

# Plant Diversity Website

## ***Phaseolus polystachios*** (L.) Britton, Sterns, & Poggenb.

**Common Names:** Bean-vine, thicket bean, wild bean, wild kidney bean (1,13).

**Etymology:** *Phaseolus* is the diminutive of the Latin word *phaselus*, which means kidney-bean. *Polys* is Greek for many; and *stachyos*, also Greek, means ear of grain, or spike (4).

**Botanical synonyms:** *Dolichos polystachios* L., *Phaseolus paniculatus* Michx., *Phaseolus perennis* Walter (1).

**FAMILY:** Fabaceae, the pea family

**Quick Notable Features** (10,12):

- Alternate, trifoliolate leaves, pubescent below
- Broadly ovate leaflets, acute apex, the apical-most petiolule longer than the others
- The raceme is longer than the petiole of the subtending leaf
- Pinkish-purple zygomorphic flowers



**Plant Height:** Usually 1-4m long (5).

**Subspecies/varieties recognized (1):**

- P. polystachios* var. *aquilonius* Fernald
- P. polystachios* var. *polystachios*
- P. polystachios* var. *sinuatus* (Nutt. ex Torr. & A. Gray) Maréchal, Mascherpa & Stainier
- P. polystachios* subsp. *polystachios*
- P. polystachios* subsp. *sinuatus*
- P. polystachios* subsp. *smilacifolius* (Pollard) Freytag

**Most Likely Confused with:** *Phaseolus vulgaris*, *Strophostyles helvula*,

*Amphicarpaea bracteata*, and *Vigna* spp.

**Habitat Preference:** *P. polystachios* thrives in moist prairies and woods, dry woods, and thickets (10,11).

**Geographic Distribution in Michigan:** There is only one occurrence of *P. polystachios* in Michigan. The species was found in Belle Island, Wayne County (2,10).

**Known Elevational Distribution:** The species occurs at 137m above sea level in Bollinger, MO (1).

**Complete Geographic Distribution:** Native to North America. *P. polystachios* is found in almost every state in the United States east of Texas (AL, AR, CT, DC, DE, FL, GA, IA, IL, IN, KY, LA, MD, ME, MI, MO, MS, NC, NJ, NY, OH, OK, PA, SC, TN, TX, VA, WV), and in Puerto Rico. In Canada, it is found in Ontario. The species also occurs in Mexico (1,6,9).

**Vegetative Plant Description:** *P. polystachios* is a perennial trailing or climbing herb with branching, glabrate to finely pubescent stems. The deciduous stipules are lanceolate, the stipels are linear. The leaves are alternate, pinnately compound, and trifoliolate. The leaflets are broadly ovate to orbiculate, entire, apically acute, 2-10.1cm long and 1.5-7.6cm broad, with an excurrent midvein above. The leaflet upper surface is slightly scabrous to glabrous, and the lower is softly pubescent. The two lateral leaflets are asymmetric, with each petiolule shorter than the apical petiolule. The apical leaflet may have a subcordate base (2,5,11,13,14).

**Climbing Mechanism:** Apically twining (5), although the orientation of climbing has not been noted in the literature.

**Flower Description:** The perfect, zygomorphic flowers are borne in many-flowered axillary racemes. The peduncled raceme (10.1-30.5cm long) exceeds the length of the petiole of the subtending leaf, occasionally the whole leaf, and the rachis can be minutely pubescent. Each pink-purple flower (occasionally white) has a 4.2-8.5mm long pedicel and is subtended by 2 bractlets (<1mm). The calyx is 5-parted, the teeth shorter than the 2-2.5mm long tube, and glabrous to densely short pubescent. The corolla (0.8-1.2cm long) is composed of a standard, two wings, and two keel petals. The standard is orbicular and bent, the same length or slightly shorter than the wings. The keel petals are coiled, like in other *Phaseolus* species, enclosing the reproductive organs. Nine stamens are fused by their filaments and one is free. The single pistil is superior, nearly sessile, and pubescent along the inner side of the persistent style. The stigma in the genus *Phaseolus* can be oblique or lateral (2,5,11,13).

