

***Gossypium hirsutum* L.**
MALVACEAE

wild cotton

Synonyms: *Gossypium religiosum* L.
Gossypium latifolium Murry
Gossypium punctatum Schum.
Gossypium taitense Parl.
Gossypium mexicanum Tod.
Gossypium marie-galante Watt



General Description.—Wild cotton, also known as upland cotton, in wild populations is a shrub or occasionally a small tree to 5 m in height and 15 cm in stem diameter. The plant is deeply rooted with a taproot and laterals. Wild cotton usually has a single trunk, unless disturbed, but may have branches arising just above the ground. The bark is gray and smooth, but tough and stringy. The stem wood of older plants is of medium density and brittle. The twigs are relatively stout. The leaves on young plants are usually without lobes; older plants usually have three lobes or occasionally are deeply incised with five lobes. The light green leaves have petioles 3 to 8 cm long and blades 10 to 15 by 12 to 15 cm. Bracteoles are pointed and may have one to seven or more teeth. The flowers of wild cotton are large and showy with cream to pale yellow petals, sometimes with a red spot at the base of the petals. The capsules have three to five valves with a smooth surface and many black gland dots and yield white or brown lint with seeds embedded. The seeds vary from black and smooth to green with tightly adhering fuzz (Howard 1989, Liogier 1994, Watt 1907). In certain instances

(Little and others 1974), wild cotton has been misidentified as *Gossypium barbadense* L., which occurs today as a residual from cultivation and as a true wild plant only on the coast of Ecuador (Izuko Museums of Cape Town 2000). Wild cotton occurs in at least three botanical varieties. The most commonly seen in the West Indies is *G. hirsutum* var. *marie-galante* (Watt) J.B. Hutchinson (Liogier 1994). Doubtless a legacy of agricultural cultivation, wild populations in Puerto Rico have a wide range of leaf and bract shapes, seed characteristics, and lint length and color (author's observation). In fact, wild cotton is a tetraploid. There is a theory that wild cotton is the result of natural hybridization between Old World diploid cottons, *G. arborium* L. or *G. herbacium* L. and *G. raimondii* Ulbrich. (Bajaj 1998).

Range.—The native range of wild cotton includes Tropical Florida, the West Indies, Northern South America, Mexico, and Central America (Howard 1989, Liogier 1994, Long and Lakela 1976) and apparently several Pacific Islands including Samoa (Kohel and Lewis 1984). Because of eradication intended to control the pink boll worm, the species has become very rare and has been listed as endangered in Florida (Nelson 1996). *Gossypium hirsutum* is the principal cultivated cotton throughout the world (Vijayakumar 2002). It has naturalized in many locations, especially in island habitats, including Hawaii (Neal 1965).

Ecology.—Wild cotton is mainly a plant of the coastal strand and lower coastal plains. The species has a particular affinity for small islands. It also grows in disturbed places, particularly along roads and on river overflow areas, well inland. Wild cotton can grow in almost all types of well-drained soils. Optimum pH's are said to be from 5.2 to 7.0 (Center for New Crops and Plants Products 2002). Soil disturbance is usually necessary for its establishment. It tolerates moderate amounts of salts in the soil and salt

spray. Wild cotton competes well with weeds and grasses but does not tolerate shade and cannot grow under tree cover. In Puerto Rico, wild cotton is most competitive at low rainfalls (750 to 900 mm of annual precipitation) but grows in well-drained areas that receive up to 1700 mm of precipitation at from near sea level to about 300 m elevation. Wild cotton does not tolerate frost.

Reproduction.—Wild cotton is dormant during the winter dry season and becomes vegetative as the rains begin again in early summer. At the end of the summer, vegetative growth ceases and plants begin to flower and fruit (Kohel and Lewis 1984). Three collections of wild cotton seeds of Puerto Rico from three locations averaged 0.088 ± 0.001 , 0.075 ± 0.001 , and 0.081 ± 0.001 g/seed or about 12,000 seeds/kg. Germination is epigeal. Seeds from two of the collections were sown without pretreatment in commercial potting mix. One collection germinated at 100 percent starting in 17 days and ending in 41 days. The second group germinated at 67 percent starting in 22 days and ending in 140 days. The wind disbursts the seeds over short distances by blowing the lint until it catches on vegetation. Birds also move seeds when they use cotton lint for nest building materials. Under greenhouse conditions, seedlings may grow more than 1 m in 6 months. In wild stands, seedlings can be abundant but they naturally thin themselves quickly.

