

Plant Diversity Website

***Vigna unguiculata* (L.) Walp.**

Common Names: Cowpea, frijol (Puerto Rico), black-eyed pea, field pea, China-bean, southern pea, Jerusalem pea, black-eyed bean, marble pea, China pea, yard-long bean, asparagus bean, Catjang cowpea, Bombay cowpea, "Sasage" in Japan (3,5,6,8,13,14).

Etymology: The genus *Vigna*, a Latin word, was given in honor of an Italian botanist Domenico Vigna. The word *unguiculata*, also Latin, means claw (4).

Botanical synonyms: *Dolichos biflorus*, *Dolichos catjang*, *Dolichos monachalis*, *Dolichos sesquipedalis*, *Dolichos sinensis*, *Dolichos sphaerospermus*, *Dolichos unguiculatus*, *Vigna catjang*, *Vigna cylindrica*, *Vigna sesquipedalis*, *Vigna sinensis* (1).

FAMILY: Fabaceae, the pea family

Quick Notable Features (8):

- ▢ Herbaceous vine with alternate, trifoliate leaves, stipules, and stipels
- ▢ Asymmetric lateral leaflets
- ▢ Flowers tinged with purple, bilaterally symmetrical
- ▢ Linear legumes usually up to 30cm long

Plant Height: *V. unguiculata* can reach 3-5m in length (3).

Subspecies/varieties recognized (2):

Vigna unguiculata var. *catjang* (Burm. f.) H.

Ohashi

V. unguiculata var. *ciliolata*

V. unguiculata var. *congolensis*

V. unguiculata var. *cylindrica* (L.) H. Ohashi

V. unguiculata var. *grandiflora*

V. unguiculata var. *kgalagadiensis*

V. unguiculata var. *mensensis* (Schweinf.)

Maréchal, Mascherpa & Stainier

V. unguiculata var. *parviflora*

V. unguiculata var. *pubescens* (R. Wilczek)

Maréchal, Mascherpa & Stainier

V. unguiculata var. *rhomboidea*

V. unguiculata var. *spontanea* (Schweinf.)

Pasquet

V. unguiculata var. *stenophylla* Mithen

V. unguiculata var. *tenuis* (E. Mey.) Mithen

V. unguiculata var. *unguiculata*

V. unguiculata subsp. *catjang* (Burm. f.)

Chiov.



V. unguiculata subsp. *cylindrica* (L.) Verdc.
V. unguiculata subsp. *dekindtiana* (Harms) Verdc.
V. unguiculata subsp. *letouzeyi* Pasquet
V. unguiculata subsp. *mensensis* (Schweinf.)
 Verdc.
V. unguiculata subsp. *pawekiae* Pasquet
V. unguiculata subsp. *sesquipedalis* (L.) Verdc.
V. unguiculata subsp. *stenophylla* (Harv.) Maréchal,
 Mascherpa & Stainier
V. unguiculata subsp. *tenuis* (E. Mey.) Maréchal,
 Mascherpa & Stainier
V. unguiculata subsp. *unguiculata*



Most Likely Confused with: *Vigna luteola*, *Phaseolus polystachios*, or *Glycine max*.

Habitat Preference: *V. unguiculata* is found in open habitats, abandoned fields, and roadsides (10).

Geographic Distribution in Michigan: The species is not common in the wild in Michigan, found only in Berrien County, but may be cultivated in other areas of the state (7).

Known Elevational Distribution: *V. unguiculata* is able to grow at high altitudes, and has been collected at 2160m above sea level in northern Malawi (1).



Complete Geographic Distribution: Native to Africa and Asia, the species was introduced to the New World tropics for cultivation and subsequently naturalized. It is found in Argentina, Belize, Bolivia, Brazil, Caribbean (Barbados, Leeward and Windward Islands), China, Costa Rica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Peru, Suriname, Venezuela, Central African Republic, Ghana, Malawi, Nigeria, Somalia, South Africa, Tanzania, and Zambia. In the United States, it is found mainly in the east: AL, AR, DC, DE, FL, GA, IL, IN, LA, MD, MI, MO, MS, NC, OH, PA, SC, TX, VA; in Puerto Rico and the Virgin Islands (1,3,6,7).

Vegetative Plant Description: *V. unguiculata* is an annual (perennial in the Tropics) herbaceous vine. The stems are generally glabrous, green, and up to 5mm across. The petioles are up to 10cm long without pubescence, thickened at the base. The stipules (0.6-1.5cm) are lanceolate, peltate, and narrow at the attachment point. The

leaves are arranged alternately, compound with 3 ovate leaflets. The leaflets are often basally hastate, apically acute, entire, 5-15cm long and 4-6cm broad, often glabrous, each bearing

stipels (2mm long); lateral leaflets are asymmetrical. The petiolules are 4-5mm long with wings and minute hairs; the rachis is 0.5-3.5cm long (3,5,8,9,10).

Climbing Mechanism: The species uses apical twining to climb (3).