**Flowering Time:** July-September (5,11).

**Pollinator:** No information was found for *P. polystachios*, but other members of the genus are pollinated by insects, including honeybees and bumblebees, as well as self-pollinating (15,16).

**Fruit Type and Description:** The fruit is a glabrous, flat, stipitate legume, 3-8cm long and 0.8-1cm broad, slightly curved. Each legume contains 4-6 seeds (5,11,12).



**Seed Description:** The small, kidney-shaped seeds are 0.5-1cm long and 0.5-0.6cm wide, smooth and glossy black or black and gray. The hilum is white, 0.3cm x 0.1cm, and oval to oblong. The cotyledons in the genus

*Phaseolus* are thick and suffer very little alteration after germination, remaining above or below the ground (7,11,14).

**Dispersal Syndrome:** At maturity, the legumes dry and twist open to forcibly expel seeds (7).

**Distinguished by:** *Phaseolus vulgaris*, the common bean, usually bears few-flowered inflorescences instead of many-flowered, and its length rarely exceeds the petiole of the subtending leaf, which is not true in *P. polystachios*. Additionally, the bractlets subtending *P. vulgaris* flowers are larger than in *P. polystachios*, being longer than the pedicel. *Strophostyles helvula* has 2-4mm long linear stipules, which are rarely noted in *P. polystachios* due to their deciduous nature. Also trifoliolate, the leaflets of *S. helvula* are slightly lobed, not entire. The racemes have few flowers (up to 10) clustered at the apex, at least the longest tooth in the calyx is longer than the tube, and the keel petals are only curved, not coiled. The seeds in *S. helvula* are pubescent. *Amphicarpaea bracteata* is a highly variable species with similar vegetative traits, but a few characteristics such as the leaflets' midvein not being excurrent can help to differentiate it from *P. polystachios*. Further, the calyx of *A. bracteata* has 4 lobes not 5 and while it bears perfect flowers on the racemes, it also bears flowers with absent corolla, and cleistogamous (flower does not open to self-pollinate) at the base of the plant, which produce underground fruits. *Vigna spp.* are also very similar to *P. polystachios*, however the inflorescence is a short-raceme with few flowers clustered at the apex, whose keel petals are only slightly curved, not coiled (2,11,13).



**Other members of the family in Michigan:** *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* (1), *Pisum* (1), *Pueraria* (1), *Robinia* (3), *Securigera* (1), *Senna* (2), *Strophostyles* (1), *Tephrosia* (1), *Trifolium* (10), *Vicia* (10), *Vigna* (1), and *Wisteria* (2) (source 2).

**Ethnobotanical Uses:** The seeds are cooked and consumed as a protein source, as a valuable part of Native American's winter diet. No medical uses are known for *P. polystachios* (7,8).

**Phylogenetic Information:** *Phaseolus* is a member of the subfamily Faboideae in the Fabaceae family, which is in the order Fabales, part of the Rosids I, Core Eudicots. 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 (3).

**Interesting Quotation or Other Interesting Factoid not inserted above:** The wild bean is listed as a Special Concern species in Connecticut (6). In Michigan, the species is presumed to be extirpated (10). Fritz (1986: 175-177) also identified many *P. polystachios* beans and their pods in desiccated samples from Ozark rockshelters. Interestingly, the beans from her samples showed possible evidence of human influence. Normally, *P. polystachios* pods expel the beans by twisting when they are ripe. Many of the pods recovered in her samples, however, while clearly belonging to *P. polystachios*, were only slightly or not at all twisted. She suggests that pods which did not twist and expel the beans had a selective advantage when humans were doing the dispersal (Fritz 1986: 177)." (7).

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