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How to identify hemp, *Cannabis sativa* L. (and lookalike) plants

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INTRODUCTION

Hemp (*Cannabis sativa* L.) is a fairly new crop for modern Florida, but with a long history of worldwide cultivation. Confusion about the appearance of this new crop throughout its life cycle has led to questions about how to distinguish hemp from other, similar plant species found in the state. Anecdotal evidence suggests that confusion about this species has led to the destruction of other plants mistaken for illegally planted *C. sativa*. This circular will provide information to identify *C. sativa* and to distinguish it from other species known to have been mistakenly identified as cannabis. Because such confusion is less likely when plants have flowers or fruits, we will focus on characteristics of vegetative structures, such as leaves and stems, but flowers will also be described. Distinguishing among plant species depends on understanding a few basic botanical structures, such as leaf types and flower parts. A brief review of these structures is provided. Descriptions of the following species, in addition to *C. sativa*, are included: *Abelmoschus esculentus* (L.) Moench (okra), *Acer palmatum* Thunb. (Japanese maple), *Cleome hassleriana* Chodat (cleome), *Hibiscus cannabinus* L. (kenaf), *Jatropha multifida* L. (coral plant) and *Manihot esculenta* Crantz (cassava).

Pests and diseases of hemp are well known because of its agricultural importance throughout its cultivation. Lists of common arthropod pests (M. Z. Ahmed, personal communication, October 8, 2020) and plant diseases (Bakro, *et al.,* 2018) are attached at the end of this circular for the convenience of the reader.

BACKGROUND INFORMATION FOR PLANT IDENTIFICATION

Leaf types

Cannabis sativa has palmately compound leaves, but some plants mistaken for this species have deeply-lobed simple leaves. The following section will focus on the distinction between palmately compound leaves and simple, lobed leaves (Fig. 1).

Compound leaves are divided into several to many small units called "leaflets." To understand a leaf shape, start by looking for the base of the leaf, the point at which the leaf stalk (petiole) is attached to a twig or the stem of a plant. At this point, you should be able to see a bud for a new leaf to replace the old leaf after it ages and falls off.

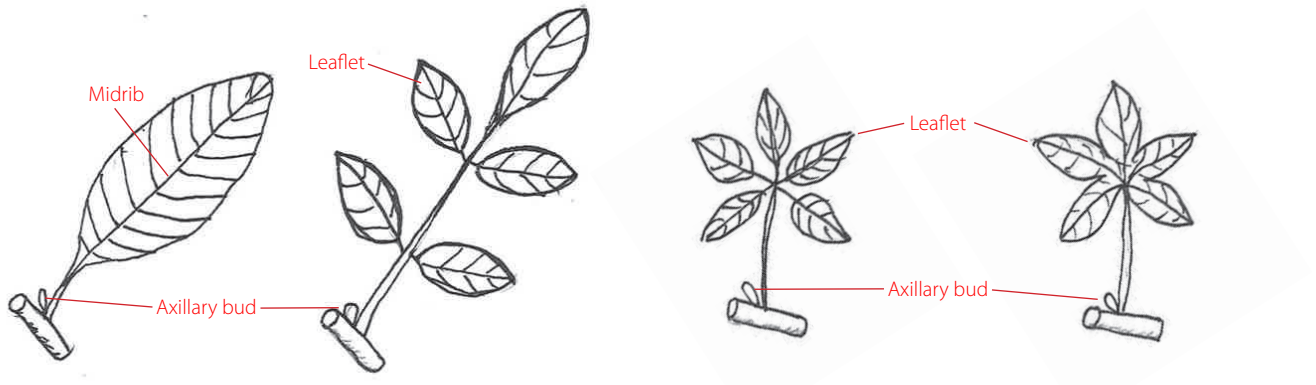


Figure 1. Simple leaf. **Pinnately compound leaf.** **Palmately compound leaf.** **Palmately lobed leaf.**

After locating the bud at the base of the leaf petiole, you can determine whether the leaf is simple or compound (Figs. 2, 3 and 4) . Although some simple leaves have very deeply dissected lobes, in most cases, careful observation will allow for a correct determination of leaf type. Simple leaves might have margins that are continuous with no indentations of any kind, or they might be edged with teeth or deep lobes. Compound leaves may be divided into leaflets that resemble a feather (pinnate), with leaflets attached on both sides of a midrib or rachis, or the fingers of a hand (palmate or somewhat like a star) attached at a single point to the leaf stalk or petiole.

Figure 2. Left: *Cannabis sativa* (hemp), palmately compound leaves with three to nine leaflets. Right: *Cnidoscolus aconitifolius* (chaya; tree spinach), simple, lobed leaves.
Photo by Patti Anderson, FDACS-DPI

Figure 3. *Cannabis sativa* (hemp). Note the lack of connected leaf blade tissue near the point of attachment with the petiole.
Photo by Patti Anderson, FDACS-DPI

Figure 4. *Cnidoscolus aconitifolius* (chaya; tree spinach). Note the connected leaf blade tissue near the point of attachment with the petiole.
Photo by Patti Anderson, FDACS-DPI

Review of flower structure

A **complete** flower has all the following structures growing from a pedicel (flower stalk): sepals, petals, stamens and a pistil (Fig. 5). The sepals together form a calyx, all the petals form a corolla, the sepals and petals combined form the perianth. An **incomplete** flower is missing one or more of the four listed parts.

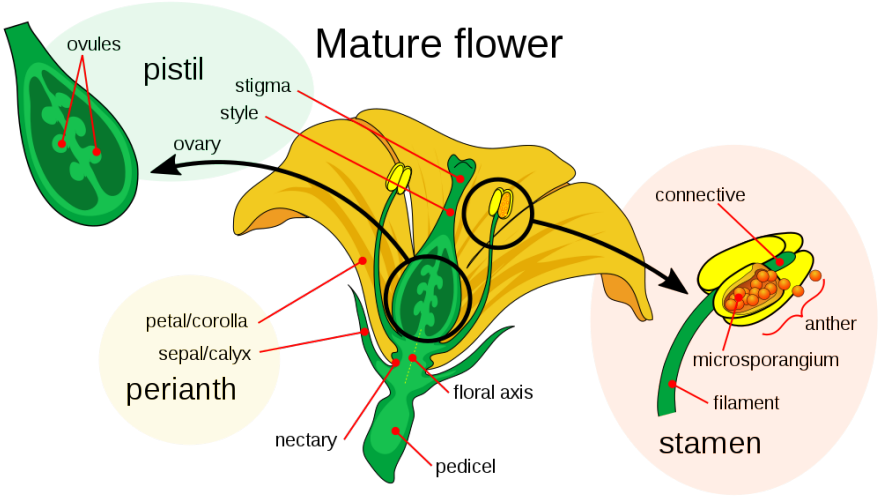


Figure 5. Diagram showing parts of a complete flower.
Image by Mariana Ruiz, Wikipedia

A **perfect** flower has both stamens and pistil, while an **imperfect** flower is missing one or the other of those structures. If the missing structure of an imperfect flower is the stamens, we call the flower carpellate, or female, because it has an ovary; if the missing part is the ovary, we call the flower staminate, or male, because it has the pollen producing structures. Having separate male and female flowers encourages cross-fertilization.

