

## COWPEA

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

Plant Symbol = VIUN

Contributed by: USDA NRCS Cape May Plant Materials Center, Cape May, NJ



Cowpea (*Vigna unguiculata*). (Photo by Christopher Sheahan, USDA-NRCS, Cape May Plant Materials Center)

#### Alternate Names

*Alternate Common Names:* blackeyed pea, field pea, southern pea, crowder pea, caupi, catjang, yardlong bean

#### *Alternate Scientific Names:*

*Vigna sinensis* (L.) Savi,

#### Uses

*Commercial crop:* Cowpea is commonly cultivated as a nutritious and highly palatable food source in the southern United States, Middle East, Africa, Asia, and throughout the tropics and subtropics. The seed is reported to contain 24% crude protein, 53% carbohydrates, and 2% fat (FAO, 2012). The leaves and flowers can also be consumed.

*Forage:* Cowpea can be used as forage, hay, and silage. When used as forage, it should only be lightly grazed after flowering (FAO, 2012). If there are several buds left after defoliation, the plant will regenerate. When used as silage, it can be mixed with sorghum, maize, or molasses to provide sugar for fermentation (FAO, 2012). In some African countries, several varieties of Cowpea has been grown together for both food and feed (Cook et al., 2005).

*Cover crop/green manure:* Cowpea is a quick growing cover crop that produces 2,500–4,500 lb/acre/yr of dry matter, while providing 100–150 lb/acre of N to the subsequent crop (Clark, 2007). Its long taproot and wide, vegetative spread make it an excellent plant for erosion

prevention and weed suppression. Allelopathic compounds in the plant may help to suppress weeds (Clark, 2007). It has also been used successfully as groundcover in orchards and intercropped with cash crops such as cotton.

*Wildlife:* Cowpea is eaten by deer as forage, and is commonly used in food plots for deer. A variety of birds, including wild turkey, eat the seeds and the plant can be used by quail as cover. Some varieties of cowpea are used specifically for wildlife purposes (Ball et al., 2007).

*Ethnobotany:* Cowpea has been a staple crop and important protein source for many cultures since the Roman Empire. It was the most commonly cultivated bean used for human consumption in the Old World (Allen and Allen, 1981). Roman writers such as Pliny referred to it as phaseolus. Thomas Jefferson is credited with first using the name cowpea. Today the crop is still widely popular, and good harvests are critical to ensure adequate levels of protein in the diets of populations in India and East Asia (Allen and Allen, 1981).

#### Status

Cowpea is an introduced species in the United States. It is native to tropical and subtropical regions. It can grow both wild and cultivated. Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

#### Description

*General:* Cowpea is a warm-season, annual legume that exhibits a wide range of growth habits. Varieties may be short and bushy, prostrate, or tall and vine-like. Canopy heights can be 2–3 feet, depending on the variety.

The upright stems are hollow and hairless, roughly 0.4 or 2/5 inch (1 cm) wide. The stems of twining varieties are thinner. The 4 inch (10 cm) long and 3 inch (8 cm) wide leaves are three-parted, egg-shaped, and hairless. The two lateral leaves are asymmetrical, and the terminal leaf is symmetrical. The plant also has extra floral nectaries, small pores on its leaves and stems of leaves that release nectar and attract beneficial insects.

The branchless inflorescence produces stemmed flowers, 1 inch (2.5 cm) long, along the main axis. The flowers can be purple or white. The lowermost whorl of leaves under the flower is bell-shaped. The lobes of the flower are fused, and the lateral petals are shorter than the upper petal.

The seeds are born in 3 to 6-inch (8–15 cm) long, slender, round, two-valved pods growing from the leaf axils. There are roughly 6–13 seeds per pod growing within spongy tissue. The kidney-shaped seeds are white with a black mark around the scar that marks the point of attachment to the seed stalk.

*V. unguiculata* is different from the two other cultivated forms of cowpea, the subspecies *V. catjang* and *V. sesquipedalis* with respect to the shape and length of the pod and seed characteristics (Allen and Allen, 1981). These characteristics are variable and often hard to discern as the plant can readily cross-fertilize and produce fertile hybrids.

Nodules on the roots of cowpea fix nitrogen in the soil.

**Distribution:** In the United States, cowpea can be found in cultivation from the Great Lakes south to Florida, from the Atlantic coast west to Texas, and in California. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

**Habitat:** Cowpea grows best in hot conditions. It can grow in moderate shade, but in agroforestry or orchard applications, shade should not be too heavy.

