Plant Diversity Website

Cucurbita pepo L.

Common Names: Marrow, pumpkin, squash, spaghetti squash, summer squash, winter squash, acorn squash, warron, zucchini, ornamental gourd, field pumpkin, Ozark melon, Texas gourd, vegetable marrow, summer pumpkin, autumn pumpkin, Jack O'lantern pumpkin, courgette, marrow zucchini, zucchini squash, cocozelle, crookneck squash, yellow summer squash, straightneck squash, gem squash, button squash, cibleme, custard marrow, custard squash, granny squash, pattipan, petit pan, scallop squash, scaloppini, sunburst squash, white squash, spaghetti marrow, spaghetti melon, vegetable spaghetti (1,2,3,15).

Etymology: *Cucurbita*, in Latin, means "gourd" and *pepo* means "large melon, pumpkin" (7).

Botanical synonyms (1,15):
Cucurbita aurantia Willd.
Cucurbita courgero Ser.
Cucurbita elongata Bean ex Schrad.
Cucurbita esculenta Gray
Cucurbita melopepo L.
Cucurbita ovifera L.
Cucurbita subverrucosa Willd.
Cucurbita verrucosa L.
Cucurbita fastuosa Salisb.
Cucurbita mammeata Molina
Cucurbita maxima var. *courgero* Ser.
Cucurbita oblonga (Duch. ex Lam) Link
Cucurbita venosa Descourt.
Cucumis pepo (L.) Dumort
Pepo citrullus Sag.
Pepo melopepo (L.) Moench.
Pepo vulgaris Moench.
Pepo verrucosus (L.) Moench.

FAMILY: Cucurbitaceae, the Gourd Family

Quick Notable Features:
¬ Creeping or climbing herb with 5-angled scabrous stems
¬ Alternate, simple, palmately lobed leaves with branched tendrils
¬ Unisexual yellow flowers
¬ Petiole of developing fruit is hard, angled, and thickened at the apex

Plant Height: 0.3 - 0.75 meters (8).

Subspecies/varieties recognized (1):
C. pepo var. *akoda* Makino

C. pepo var. *americana* Zhit.
C. pepo var. *condensa* L.H. Bailey
C. pepo var. *fibropulposa* Makino
C. pepo var. *flogra* Teppner
C. pepo var. *fraterna* (L.H. Bailey) Filov
C. pepo var. *georgica* Teppner
C. pepo var. *kintogwa* Makino
C. pepo var. *maxima* (Duch.) Delile
C. pepo var. *medullosa* Alef.
C. pepo var. *melopepo* (L.) Alef.
C. pepo var. *moschata* (Duch.) Duch.
C.pepo var. *ovifera* (L.) Alef.
C. pepo var. *ozarkana* Deck.-Walt.
C. pepo var. *pepo*
C. pepo var. *sororia* (L.H. Bailey) Filov
C. pepo var. *texana* (Scheele) D.S. Decker
C. pepo var. *toonas* Makino
C. pepo var. *torticollis* Alef.
C. pepo subsp. *fraterna* Lira
C. pepo subsp. *gumala* Teppner
C. pepo subsp. *ovifera* (L.) D.S. Decker
C. pepo subsp. *pepo*
C. pepo subsp. *texana* (A. Gray) Filov

Most Likely Confused with: *Cucurbita maxima*, *Cucurbita foetidissima*, *Cucumis* ssp., *Citrullus lanatus*, *Vitis* ssp., *Menispermum canadense*.

Habitat Preference: The species is drought tolerant, yet prefers fertile, moist, well-drained soils and little or no shade (6,12).

Geographic Distribution in Michigan: *C. pepo* has been collected outside of cultivation only in Alpena, Lenawee, St. Clair, and Tuscola Counties (2).

Known Elevational Distribution: In La Paz, Bolivia, *C. pepo* grows up to elevations of 3600 m (1).

Complete Geographic Distribution: Native to eastern United States and Mexico and cultivated worldwide for its fruits (5,9). In the USA, *C. pepo* is found in AL, AR, CA, CT, GA, IL, KS, KY, LA, MA, MI, MO, MS, NC, NH, NM, NV, NY, OH, PA, SC, TN, TX, UT, VA, WV, and PR. In Canada found in ON and QC (3).