A species with imperfect flowers can have both staminate and carpellate flowers on one individual plant (the plant is called monoecious for "one house"); or each plant can produce only one of the flower types (the plant is called dioecious or "two houses"), and two plants are required for pollination. Plants can also change over time to produce only male, only female or both flower forms. All of this is to prepare you for the variability found in hemp flowers.

PLANT DESCRIPTIONS

The species included in this document can be easily identified and differentiated from hemp when flowers or fruits are present, but the leaves of these plants can be (and have been) confused with the leaves of hemp. The following descriptions provide information intended to help identify these similar species when reproductive structures are not present, but descriptions of flowers are also included.

***Cannabis sativa* (hemp),** from a genus with a single species in the plant family Cannabaceae.

Cannabis sativa is native to Asia and has long been cultivated for its many useful properties. During this association with humans, the plant has been modified by artificial selection for its fibers or chemical properties. Over time, cultivated plants have escaped and crosspollinated wild plants, making any distinction between wild populations and cultivated plants quite difficult. Although early taxonomists named two distinct species, most now consider the genus to have only one polymorphic species (having two or more forms based on genetic variation). Linnaeus, father of modern biological taxonomy, recognized only one species of *Cannabis*, and he named it *Cannabis sativa*. Later, another biologist, Lamarck, gave the name *Cannabis indica* to plants he thought to be a different species. During the time two species were recognized by taxonomists, *Cannabis indica* applied to forms with high levels of THC (delta-9-tetrahydrocannabinol), while *Cannabis sativa* was used as the name for hemp plants, based on the fibers they produced. More recently, named varieties of *C. sativa* have been used to distinguish separate forms of the species, but the characters used to make the distinctions often overlap. Most taxonomists now agree only one species name is needed, and we follow that practice, using only *C. sativa* in this document.

Although the species is variable and many-named, and informal varieties exist, the following description should be reasonably accurate for most plants grown from seeds. Plants grown from cuttings or tissue culture, as well as cultivars bred for distinctive characteristics, might differ. A short discussion of variation in cultivated plants follows the description of the species.

Plants grown from seeds emerge with simple seed leaves (cotyledons), followed by a few simple leaves, then the plant begins to produce more typical compound leaves (Fig. 6). Rooted cuttings used for propagation usually include two bracts surrounding a flower bud. This developing flower can be used to determine whether the plant will produce male or female flowers. Plants grown from this type of cutting will likely produce only alternate leaves, not the basal opposite leaves described below (Figs. 8 and 9).

Figure 6. *Cannabis sativa* (hemp), simple first leaves of young seedling.
Photo from Shutterstock

Figure 7. *Cannabis sativa* (hemp), opposite leaves of young plant grown from seed.
Photo from Shutterstock

Figure 8. *Cannabis sativa* (hemp), cutting plant with alternate leaves for propagation.
Photo from Shutterstock

Figure 9. *Cannabis sativa* (hemp), alternate leaves of young plant grown from a cutting.
Photo by Ben Spitzer-Rimon, *et al.* (2019)

Cannabis sativa is a herbaceous annual with strong, flexible fibers ("bast" fibers from the phloem vessels) in the stem. Stems can reach 2 m in height and are covered with sharp, straight hairs, all usually pointing in one direction (strigose). The palmately compound leaves are opposite near the base of the stem but become alternate higher on the stem (Figs. 7 and 11). Each leaf can be composed of three to nine, narrow, lance-shaped leaflets, with serrate (toothed) margins, 6-14 cm in length. The upper leaf surface is rough like sandpaper (scabrid) with bulbous-based hairs. The lower surface is strigose and covered with yellowish resin dots (Fig. 10).

Figure 10. *Cannabis sativa* (hemp), leaf underside.
Photo by Patti Anderson, FDACS-DPI

Each hemp flower is either male (staminate) or female (carpellate), but a plant may produce both flower types or only one. In addition, some plants begin the growing season producing one type of flower then switch to the other; for example, having only pollen producing (male) flowers early in the season, then seed producing (female) flowers later. Male (staminate) flowers develop in the axils of leaves to form a branched cluster (cymose panicle inflorescence) with each green flower having a flower stalk (pedicel) 1-3 mm long, five sepals 3-4 mm long, five stamens and no petals. Female (carpellate) flowers are axillary, in compressed, more or less sessile (with little or no flower stalk), spike-like inflorescences (pseudospikes). Each female flower is held within a gland-covered leaf-like structure (called a bract) surrounding the flower parts, 4-15 mm long and a smaller bract-like structure surrounding the flower parts (a perigonal bracteole) about 2 mm long. Thin, fused perianth parts surround and adhere to the base of the ovary and persist to enclose the fruit. The female flower has a 2-3 mm long style and a two-branched filiform stigma. The compressed, dry fruit (an achene) is 2-5 mm long and may be white or greenish, with purple blotches. In Florida, this species can flower all year and is found growing in disturbed sites and other open habitats after escaping from cultivation (Miller, 1970; Small, 1997; Spitzer-Rimon, *et al.,* 2019; Watts, 2006; Wunderlin and Hansen, 2016).

