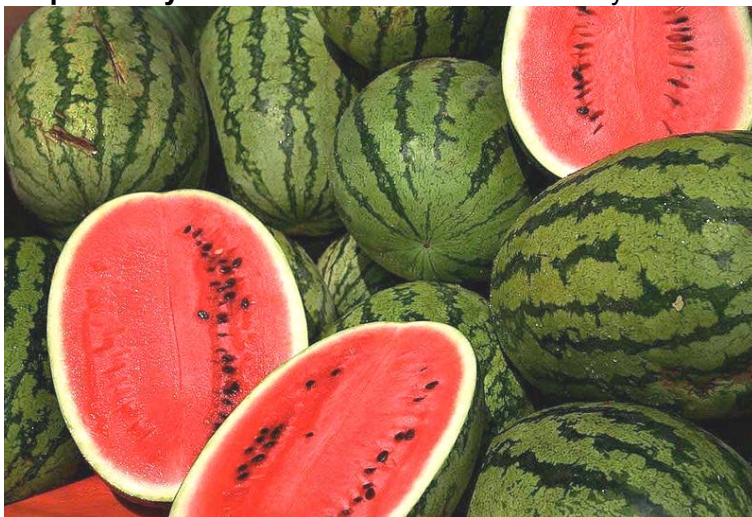
Pollinator: *C. lanatus* is autogamous as well as open-pollinated by insects (7,8). In the U.S., watermelon crops are mostly pollinated by honey bees (*Apis mellifera*), but also by wild bees, flies, and beetles that are attracted by the nectar produced in both male and female flowers. The wild bees have been identified as members of the genera *Agapostemon*, *Augochlora*, *Augochlorella*, *Augochloropsis*, *Bombus*, *Calliopsis*, *Ceratina*, *Halictus*, *Hylaeus*, *Lasioglossum*, *Megachile*, *Melissodes*, *Peponapis*, *Ptilothrix*, *Triepeolus*, and *Xylocopa* (9,15).

Fruit Type and Description: Each female flower produces one round to oblong berry that can be various shades of green and/or yellow, white, striped, mottled, or evenly colored, with a smooth surface. The flesh of the watermelon can be greenish white, or yellow to red, and can be juicy and sweet (common watermelon), neither sweet nor bitter (cooking melon), or very bitter (egusi melon). A watermelon can be 5-70cm long and weigh up to 30kg; the egusi melon is smaller than the common watermelon. The berries have many seeds, or none in the case of the triploid hybrid seedless watermelon (8,10,12).



Seed Description: Like the fruit, the ovate seeds appear in many colors: white, yellow to brown, black, or mottled. The seeds are smooth, flat, 0.5-1.8cm long, 0.3-1.1cm at the broadest point, and 1000 seeds weigh 60-150g. They do not require a dormancy period, remain viable for up to 10 years, and germinate epigeally (8,10,11).

Dispersal Syndrome: The fruit is consumed by animals that then spread its seeds, and are also dispersed by water. Since *C. lanatus* is a widely cultivated species, its spread throughout the world is credited to its agricultural acceptance (8,14,16).



Distinguished by: Members of the genera *Cucurbita* and *Cucumis* have unlobed or palmately lobed leaves, while *C. lanatus* has pinnately lobed leaves. The flowers of *Cucurbita* (>5cm across) are larger than the flowers of *C. lanatus* (≤3.5cm across). *Cucurbita foetidissima* has deltoid leaves with very few and shallow lobes, the

plant smells foul when brushed against. *C. lanatus* has deeply lobed leaves and does not smell foul. *Cucurbita maxima* and *Cucurbita pepo* leaves are broader than long, not the case in *C. lanatus*, and the fruits are different types of squash and may not have the round to oblong shape of *C. lanatus*. *Cucurbita maxima* has unlobed leaves, the pedicels of staminate flowers are long (10-20cm long) while those of *C. lanatus* are relatively short (0.5-4cm long). *Cucurbita pepo* has palmately lobed leaves, and the fruits mature as zucchini, squash, or pumpkin. *Cucumis melo* and *Cucumis sativus* have unbranched tendrils, while tendrils are bifid in *C. lanatus*, and the leaves are as broad as long in the former species but longer than broad in *C. lanatus*. *Cucumis melo* staminate flowers may be grouped or solitary, while *C. lanatus* flowers are always solitary. The fruit of *C. melo* are different well-known varieties of melon, including cantaloupe, and they can be pubescent during early development. *Cucumis sativus*, the cucumber, has fascicled staminate flowers and fascicled or solitary pistillate flowers, and it has a warty fruit, which is smooth in *C. lanatus* (1,11).



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

Ethnobotanical Uses: The watermelon fruit is widely consumed and rich in water and pectin. Pectin is a substance used in jams for thickening and is believed to offer protection from radiation. The fruit is used to aid treatment of edema and kidney stones, as a diuretic, and to prevent heart attacks (contains lycopine). When mature, they are used as fever reducer. The leaves and seeds can be consumed once they are cooked. The seeds can also be consumed raw and made into flour or fermented to make a sweetener called *ogiri* or *igbãlo* (made from another process). The pharmaceutical industry uses a vegetable oil extracted from the seeds to make cosmetics, or the oil can simply be used for cooking; the byproduct can be prepared fried, or given to cattle. The seeds are mucoprotective, diuretic, tonic, and used to expel intestinal worms. The rind aids in regulating blood sugar levels to treat diabetes and alcohol poisoning, and can be made into pickles or jam. The roots induce vomiting and are purgative. Seedlings are toxic and should not be consumed (7,8).

Phylogenetic Information: The genus *Citrullus* is included in the tribe Benincaseae in the subfamily Cucurbitoideae (8) of the Cucurbitaceae family, which is in the Cucurbitales order, part of the Rosid I clade of Core Eudicots. Six other families are part of the order Cucurbitales: Anisophylleaceae, Corynocarpaceae, Coriariaceae, Tetramelaceae (closest to Cucurbitaceae), Datisceae, and Begoniaceae. Members of the Cucurbitaceae are found in tropical, subtropical, and warm temperate climates throughout the world and are very important economically. The family also includes pumpkin, squash, melon, and cucumber (3). The genus *Citrullus* includes four species, all native to arid regions of Africa and Eurasia: *C. colocynthis*, *C. lanatus*, *C. rehmii*, and *C. ecirrhosus* (5). *C. lanatus* and *C. colocynthis* probably evolved from a common ancestor about 2 Myr ago (13).

Interesting Quotation or Other Interesting Factoid not inserted above: In 2002, the world production of watermelon was 81 million tons, of which 57 million tons were produced in China. The edible portion of the fruit of the traditional watermelon is about 91.5% water (8). Seedless watermelons last longer than those with seeds “because of reduced enzymatic action in the

flesh at the area of the undeveloped seed.” (12). Additionally, seedless watermelons (triploids) have sterile staminate flowers, therefore it is necessary to plant diploid plants nearby to ensure pollination and fruit production (8). In Japan, the production of square watermelons started in 2001 in order to save space in the refrigerator. The square watermelons are grown by placing a regular developing watermelon inside an acrylic box, and as it grows, it conforms to the shape of the box (17).

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