Vegetative Plant Description: *C. pepo* is an annual herb with climbing, creeping, or in some varieties bushy, 5-angled stems up to 15 m long. The shallow root system is branched, growing from a well-developed taproot. The stems are scabrous and setose, branching, often rooting at the nodes. The petioles are setose, grooved, 6-24 cm

long, and estipulate. The plant bears tendrils borne at 90 degrees to the leaf insertion, which are coiled, and 1-6-branched. On bushy plants, tendrils may be poorly developed. The thin leaves are simple, alternate, broadly ovate to deltoid, basally cordate, apically acute, palmately lobed with 5-7 lobes, marginally toothed, scabrous, palmately veined, 20-30 cm long, and 10-35 cm broad (2,5,8,12,15,16).

Climbing Mechanism: *C. pepo* uses its 1-6-branched tendrils to climb (12,15).

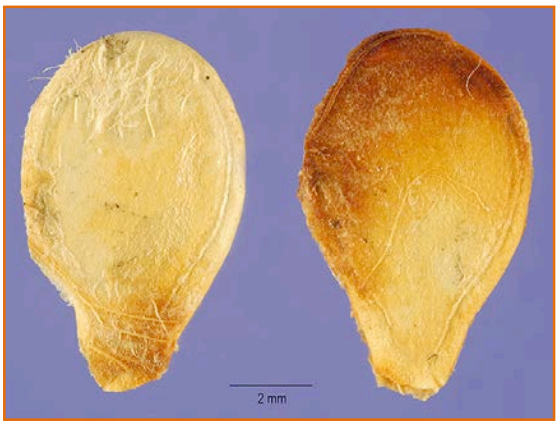
Flower Description: *C. pepo* is monoecious (unisexual flowers, with male and female on the same plant) and bears solitary actinomorphic flowers (~ 10 cm across) that produce nectar. The calyx is campanulate with 5 free sepals; each sepal is linear and 0.9-3 cm long, smaller on pistillate flowers. The yellow corolla is campanulate, 5-parted (occasionally 6-parted) with erect to spreading petals that are apically acute, approximately 5-10 cm long, and ca. 3 cm broad on smaller flowers. Staminate flowers are borne on a 3-20 cm long peduncle, and have 3 stamens with free filaments (~ 1.5 cm long) and connivent twisted anthers (~ 1 cm long). Pistillate flowers are borne on shorter peduncles, only 2-5 cm long, and have an inferior 1-locular globose to cylindrical ovary, and a thick style with 3 bi-lobed stigmas. The peduncle of the developing fruit is hard, slightly bent, expands at the junction of the fruit, and ranges from 5.6 to 15.1 mm in diameter (2,5,10,12,14,15,16).

Flowering Time: July to August (8).

Pollinator: Both male and female flowers produce nectar to attract wild bees, including the squash bee (*Peponapis pruinosa*), honey bees, bumble bees, wasps, and other insects that can pollinate the flowers. The plants are self-compatible, and the pollen does not remain viable for long and must reach a stigma within a few hours after anthesis to produce a pollen tube (10,12,13).

Fruit Type and Description: *C. pepo* fruits are technically berries, and are highly variable in shape, color, and size. The shape can be oval, cylindrical, flattened, globular, scalloped, fusiform, and/or tapering to a curved or straight neck on one or both ends. They can be up to 5 times longer than wide. The skin can be smooth, warty, wrinkled, furrowed, or/and have shallow to deep longitudinal ridges. Often there is more than one color to the soft to hard skin: white, yellow, light to dark green, nearly black, cream, and/or orange. The flesh is also variable in color (white, yellow, orange) and thickness. The fruit

varies from 30 g to 50 kg, and each fruit bears few to numerous seeds (5,12,15,17).



Seed Description: The seeds of *C. pepo* are variable in size. Specimens in Florida range from about 6.9 to 15.6 mm long and 4.2 to 8.4 mm broad. Seeds collected from archaeological sites that are longer than 11 mm are considered to be derived from domesticated populations (14).