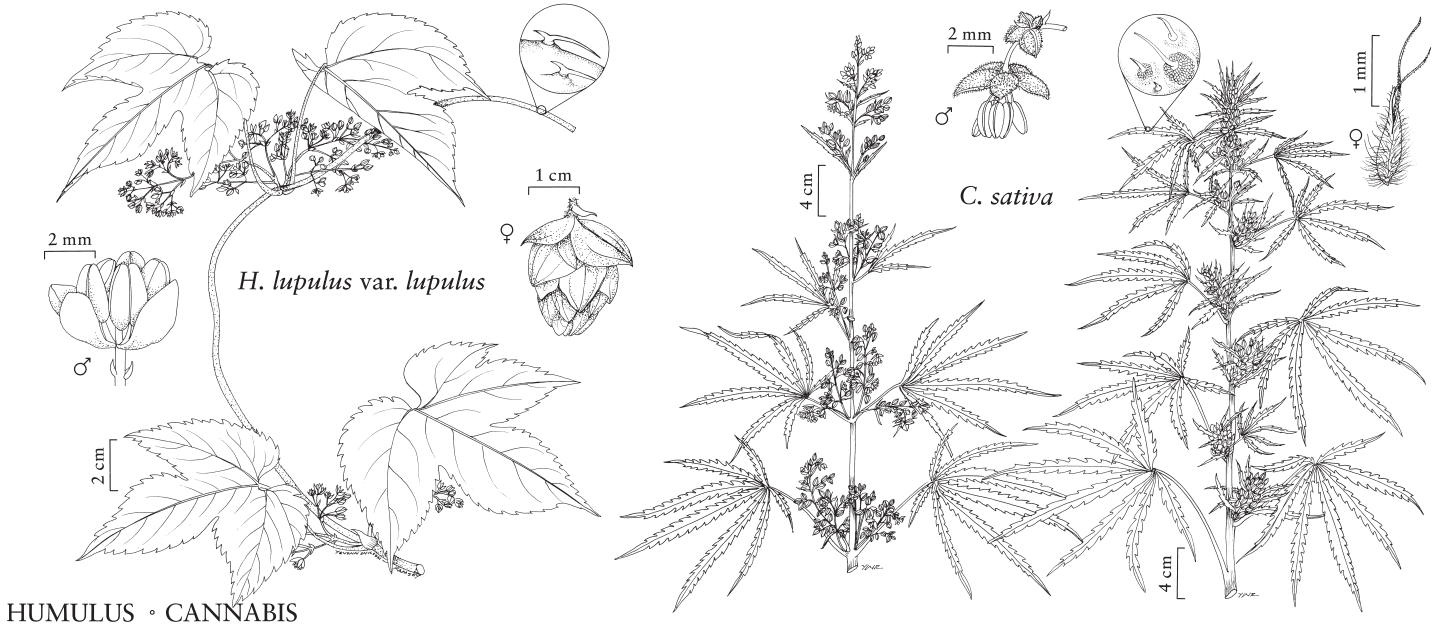


Figure 11. Simple lobed leaves of *Humulus lupulus* (hops) in contrast with compound leaves of *Cannabis sativa* (hemp). Male ♂ and female ♀ flowers and inflorescences, as well as bulbous based trichomes, are illustrated.
Illustration by John Myers, Flora of North America Association

Variation in cultivated hemp plants

The overall appearance or architecture (height and amount of branching) in *Cannabis sativa* plants depends on the genetic selection by breeders for use of the plant, male or female flower production and the density of planting in a field. Plants intended for medicinal uses are bred to maximize the plant chemicals (phytochemicals) produced. Glands that produce resins containing these phytochemicals are found on the epidermis of most plant parts, but they are concentrated on the bract-like structures surrounding the female flowers. Maximizing the production of these flowers is the goal of the plant breeders. Cultivars developed for medicinal purposes are generally low-growing with abundant branching to encourage flower development. Hemp plants intended for use as fiber are selected to maximize height and distance between leaves and branches to produce longer stem fibers. The quantity of phytochemicals produced is minimized with male-flowered plants. Plants intended for oilseed or other seed uses require female-flowered plants and have been selected for abundant seed production with intermediate branching, useful for mechanized harvesting. Usually, medicinal cannabis crops are widely spaced to maximize light exposure and encourage early flowering with abundant branching. In contrast, hemp plants grown for fiber are typically planted at high densities to encourage upright growth as plants compete for light. Flowering can be delayed in hemp as densely planted crops devote energy into vegetative growth, adding to the likely abundance and length of fibers. In addition, plants with male flowers age quickly and die soon after flowering. Delayed flowering allows more time for fiber production by male-flowered plants. Putting the factors together, plants intended for medicinal use are typically low-growing, widely spaced plants with female flowers; those used for fiber are likely tall, closely spaced plants with male flowers; and plants used for oils from seeds are likely to be of intermediate height and field spacing with female flowers. (Schultes, 1970; Small and Marcus, 2002.)

HEMP LOOKALIKE PLANTS

***Abelmoschus esculentus* (okra),** from a genus with one to as many as six species in the plant family Malvaceae.

Abelmoschus esculentus is thought to have arisen from cultivation in India or Africa with no known wild progenitor, but it is closely related to *Hibiscus* and is considered a member of that genus by some botanists. This species has been introduced nearly worldwide and has become naturalized in many tropical and subtropical countries. In Florida, it has escaped cultivation to persist in disturbed sites of Miami-Dade County and the Florida Keys of Monroe County. Okra is cultivated as an annual vegetable crop with a green stem, sometimes mottled with red, 1-2 m in height. It can persist as a perennial outside of cultivation. Leaves are variable, from 10-25 cm in length, and having from slightly palmate lobes to three, five or seven deeply cut palmate divisions with coarsely toothed margins. The flower is composed of 8-12 linear bracts, up to 2.5 cm long, five fused sepals, a corolla of five white to yellow petals, 4-8 centimeters long, often with a red or purple spot at the base of each petal (Fig. 12). The anthers are attached to a column (androgynophore), and the stigma is five-branched. The fruit is five-sided, up to 30 cm long with numerous seeds. Flowering can occur from spring to fall. As a vegetable, this species is a well-known ingredient in gumbo and other soups and stews.

Abelmoschus esculentus and *Cannabis sativa* differ in the appearance of their flowers and fruit, but young okra plants without flowers and with the deeply-dissected, palmately-lobed leaf form have been confused with hemp plants. The leaves of the two species differ in several ways. For example, okra leaves are alternate throughout and palmately lobed, while hemp has opposite leaves on the lower stem and are palmately compound (divided for their total length into leaflets). The potential length of the leaves overlaps for the two species (okra 10-25 cm and hemp 6-14 cm), but individuals with the shortest and longest dimensions can be identified. The leaves also differ in that okra leaves have course, stiff hairs scattered along the veins on the undersides, while hemp leaves have yellow resin dots in addition to sharp hairs giving a sandpaper feel to the leaf undersides (Fig. 13). (Bates, 2015; Missouri Botanical Garden, website; Wunderlin, *et al.* 2017).