Growth and Management.—Although wild cotton in its cultivated form is managed as an annual, it is a true perennial, and if allowed to do so under favorable conditions, will live for several years (Kohel and Lewes 1984) and become tall and woody. Wild cotton in Puerto Rico grows 1 to 1.5 m in its first year. The wild variety requires 15 or more nodes to be formed along the main axis before it can flower. Consequently, the plant is rarely able to bloom during its first year (Kohel and Lewis 1984). Cotton can be transplanted using containerized nursery plants. However, direct seeding following removal of overhead competition and cultivation of the soil is recommended. Soil temperatures must be at least 18 °C before planting (Center for New Crops and Plant Products 2002).

Benefits.—About 87 percent of the cotton grown commercially is *G. hirsutum* (Vijayakumar 2002). It has been selected, bred, and, in some cases, hybridized to give the manageable and productive varieties planted today. Evidence from Mexico shows that wild cotton has been used by man for

making string and cloth since at least 200 BC (Iziko Museums of Cape Town 2000). Today, cotton is the world's most widely used natural fiber. The seeds of cultivated cotton form the basis for an important oil and animal food industry. The seeds contain 7.3 g water, 23.1 g protein, 22.9 g fat, 43.2 g total carbohydrate (16.9 g fiber), and 3.5 g ash per 100 g (Center for New Crops and Plant Products 2002). Gossypol, a sesquiterpinoid, is present in vegetative parts of wild cotton as well as the cultivated varieties. It is a natural deterrent to insects but is toxic to man and nonruminant animals. It has been shown to have strong antifertility, antitumor, antiparasite, and anti-HIV properties (Bajaj 1989). Gossypol is widely used in China as a male contraceptive (Center for New Crops and Plant Products 2002). Raw cottonseed oil (containing gossypol) used alone showed promise as an insecticide (Tadas and others 1994). In herbal medicine, cottonseed and roots have been used to treat nasal polyps, asthma, diarrhea, hemorrhoids, dysentery, uterine fibroids and certain cancers, to induce abortions, and as a diuretic. (Center for New Crops and Plant Products 2002). Wild cotton is occasionally planted as an ornamental. The species contributes to biodiversity, soil stability, wildlife habitat, and scenic beauty in its beach strand and lowland habitat.

References

- Bijaj, Y.P.S. 1998. Cotton. In: Y.P.S. Bijaj, ed. *Biotechnology in Agriculture and Forestry* 42. Springer-Verlag, New York. p. 3-36.
- Center for New Crops and Plant Products. 2002. *Gossypium hirsutum* L. Purdue University. http://www.hort.purdue.edu/newcrop/duke_energy/Gossypium_hirsutum.html. 6 p.
- Howard, R.A. 1989. *Flora of the Lesser Antilles, Leeward and Windward Islands*. Vol. 5. Arnold Arboretum, Harvard University, Jamaica Plain, MA. 604 p.
- Iziko Museums of Cape Town. 2000. *Gossypium* (cotton). Biodiversity explorer. <http://www.museums.org.za/bio/plants/malvaceae/gossypium.htm>. 2 p.
- Kohel, R.J. and C.F. Lewis, eds. 1984. Cotton. *Agronomy* 24. American Society of Agronomy, Inc., Crop Science Society of America, Inc., and Soil Science Society of America, Inc., Madison, WI. 605 p.

Liogier, H.A. 1994. Descriptive flora of Puerto Rico and adjacent islands. Vol. 3. Editorial de la Universidad de Puerto Rico. Río Piedras, PR. 461 p.

Little, E.L., Jr., R.O. Woodbury, and F.H. Wadsworth. 1974. Trees of Puerto Rico and the Virgin Islands. Vol. 2. Agriculture Handbook 449. U.S. Department of Agriculture, Washington, DC. 1,024 p.

Long, R.W. and O. Lakela. 1976. A flora of Tropical Florida. Banyon Books. Miami, FL. 962 p.

Neal, M.C. 1965. In gardens of Hawaii. Spec. Pub. 50. Bernice P. Bishop Museum Press, Honolulu, HI. 924 p.

Nelson, G. 1996. The shrubs and woody vines of Florida. Pineapple Press, Sarasota, FL. 391 p.

Tadas, P.L., H.K. Kene, and S.D. Deshmukh. 1994. Effect of raw cottonseed oil against sucking pests of cotton. PKV Research Journal 18(1): 142-143.

Vijayakumar, T. 2002. Cotton. <http://www.geocities.com/vijayakumar777/cotton1.html>. 14 p.

Watt, Sir G. 1907. The wild and cultivated cotton plants of the world. Longmans, Green, and Co., London. 406 p.

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