#### **Adaptation**

Cowpea has been cultivated and domesticated in Africa for centuries. It is now grown worldwide, especially in the tropics. It is a warm-season crop that can be produced in semi-arid regions and dry savannas. It is better adapted to sandy soils and droughty conditions than soybeans (TJAI, 2010). It can be grown in regions with an average annual rainfall of 2.5 to 8 inches (Cook et al., 2005). The largest producers are Nigeria, Niger, Brazil, Haiti, India, Myanmar, Sri Lanka, Australia and the United States (TJAI, 2010).

#### **Establishment**

Cowpea readily germinates and the young plants are robust. Planting dates and temperatures are roughly the same as soybean. Planting dates should be late May through mid-June. A daytime temperature of 80°F (FAO, 2012) and a consistent soil temperature of at least 65°F (TJAI, 2010) are best. Plants require well-drained, highly acid to neutral soils, but can grow well in a range of soil types, including soils with low fertility. The plant is very drought resistant and does not survive flooded conditions (Clark, 2007).

Inoculation of seed is not required, but using a cowpea strain (EL-type) can be advantageous for growth (FAO, 2012). Both wild and cultivated plants naturally nodulate in a variety of soils (Allen and Allen, 1981). Seed should be sown 1 to 2 inches deep in early summer at 50 lb/acre (TJAI, 2010), or roughly 4–8 plants per row foot (TJAI, 2010) with 30-inch row spacing. Smaller amounts should

be used if seed is drilled (30 lb/acre) and larger amounts should be used if broadcast (85 lb/acre) (FAO, 2012).

An eight foot taproot can develop in roughly eight weeks (Clark, 2007). Flowering occurs in roughly 48 days (Anyia and Herzog, 2004), and earlier varieties will produce pods in roughly 60 days (TJAI, 2010). Total biomass in the summer can be 2,000–4,000 lb/acre (FAO, 2012; Clark, 2007). Cowpea has the potential to reseed from previous plantings.

#### **Management**

Cowpea can be planted in mixtures with buckwheat or sorghum-sudangrass to maximize its potential to suppress weeds. It is often interseeded into corn for weed suppression (Clark, 2007). Although cowpea is known to be a quick-growing weed-fighter, it is less successful at suppressing perennial grasses, so cultivation of rows may be required for weed control when it is grown for dry seed. Because cowpea can grow on nutrient poor soils and fix its own nitrogen, no nitrogen fertilizer is required.

The best time to harvest cowpea hay is when the seed pods have fully ripened. Plants can be cut with a sickle-bar mower then harvested with a bailer for conventional harvest or be crimped with a roller crimper when used as a green manure. For use as a green manure in California, the plant is turned into the soil 60–90 days after planting (Clark, 2007). Allelopathic properties in the residue should be monitored, as they may negatively affect the subsequent cash crop. A conventional grain combine can be used for harvesting dried cowpea.

Natural reseeding can occur, and disking in spring can stimulate the growth of buried seed (Ball et al., 2007). The plant will not tolerate fire (FAO, 2012).

#### **Pests and Potential Problems**

Cowpea may be affected by fusarium wilt (*Fusarium oxysporum*), bacterial canker, southern stem blight (*Sclerotium* spp.), cowpea mosaic virus, cercospora leaf spot, rust, and powdery mildew (*Podosphaera* spp.) (MSU, 2010). Insect damage will most often occur during the seedling stage and may be caused by Mexican bean beetles (*Epilachna varivestis*), bean leaf beetles (*Cerotoma trifucata*), cowpea curculios (*Chalcodermus aeneus*), grasshoppers, aphids, green stink bugs, lesser cornstalk borers, and weevils (when in storage)(TJAI, 2010).

#### **Environmental Concerns**

Cowpea is not likely to persist outside cultivated fields.

#### **Seeds and Plant Production**

The seed matures in 90 to 140 days, and an acre can produce 1,400 lb (TJAI, 2010) to 2,700 lb of seed (Clark, 2007). There are approximately 4,000 seeds/lb (Woodruff et al., 2010), and there are about 60 lb/bushel of grain (Murphy, 1993). There is a low percentage of hard seeds

(FAO, 2012). Seed harvesting is recommended after the first frost has killed the crop (FAO, 2012).

It is a self-pollinating plant, but wild annuals can easily be crossed with cultivated crops.