Figure 12. *Abelmoschus esculentus* (okra), flower and leaves.
Photo by Keith Bradley, Atlas of Florida Plants

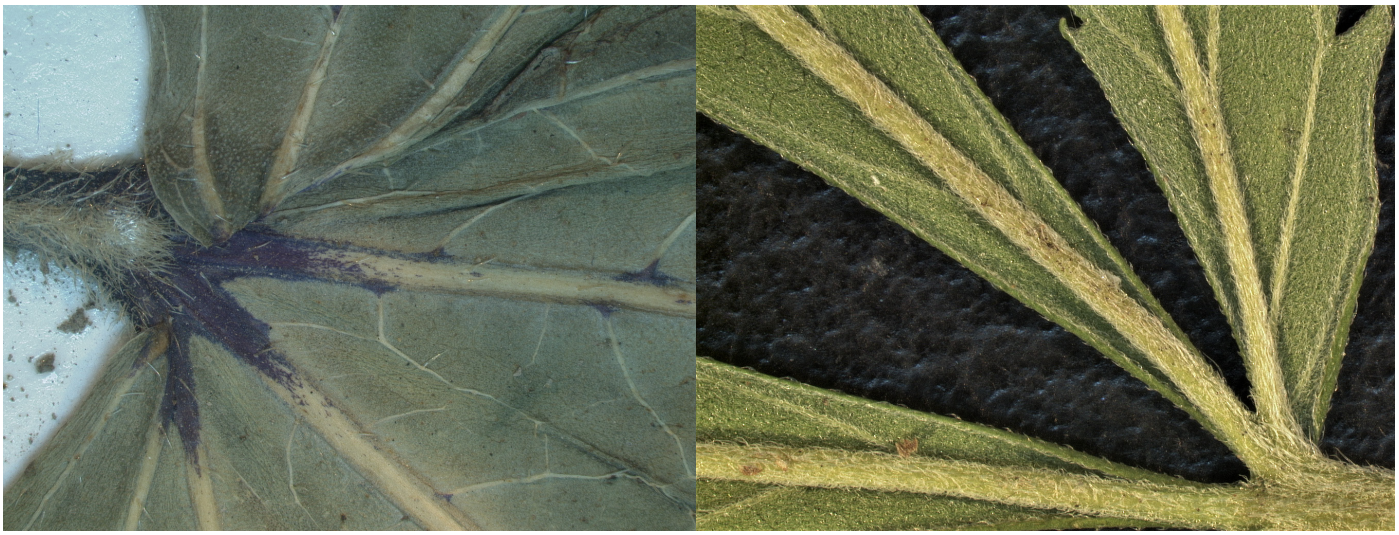


Figure 13. *Abelmoschus esculentus* (okra), underside of leaf. Note stiff hairs along veins (left). Compare with *Cannabis sativa* (hemp), leaf underside (right).
Photos by Patti Anderson, FDACS-DPI

***Acer palmatum* (Japanese maple),** from a genus with over 120 species from Northern Hemisphere temperate regions and tropical mountain areas, in the plant family Sapindaceae.

Acer palmatum is thought to be native to Japan (Hokkaido, Honshu, Kyushum and Shikoku) and South Korea and is widely cultivated elsewhere as an ornamental. Hardiness zones for most cultivars of this species in the United States are 5-8, suggesting that it grows well only in northern Florida. There are no documented vouchers for naturalized Japanese maples within the state. The genus name is Latin for a maple tree, and the species epithet suggests the palmate divisions of the leaf blade. This deciduous tree grows to 15 m tall in its native setting but is usually much shorter (3-7 m) as an ornamental cultivar. The leaves are opposite with a petiole 2-6 cm long. The up to 6 by 8 cm leaf blade is deeply divided into five or seven (sometimes nine) lance-shaped lobes with irregularly, but finely, toothed margins (Fig. 14). The inflorescences have 10-20 drooping unisexual flowers, 6-8 mm across. Flowers consist of five, reddish purple, oblong to oblanceolate sepals. Petals are cream colored to pinkish white, broadly obovate and smaller than the more colorful sepals. Staminate (male) flowers include eight stamens exerted about 3.5 mm and a minute, non-functional ovary. Carpellate (female) flowers contain small, residual stamens, as well as functioning female structures. The dry fruits (samaras) are about 1 cm long, with wings spreading at an obtuse angle. This species is highly valued as an ornamental for its bright fall color and adaptability as a bonsai plant.

Only seedlings or very young saplings of *Acer palmatum* are likely to be confused with hemp because the maple stem starts to become woody after its first growing season. In addition, the leaf surfaces of the maple are hairless (glabrous) except for tufts of soft hairs between the veins on the underside of the leaf at the point where the veins meet (Fig. 15). There is no strong odor from crushed maple leaves, in contrast with hemp leaves, and the teeth along the margins of maple leaves are fine, not coarse, as in hemp. In addition, Japanese maple leaves are palmately lobed, while hemp leaves are palmately compound (divided for their total length into leaflets) although some cultivars of Japanese maple have extremely deep lobes and require close observation to distinguish. (Nelson, *et al.,* 2014; Xu *et al.,* 2008.)

Figure 14. *Acer palmatum* (Japanese maple). Examples of leaf variation.
Photos by Scott Burton, FDACS-DPI

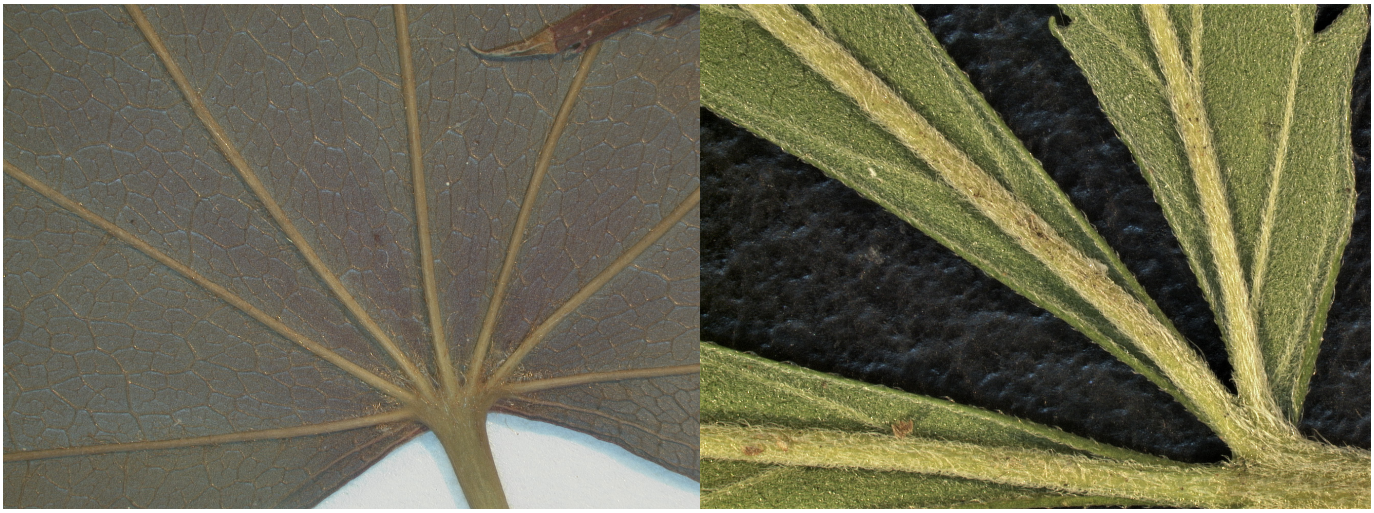


Figure 15. *Acer palmatum* (Japanese maple), underside of leaf. Note soft hairs between veins where they come together at the base of the blade (left). Compare with *Cannabis sativa* (hemp), leaf underside (right).
Photos by Patti Anderson, FDACS-DPI

***Cleome hassleriana* (cleome, pinkqueen spiderflower),** from a genus with about 300 species from warm and tropical areas in the plant family Cleomaceae.

