

***Cajanus cajan* (L.) Millsp.**
FABACEAE

pigeon pea

Synonyms: *Cystisus cajan* L.
Cajanus bicolor DC.
Cajanus flavus DC.
Cajanus indicus Spreng.
Cajanus luteus Bello



General Description.—Pigeon pea, also known as red gram, Congo pea, gungo pea, no eye pea, dhal, gandul, gandure, frijol de árbol, and pois cajan, occurs in several varieties. The old varieties in cultivation and semicultivation in the West Indies treated here are semideciduous, short-lived shrubs usually 1 to 4 m in height and 1 to 4 cm in basal stem diameter. They are usually single stemmed, freely branching, and become woody after a few months. The wood is moderately hard and brittle. They have a deep taproot (to 3 m) with lateral roots and nodulated fine roots. The branches and fine twigs support abundant light-green or yellow-green foliage. Spirally arranged, silky-pubescent, trifoliate leaves have narrowly elliptic, lanceolate or oblong leaflets, 2.5 to 9 cm long, the center leaflet being slightly longer than the laterals. The five- to 12-flowered racemes are axillary. Flowers are about 2 cm long, yellow, the standard often being orange to purple outside. The legumes, which are flattened, somewhat

constricted between seeds, and 4 to 8 cm long, are mottled bronze-purple when immature, drying to brown. They contain two to nine mottled brown (white, red, brown, gray, or black in improved varieties) seeds, 7 to 8 mm long by 6 mm broad. There are $2n = 22, 44,$ or 66 chromosomes (Liogier 1988, Long and Lakela 1976).

Range.—Pigeon pea probably originated in India, but may have come from Africa. Both are centers of diversity for the genus *Cajanus*. It is clear that the species has been under cultivation for a long time and was spread by traders thousands of years ago. The wild progenitor may be *Cajanus cajanifolius* (Haines) van der Maesen of India and Myanmar (van der Maesen 1990). Today, pigeon pea is cultivated throughout the tropics and has naturalized in many areas including Florida, Puerto Rico, and the U.S. Virgin Islands (Liogier 1988, Long and Lakela 1976).

Ecology.—Pigeon pea grows on a broad range of well-drained soils, from sands to clays over sedimentary, igneous, and metamorphic parent materials. It tolerates pH's of from 4.5 to 8.4 and some varieties tolerate 6 to 12 mmhos/cm of salinity. However, the species is sensitive to waterlogging. Pigeon pea will grow in areas that receive from 530 to 4000 mm of mean annual precipitation (Van Den Beldt 1988). Pigeon pea grows best in temperatures of 18 to 30 °C. It is subject to frost damage (Skerman and others 1988). The species is grown under cultivation from near sea level to 3,000 m in elevation (Van Den Beldt 1988). Although a large number of insects and diseases affect it (American Phytopathological Society 2002), the actual incidence of attack is low (Center for New Crops and Plants Products 2002). Pigeon pea is intolerant of shade and tolerates only moderate competition. It does best in full sun on bare ground but can grow with side shade or broken shade from trees and a low cover of grass and forbs. Growth is moderately slow during the first 2 to 3 months of life during which time

seedlings are not competitive with grass and weeds; afterwards pigeon pea competes well with vegetation equal or lower in height (van der Maesen 1990). In Puerto Rico, the species persists for a generation or two after cultivation and grows along roadsides and in waste places where seeds have fallen, but the populations are not sustained indefinitely. Although seldom devastating, a large number of insects and diseases affect pigeon pea and can reduce yield or shorten a plant's life (American Phytopathological Society 2002).

Reproduction.—Pigeon pea flowers nearly throughout the year (Red de Grupos de Agricultura de Cobertura 2002). The flowers are self-compatible and usually self-pollinated (Smartt 1976). Insects visit and pollinate the flowers (5 to 40 percent cross pollination), but it is not known whether they increase seed yield (McGregor 2002). Upon drying, the pods spring and coil to release the seeds. Pigeon pea seeds weigh about 0.1g and germinate in about 2 weeks (Center for New Crops and Plants Products 2002).

Growth and Management.—Pigeon pea is normally sown directly into prepared ground. Seeding rates for pure stands are 12 to 25 kg of seed/ha (Smartt 1976). Seeding depths of 2.5 to 5 cm are recommended (Center for New Crops and Plants Products 2002). No pregermination treatment of the seed is needed. Although some varieties mature seed in 5 to 6 months, longer-lived, tall varieties including those that are more competitive in the wild take 10 to 12 months to mature seed. These plants live about 5 years (Smartt 1976). Experimental yields of 50 dry t/ha/year have been demonstrated; yields of 3 to 8 dry t/ha/year are obtained under normal management (Van Den Beldt 1988).

Benefits.—Pigeon peas are an important food in developing tropical countries. An excellent source of protein, the seeds (and sometimes the pods) are eaten as a vegetable, as a flour additive to other foods, in soups, and with rice (Center for New Crops and Plants Products 2002). Although they vary slightly, typical nutritional values for seeds are: moisture, 10.1 percent, protein 19.2 percent, fat, 1.5 percent, carbohydrates, 57.3 percent, fiber 8.1 percent, and ash, 3.8 percent (Smartt 1976). About 3.4 million ha were under cultivation in 1978-1988 period, 88 percent of it in India (Nene and Sheila 1990). Although pigeon pea makes excellent forage, because of the brittleness of its stems, the plant is damaged by browsing, especially by cattle (Department of Primary

Industries 2002). The species is planted as a green manure crop, nurse crop, cover crop, a windbreak hedge, as a host for lac insects, and as food for silk worms. The stalks are used for fuel, thatch, and basketry (Center for New Crops and Plants Products 2002). Pigeon pea forms root nodules in association with *Rhizobium* sp. bacteria and is capable of fixing 41 to 280 kg/ha of nitrogen (Red de Grupos de Agricultura de Cobertura 2002). Preparations of the leaves are used to treat jaundice, inflammation, and sores of the mouth (Parrotta 2001).

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