Flower Description: The flowers are perfect and zygomorphic, with 2-6 flowers per axillary raceme (15-40cm long). The peduncles are smooth, and the pedicels (0.2cm long) are erect. The calyx (approximately 0.8cm) is green, fused, and campanulate, with irregular lobes. The petals are 5, tinged with purple, yellowish or less commonly just white. The keel and wing petals are roughly the same size, but shorter than the standard; the keel petals are curved. The auriculate standard petal is 1.5-3.3cm long and 1-3.2cm wide, and rounded with a shallow apical notch. The stamens are 10 (fused as 9+1). The single pistil has a hirsute style (3,9,10).

Flowering Time: In the tropics, the species flowers year round, but flowering is seasonal northward. In the United States flowering occurs in June-August (3,10).

Pollinator: Insects pollinate the flowers. Bees (*Apis mellifera*) collect the nectar of the flowers. The plant is also capable of self-pollination (11).

Fruit Type and Description: The fruit is a long legume usually up to 30cm long and 1cm wide (ssp. *sesquipedalis* up to 90cm long) bearing 10-15 seeds each. The explosively dehiscent pods are linear, often glabrous, and maturing July-September (3,9,10,12).



Seed Description: The seeds have varied colors and can be tan, reddish-brown, or black, with a tan hilum scar at least 1mm in size where attached to the pod. They are reniform, flat, 6-12mm long and 5mm broad (8,9).

Dispersal Syndrome: The seeds are forcibly expelled from the dry pods, via a vapor pressure deficit (12).

Distinguished by: *Vigna luteola* has similar habit and trifoliate leaves, however its leaflets are shorter (≤ 8 cm long) with sparse pubescence. *V. luteola* stipules are not peltate like *V. unguiculata*'s and also has a yellowish corolla instead of purplish. Fruits of *V. luteola* are shorter (≤ 7 cm long) and pubescent. *Phaseolus polystachios* has pubescent stems, unlike *V. unguiculata*. The leaves are also trifoliate, but the leaflets are somewhat rounder, with less prominent apices and adaxially scabrous, capable of adhesion. In addition, *P. polystachios* flowers, although similar to *V. unguiculata*'s, have apically coiled keel petals and style. Furthermore, the legumes are shorter (3-8cm long). *Glycine max* (the soybean) is erect and its branches infrequently coil like a vine. The stems of *G. max* are densely tomentose, not glabrous as in *V. unguiculata*. The flower has a hirsute pedicel and calyx; the corolla colors are similar to *V. unguiculata*'s, but the wings are much longer and adherent to the keel, and stamens are usually monadelphous. The bristly legume produced by *G. max* is only ~8cm long (5,10).

Other members of the family in Michigan (number species): *Amorpha* (2), *Amphicarpaea* (1), *Anthyllis* (1), *Apios* (1), *Astragalus* (3), *Baptisia* (3), *Caragana* (1), *Cercis* (1), *Chamaecrista* (2), *Colutea* (1), *Crotalaria* (1), *Cytisus* (1), *Dalea* (2), *Desmanthus* (1), *Desmodium* (12), *Galega*

(1), *Gleditsia* (2), *Glycine* (1), *Gymnocladus* (1), *Hedysarum* (1), *Hylodesmum* (2), *Kummerowia* (1), *Lathyrus* (9), *Lespedeza* (9), *Lotus* (1), *Lupinus* (3), *Medicago* (3), *Melilotus* (3), *Mimosa* (1), *Orbexilum* (1), *Phaseolus* (2), *Pisum* (1), *Pueraria* (1), *Robinia* (3), *Securigera* (1), *Senna* (2), *Strophostyles* (1), *Tephrosia* (1), *Trifolium* (10), *Vicia* (10), and *Wisteria* (2) (source 7).

Ethnobotanical Uses: *V. unguiculata* is a very important crop species worldwide. The young pods and seeds can be cooked and are a very good protein source. The seeds also have deworming and diuretic properties, and promote stomach health; when powdered and burned they alleviate insect bites. The leaves and seeds are made into compresses to treat blisters. The root also has medicinal properties and is used as a cure for snakebites and as medicine for epilepsy, chest pain, and dysmenorrhea. The plant is also used as animal feed. In Nigeria, the fibers of the peduncles are used to make fishnets and paper (11,13,14).



Phylogenetic Information: The genus *Vigna* is a member of the tribe Phaseoleae, subfamily Faboideae, in the Fabaceae, which is in the order Fabales, superorder Rosanae, subclass Magnoliidae. Members of the Fabaceae family are distributed worldwide, and the family contains approximately 9.4% of all eudicots and 16% of all known woody plants found in neotropical rainforests (1,2,9).

Interesting Quotation or Other Interesting Factoid not inserted above: The Southern Weed Science Society declared *V. unguiculata* a weedy or invasive species (6). A study in Africa shows that *V. unguiculata* and *Apis* bees should be cultivated together. The plant has nectar with high nutritional value for the bees, and pollination by the bees increases seed production (11). The roots of *V. unguiculata*, like many Fabaceae plants, have a symbiotic relationship with nodule-forming, nitrogen-fixing bacteria, which also benefits surrounding plants (13).

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