Recent studies have suggested the name *Cleome hassleriana* be changed to *Tarenaya hassleriana* (Chodat) Iltis in the Brassacaceae/Cruciferae, but we continue to recognize the previously accepted taxonomy. The species is thought to be native to South America (Argentina, Bolivia, Brazil and Peru) and is cultivated elsewhere as an ornamental. In Florida, cleome has escaped from cultivation in scattered counties around the state. This annual, herbaceous species can grow to 2 m tall with a glandular-pubescent (dotted with glandular hairs) stem. The leaves are alternate and palmately compound, with five to seven leaflets, usually 2-6 cm long, but sometimes up to 9 cm (Fig. 16). Leaflet margins are toothed, and the leaflet blade surfaces are dotted with glands or glandular hairs. With a hand lens, glandular hairs can appear similar to a stiff blade of grass topped by a drop of dew. The leaf stalk (petiole) is also glandular-pubescent with a few to many small (1-3 mm), scattered spines. The inflorescence spikes (racemes) are 5-30 cm long with leaf-like, ovate bracts to 2.5 cm long, along its axis. Each flower has four sepals, four petals and six stamens fused in a column with the female parts. The dry fruit is 4-8 cm long, containing 10-20 seeds. This species has become naturalized in disturbed areas such as roadsides, vacant lots and stream banks.

Cleome plants have been confused with hemp plants because of the similarities in their leaves. Both species have palmately compound leaves (leaflets separated to the base and attached like fingers to the palm of a hand). Cleome leaves usually have five to seven leaflets, while hemp can have three to nine leaflets; both have leaflets with toothed margins, but the teeth of cleome leaflets are much less obvious. The leaves of cleome are alternate along the stem, while those of hemp are opposite near the base of the stem but become alternate higher on the stem. The surface of cleome leaflets and their petioles are clothed with glandular hairs that produce a rank, musky or skunky odor when crushed (Fig. 17). The surface of hemp leaflets is sandpapery (scabrous) and produce a characteristic, but different, odor. Prickles on cleome are inconspicuous and vary in number and density, but there are none on hemp. (Tucker and Iltis, 2010; Wunderlin, *et al*., 2017.)

Figure 16. *Cleome hassleriana* (cleome, pinkqueen spiderflower), plant with flowers.
Photo from Shutterstock

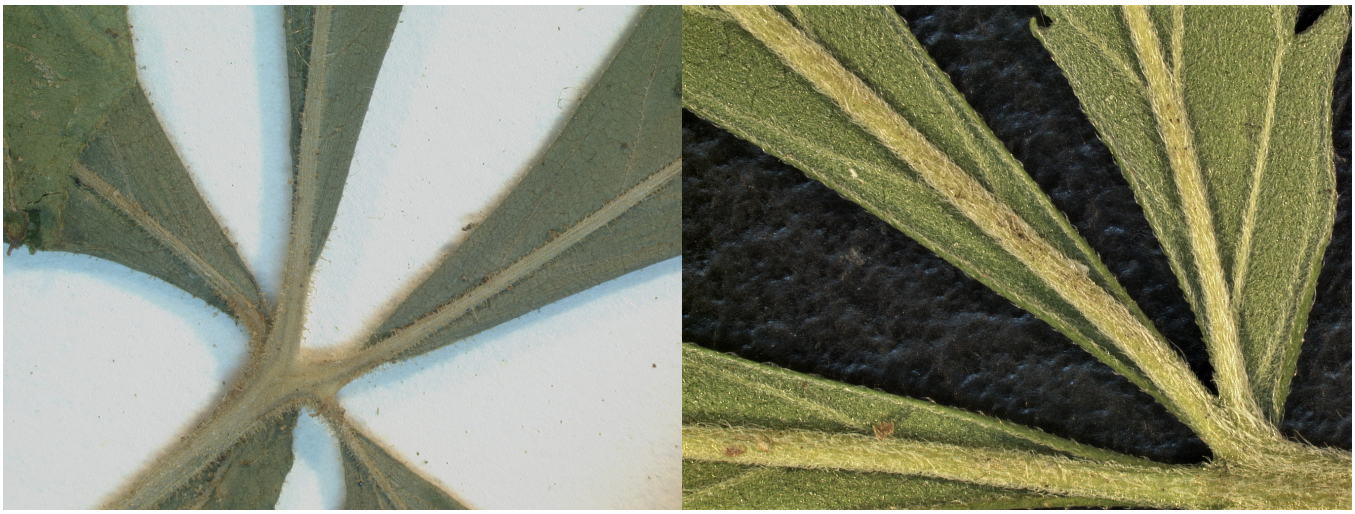


Figure 17. *Cleome hassleriana* (cleome, pinkqueen spiderflower), underside of leaf. Note glandular hairs and the lack of leaf tissue between leaflets (left). Compare with *Cannabis sativa* (hemp), leaf underside (right).
Photos by Patti Anderson, FDACS-DPI

***Hibiscus cannabinus* (kenaf),** from a genus of about 350 species in the plant family Malvaceae.

Hibiscus cannabinus is an annual or perennial herb native to Africa and Asia that grows to 3 m tall. In Florida, it has escaped from cultivation and can be found in disturbed sites in Miami-Dade County. The stems are erect and robust with the surface glabrous to sparsely spiny. The leaves are alternate and have two shapes: lower leaves are heart-shaped (cordate); the upper leaves are palmately lobed with three to seven lobes. Both forms have toothed (serrate) margins and hairless (glabrous) surfaces (Fig. 18). The flowers are nearly sessile and are borne solitary in the leaf axils. The calyx (composed of fused sepals) is subtended by an epicalyx (a group of bracts resembling a calyx), which consists of seven to 10 finely divided lobes that are sparsely spiny. The calyx is five-lobed, somewhat bell-shaped and fused for nearly half its length, with the surface spiny and covered with densely matted, short, white, woolly hairs (white-tomentose). The corolla (composed of fused petals) is five-lobed, broadly funnel-shaped and yellow with a red center (Fig. 19). There are numerous stamens with the filaments fused, forming a hollow tube (staminal column) around the style. The ovary is superior and terminates in five style branches and stigmas that extend past the staminal column. The fruit is densely spiny and splits open at maturity to expose several kidney-shaped (reniform), nearly hairless (glabrate) seeds. *Hibiscus cannabinus* is cultivated as a fiber crop. The seed oil is considered inedible but is used industrially and in oil-lamps.
The upper leaves of *Hibiscus cannabinus* are similar to those of hemp (*Cannabis sativa*), hence the specific epithet "*cannabinus*." The key difference is the leaves of *C. sativa* are divided into separate leaflets, while the leaves of *H. cannabinus* are lobed, *not* divided (Fig. 20). The leaves of *H. cannabinus* are deeply three to seven lobed with toothed margins. The leaves of *C. sativa* are palmately compound with three to nine leaflets with toothed margins. The flowers of *H. cannabinus* are complete (with sepals, petals, stamens and carpels) while the flowers of *C. sativa* are incomplete. (Wunderlin, *et al.* 2017.)