### **Cultivars, Improved, and Selected Materials (and area of origin)**

There are more than 7,000 cultivars worldwide (Clark, 2007). Roughly fifty varieties of commercial cowpea are used in the United States. Cultivars include ‘Chinese Red’, ‘Calhoun’, and ‘Red Ripper’. The cultivar ‘Iron Clay’ combines bushy and viny characteristics and is popular in the Southeast. Viny cultivars are more suitable for use as forage and cover crops, while bushy cultivars can be harvested with a combine as a dry seed. Viny cultivars are more susceptible to insect pests, diseases, and weed competition (Thorp et al., 2012). Environmental conditions have a large influence on the performance of the cultivar.

### **References**

- Allen, O.N., and E.K. Allen. 1981. The Leguminosae: a source book of characteristics, uses, and nodulation. The Univ. of Wisconsin Press, Madison, WI.
- Anyia, A.O., and H. Herzog. 2004. Water-use efficiency, leaf area and leaf gas exchange of cowpeas under mid-season drought. *Eur. J. Agron.* 20(4): 327–339. <http://www.sciencedirect.com/science/article/pii/S1161030103000388> (accessed 6 Jun. 2012)
- Ball, D.M., C.S. Hoveland, and G.D. Lacefield. 2007. Southern forages: modern concepts for forage crop management. 4<sup>th</sup> ed. International Plant Nutrition Institute (IPNI), Norcross, GA.
- Clark, A. (ed.) 2007. Cowpeas: *Vigna unguiculata*. In: Managing cover crops profitably. 3<sup>rd</sup> ed. Sustainable Agriculture Research and Education, College Park, MD. p.125–129. <http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition/Text-Version/Legume-Cover-Crops/Cowpeas> (accessed 6 Jun. 2012)
- Cook, B.G., B.C. Pengelly, S.D. Brown, J.L. Donnelly, D.A. Eagles, M.A. Franco, J. Hanson, B.F. Mullen, I.J. Partridge, M. Peters, and R. Schultze-Kraft. 2005. Tropical forages: an interactive selection tool. *Vigna unguiculata* CSIRO, DPI&F(Qld), CIAT, and ILRI, Brisbane, Australia. [http://www.tropicalforages.info/key/Forages/Media/Html/Vigna\\_unguiculata.htm](http://www.tropicalforages.info/key/Forages/Media/Html/Vigna_unguiculata.htm) (accessed 6 Jun. 2012)
- Food and Agriculture Organization (FAO). 2012. Grassland species index. *Vigna unguiculata* <http://www.fao.org/ag/AGP/AGPC/doc/Gbase/data/pf000090.htm> (accessed 6 Jun. 2012)
- Mississippi State University (MSU). 2010. Mississippi forages: cowpea (*Vigna unguiculata*). Mississippi Agric. and For. Exp. Stn. <http://msucares.com/crops/forages/legumes/warm/co-wpea.html> (accessed 6 Jun. 2012)
- Murphy, W.J. 1993. Tables for weights and measurement: crops. Publication # G4020. Univ. of Missouri Extension. <http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4020> (accessed 6 Jun. 2012)
- Thorp, S., M. Davison, O. Frost, and M. Pickstock. (ed.) 2012. New agriculturist: the highs and lows of cowpea IPM. Wren Media Ltd., Suffolk, UK. <http://www.new-ag.info/99-5/focuson/focuson9.html> (accessed 6 Jun. 2012)
- Thomas Jefferson Agricultural Institute (TJAI). 2010. Cowpea: a versatile legume for hot, dry conditions. Columbia, MO. <http://www.jeffersoninstitute.org/pubs/cowpea.shtml> (accessed 6 Jun. 2012)
- Woodruff, J.M., R.G. Durham, and D.W. Hancock. 2010. Forage establishment guidelines. The Univ. of Georgia College of Ag. and Env. Sciences. <http://www.caes.uga.edu/commodities/fieldcrops/forages/establishment.html> (accessed 6 Jun. 2012)

**Prepared By:** *Christopher M. Sheahan*; USDA-NRCS, Cape May Plant Materials Center, Cape May, New Jersey.

### **Citation**

Sheahan, C.M. 2012. Plant guide for cowpea (*Vigna unguiculata*). USDA-Natural Resources Conservation Service, Cape May Plant Materials Center, Cape May, NJ.

Published 06/2012

Edited: 16jun2012 aym, 20jun2012 aj; 25jun2012plsp; 25jun2012ac

For more information about this and other plants, please contact your local NRCS field office or Conservation District at <http://www.nrcs.usda.gov/> and visit the PLANTS Web site at <http://plants.usda.gov/> or the Plant Materials Program Web site <http://plant-materials.nrcs.usda.gov>.

PLANTS is not responsible for the content or availability of other Web sites.

**USDA IS AN EQUAL OPPORTUNITY PROVIDER AND EMPLOYER**