Dispersal Syndrome: The fruits are buoyant and can be dispersed by water or ingested and carried by large mammals, originally believed to be dispersed by Pleistocene megafauna (14).

Distinguished by: *C. maxima* leaves are round-reniform and only shallowly lobed, if lobed at all. Additionally, the peduncle of *C. maxima* developing fruits is spongy and not thickened at the apex. *Cucurbita pepo* has round-triangular leaves with 5-7 palmate lobes, and the peduncle of the developing fruit is hard and thickened at the junction of the fruit. *Cucurbita foetidissima* has triangular leaves that are longer than wide and leathery, and produces a foul smell when bruised. *C. pepo* leaves are thin and wider than long and the plant does not smell foul. *Cucumis* ssp. have unbranched tendrils, the corolla is only up to 3 cm broad and long. *C. pepo* tendrils are 1-6-branched, and the corolla is longer and often broader than 5 cm. *Citrullus lanatus* has deeply pinnate-lobed leaves, the pedicels of staminate flowers are a lot shorter (3-4 cm long), the corolla is campanulate or rotate and 2.5-3 cm broad. *C. pepo* leaves are palmately lobed, the staminate flowers are borne on 3-20 cm long pedicels, and the corolla is campanulate. *Vitis* ssp. has woody, shredding stems, tendrils are opposite the leaves, and the inflorescence is a many-flowered thyrse of inconspicuous minute flowers that later produces small blue-black berries (grapes). *C. pepo* is herbaceous, the tendrils are 90 degrees to the leaves, and the inflorescence is solitary, composed of conspicuous flowers that turn into large berries of varied shape, size, and color. *Menispermum canadense* climbs by twining (tendrils absent), the leaves are peltate, the staminate and pistillate flowers are on different plants (dioecious), the minute flowers have 5-8 sepals and 4-12 petals and later develop into bluish-black drupes. *C. pepo* does not have peltate leaves, the large staminate and pistillate flowers are on the same plant (monoecious) and 5-merous (2,5).

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

Ethnobotanical Uses: The immature fruits of many varieties are consumed raw, cooked or fried. The mature fruits are cooked or roasted, and can be incorporated into soups, pies, and other baked goods. Vegan spaghetti can be made out of the “vegetable spaghetti” varieties. The seeds, rich in oil and zinc, can be eaten raw, roasted, powdered and used as flour, or have the oil extracted and used for cooking or in salads. Young leaves and stems can be added to soups and stews. Flowers and flower buds are also edible and can be breaded and fried, cooked, or dried. The fruits can be made into a poultice and applied to burns, skin inflammations, and tumors for its cooling effects, also as a compress for headaches and neuralgia, or ingested to alleviate inflammation of the intestines. The seeds help prevent the formation of kidney stones and treat other problems of the urinary system, can be used as a vermifuge, can be made into an infusion to treat hypertension, alleviate prostate discomforts, or applied to erysipelas skin

infection. Some fruit varieties are grown as animal feed, and some for decorative purposes (6,12).

Phylogenetic Information: The genus *Cucurbita* is included in 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 (which closest to Cucurbitaceae), Datiscaceae, 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 cucumber, melon, watermelon, and other gourds (4).

Interesting Quotation or Other Interesting Factoid not inserted above: The species went through multiple domestications from Mexico to southern Canada. *C. pepo* ssp. *pepo* likely originated in Mexico and *C. pepo* ssp. *ovifera* in eastern U.S (9). The oldest archeological records of *C. pepo* are from Guilá Naquitz cave in Oaxaca, Mexico (from 8,000 to 10,000 years ago), twice as old as other domesticated crops like corn and beans (11).
The fruits of many cultivars of *C. pepo* are harvested before the seeds mature, when the fruit is only about ¼ of the mature size. *C. pepo* can hybridize with *Cucurbita moschata* and *Cucurbita maxima*, producing sterile plants (12).
"Pumpkins grow well with sweetcorn and thornapple but they dislike growing near potatoes" (6).
"*C. pepo* behaves as a day neutral plant but photoperiod has an impact on flowering and sex expression. The male flowers are promoted when there are long hot days. Long days and warm temperatures seem to favor the staminate flowering phase and delay the pistillate phase and fruit development" (15).

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