Figure 18. *Hibiscus cannabinus* (kenaf), leaves.
Photo from Wikimedia by Dinesh Valke

Figure 19. *Hibiscus cannabinus* (kenaf), plant with flower and leaves.
Photo from Wikimedia by Raj.palgun13

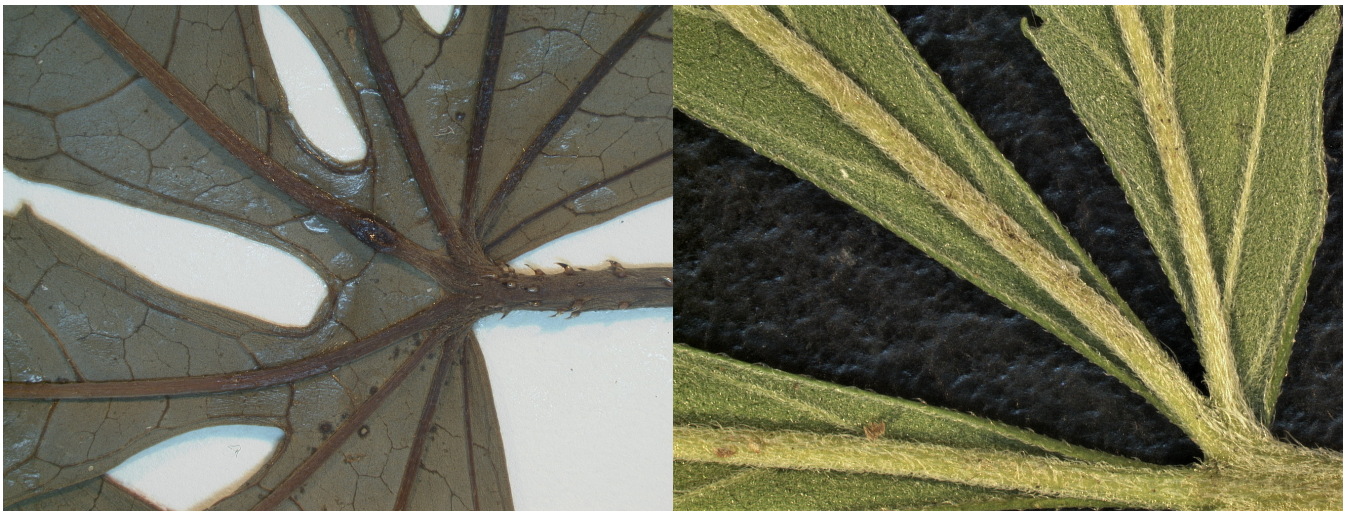


Figure 20. *Hibiscus cannabinus* (kenaf), underside of leaf. Note stiff hairs and the presence of leaf tissue between leaf lobes (left). Compare with *Cannabis sativa* (hemp), leaf underside (right).
Photos by Patti Anderson, FDACS-DPI

***Jatropha multifida* (coralbush),** from a genus of about 175 species in the plant family Euphorbiaceae.

Jatropha multifida is a shrub native to tropical America that grows to 5 m tall. In Florida, it has escaped from cultivation and can be found in disturbed sites in Broward, Highlands, Indian River and Polk counties. Like many members of the Euphorbiaceae, this species exudes a viscous, white latex from all parts of the plant when damaged. The branches are erect, yellow-brown and hairless (glabrous). The leaves are alternate and petiolate with the leaf blade ovate to heart-shaped (cordate) in outline and deeply five to eleven lobed with incised margins and glabrous surfaces. The flowers are unisexual (male or female), and both types occur on the same individual plant (monoecious). The inflorescence is a dense cluster (cyme) with the female (carpellate) flowers at the center surrounded by the male (staminate) flowers. The staminate flowers are composed of five ovate-oblong sepals; five red, obovate petals and seven to eight stamens. The carpellate flowers are composed of five sepals; five red petals and three united carpels with the styles fused at the base. The fruit is green-yellow, somewhat fleshy and ridged, splitting open at maturity to expose three pale brown, elliptic seeds (Fig. 21). *Jatropha multifida* is widely cultivated in the tropics and subtropics of the world as an ornamental in gardens and landscapes.

The leaves of *Jatropha multifida* are similar to those of hemp (*Cannabis sativa*). The key difference is the leaves of *C. sativa* are divided into separate leaflets, while the leaves of *J. multifida* are lobed, not divided (Fig. 23). The leaves of *J. multifida* are deeply five to eleven lobed with incised margins (Fig. 22). The leaves of *C. sativa* are palmately compound with three to nine leaflets with serrate margins. Also, *J. multifida* exudes a viscous, white latex when damaged, and *C. sativa* does not. (Dehgan, 2016.)

Figure 21. *Jatropha multifida* (coralbush), flower with fruit.
Photo from Shutterstock

Figure 22. *Jatropha multifida* (coralbush), leaves. Although the leaves are deeply dissected, continuous leaf blade tissue can be seen around the point of attachment to the petiole.
Photo by Hans Denis Schneider

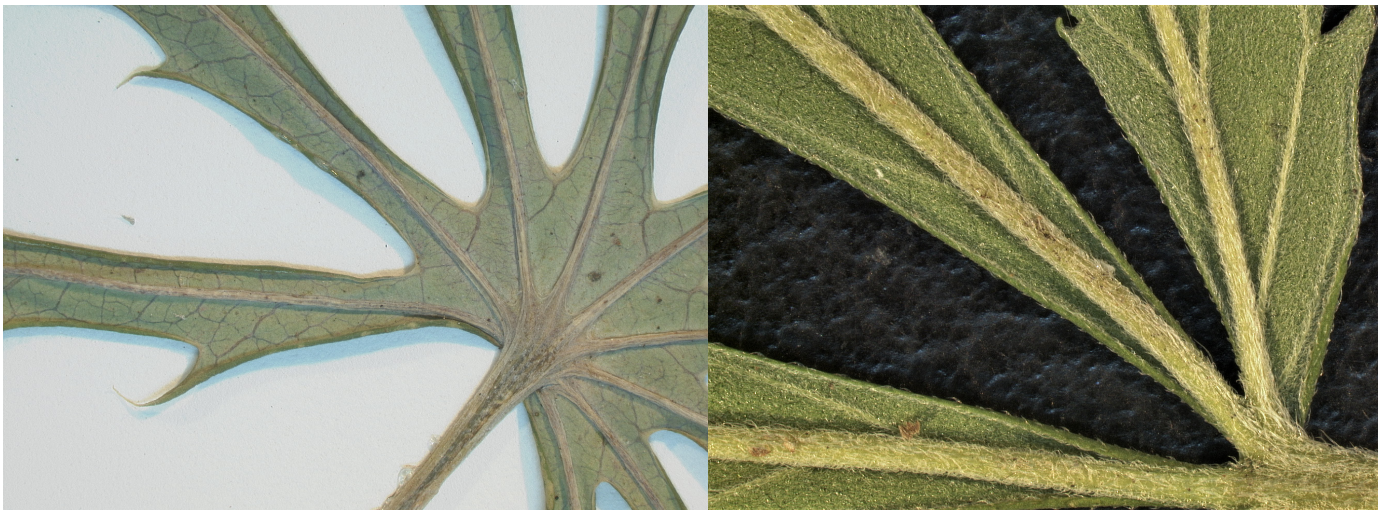


Figure 23. *Jatropha multifida* (coralbush), underside of leaf. Note the absence of hairs and the presence of leaf tissue between leaf lobes (left). Compare with *Cannabis sativa* (hemp), leaf underside (right).
Photos by Patti Anderson, FDACS-DPI

***Manihot esculenta* Crantz**, cassava, from a genus of about 60 species in the plant family Euphorbiaceae.

Manihot esculenta is a perennial suffrutescent herb or shrub native to tropical America that grows to 3 m tall. In Florida, it has escaped from cultivation and can be found in disturbed sites in Hillsborough, Martin and Miami-Dade counties and the Florida Keys of Monroe County. Like many members of the Euphorbiaceae, this species exudes a viscous, white latex from all parts of the plant when damaged. The roots are thickened into storage organs. The branches are erect, red or green and hairless (glabrous) with conspicuously swollen nodes (the points along the stem where leaves are attached). The leaves are alternate, petiolate and deeply three to ten lobed (but sometimes undivided). The leaves have entire margins and glabrous surfaces (Fig. 24). The flowers are unisexual (male or female), and both types occur on the same individual plant (monoecious). The inflorescence is a branched cluster (racemiform cyme) with the female (carpellate) flowers below and the male (staminate) flowers above. The staminate flowers are composed of five ovate, yellow, green or purple petaloid sepals; no petals and 10 stamens. The carpellate flowers are composed of five oblong-lanceolate, yellow, green or purple, petaloid sepals; no petals and three united carpels with the styles fused at the base. The fruit is a wrinkled and winged capsule, splitting open at maturity to expose three compressed, brown-mottled seeds. *Manihot esculenta* has been widely cultivated worldwide in the tropics since pre-Columbian times for the enlarged storage roots which yield a starchy staple food. Multiple cultivars of this species are grown for food, and a form with variegated leaves is sometimes cultivated as an ornamental (Fig. 25).

The leaves of *Manihot esculenta* are similar to those of hemp (*Cannabis sativa*), but the leaves of *C. sativa* are divided into separate leaflets, while the leaves of *M. esculenta* are lobed, <u>not</u> divided. The leaves of *M. esculenta* are simple but deeply three to 10 lobed and the leaf margins have no teeth (entire margins). The leaves of *C. sativa* are palmately compound with three to nine leaflets with toothed (serrate) margins (Fig. 26). Also, *M. esculenta* exudes a viscous, white latex when damaged and *C. sativa* does not. Although the flowers of both species lack petals, the sepals of *M. esculenta* are petaloid, colorful and conspicuous, while the sepals of *C. sativa* are green-white and inconspicuous. (Hayden, 2016; Wunderlin and Hansen, 2015.)

Figure 24. *Manihot esculenta* (cassava), leaves.
Photo from Shutterstock

Figure 25. *Manihot esculenta* (cassava), variegated ornamental form.
Photo from Shutterstock

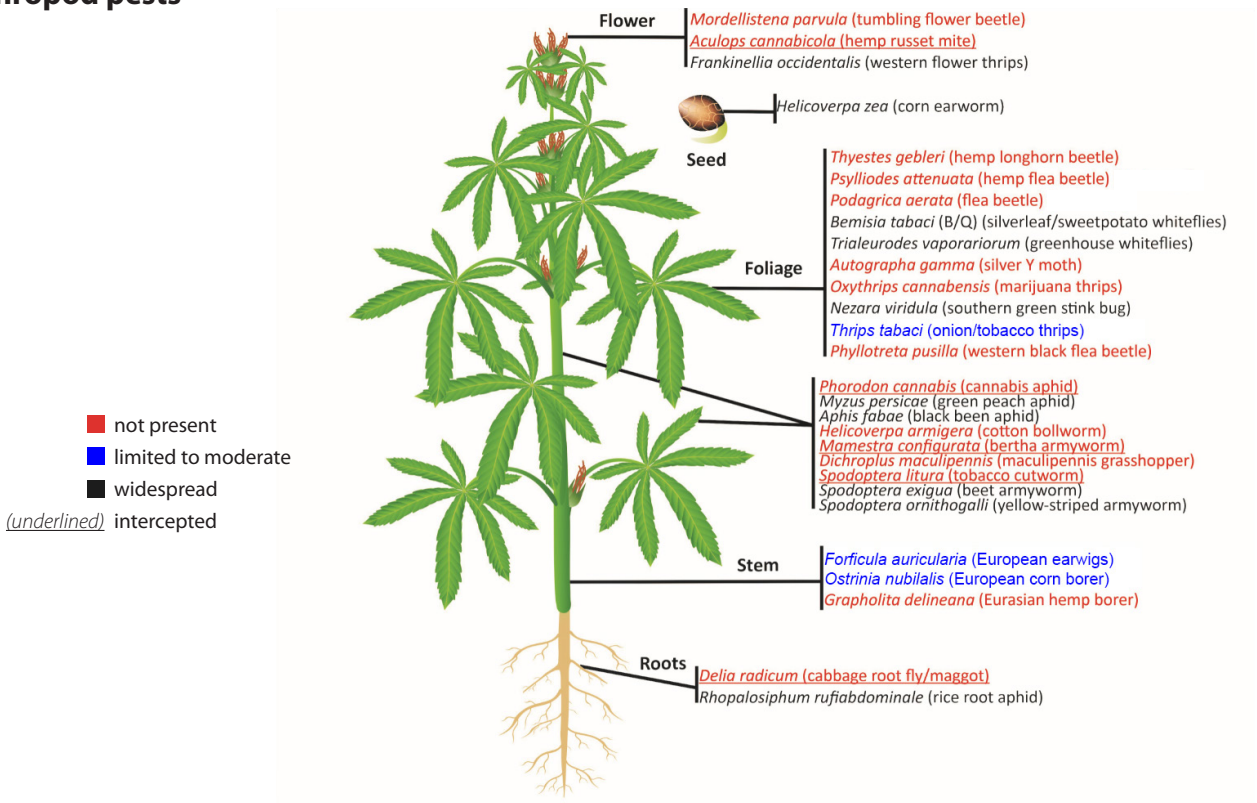
Figure 26. *Manihot esculenta* (cassava), underside of leaves. Note the absence of hairs and the presence of leaf tissue between leaf lobes (left). Compare with *Cannabis sativa* (hemp), leaf underside (right).
Photos by Patti Anderson, FDACS-DPI

The following table provides a comparison of the plant characteristics useful in identifying the species discussed above. In addition, there are lists of pests and diseases of hemp and references for more information.

Comparison Chart of Plant Characteristics

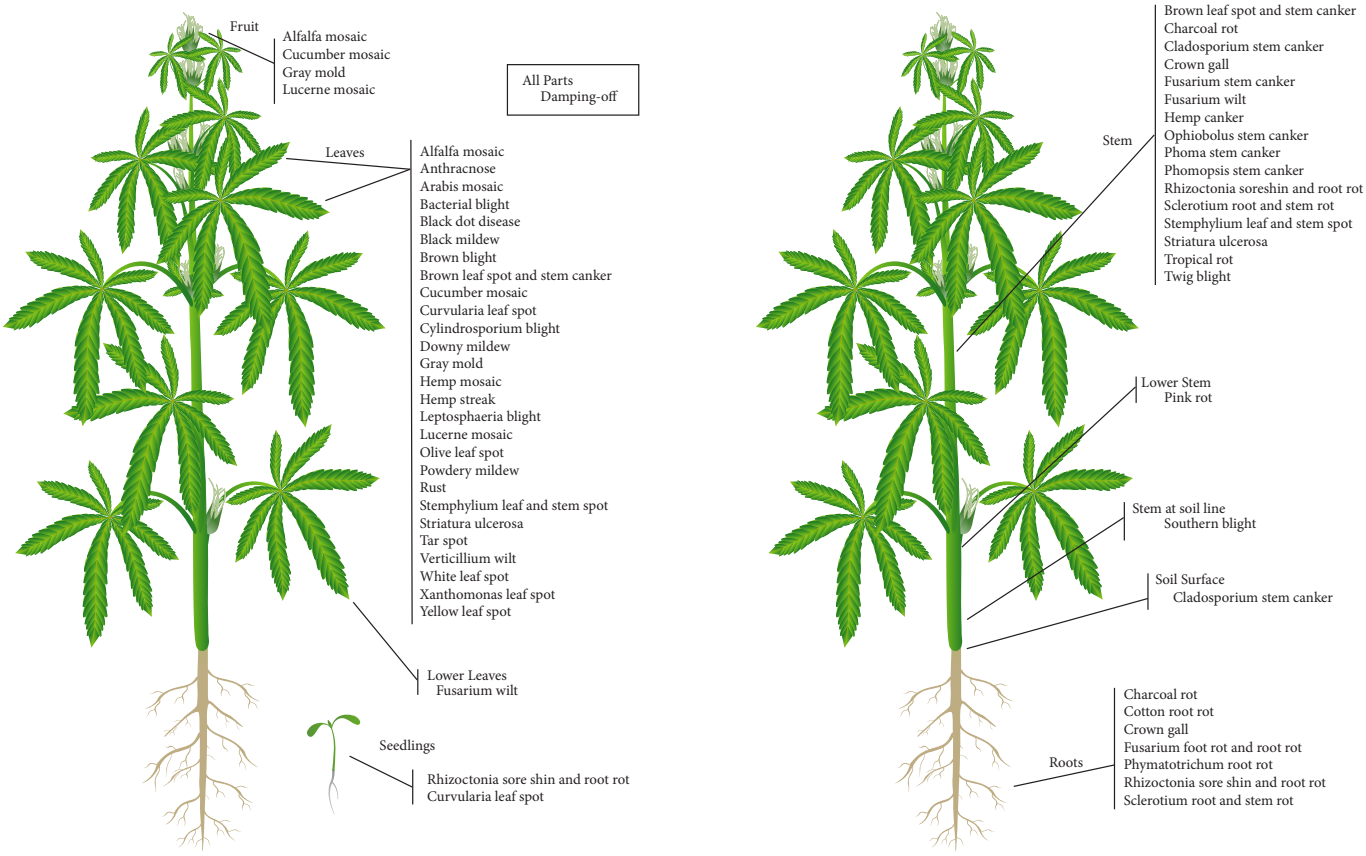
Latin name	Common name	Leaf structure compound/ simple	Leaf margin serrate/entire	Leaf surface upper (adaxial)	Leaf surface lower (abaxial)	Stem	Odor of crushed leaves	Other
Cannabis sativa	hemp	palmately compound	serrate	rough to the touch, bulb-based hairs	resin dotted	sharp, straight hairs	strong, rank	
Abelmoschus esculentus	okra	palmately lobed (slightly to deeply)	coarsely to sparsely serrate/ dentate	glabrate to setose	glabrate to setose	green; some mottled red		
Acer palmatum	Japanese maple	palmately lobed	finely serrate	glabrous	tufts of hairs in vein axils	becoming woody with age		
Cleome hassleriana	cleome	palmately compound	finely serrate/ dentate	glandular	glandular pubescent	glandular pubescent	strong, rank	scattered prickles
Hibiscus cannabinus	kenaf	lower leaves heart-shaped; upper, palmately lobed	serrate	glabrous	glabrous	glabrous to sparsely spiny		
Jatropha multifida	coral plant	palmately lobed	incised	glabrous	glabrous	becoming woody with age		viscous white latex
Manihot esculenta	cassava	palmately lobed	entire to slightly wavy	glabrous	glabrous	nodes swollen		viscous white latex

Arthropod pests



Arthropod pests of hemp.
Illustration by Muhammad Z. 'Zee' Ahmed, FDACS-DPI

Diseases of Hemp



These diseases of hemp have been found on hemp plants, but not necessarily in Florida.
Illustration by Alexandra Giang, FDACS-DPI

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