



## **Backyard Sugarcane<sup>1</sup>**

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### **Introduction**

Sugarcane is a tropical perennial grass, belonging to the genus *Saccharum*. Although sugarcane thrives in humid temperatures, between 70 and 95°F, sugarcane can be grown in many areas of the southern United States.

Sugarcane is vegetatively propagated by means of "seed-cane," a section of a mature cane stalk with one or more buds (or "bud-eyes"). Following harvest, sugarcane re-sprouts from underground buds located on basal (bottom or lower) portions of old stalks. This process is called "ratooning". Depending on variety and growing conditions, a stalk weighing 2 - 4 pounds with 11 - 12 percent sugar will be produced in about 12 - 14 months from an original planting or in 11 - 12 months from a ratoon re-growth.

If soil temperatures are cold, initial shoots from the ratoon may not sprout above ground before March. In these colder growing environments, ratoon crops will likely have shorter growing seasons, 8 - 9 months.

### **Types**

For the purposes of this publication, sugarcane varieties can be placed into one of three categories according to their physical and chemical characteristics - chewing canes, crystal canes or syrup canes.

Chewing canes are generally softer and contain fibers that stick together when chewed, making it easier to spit out the pulp once the sugary juice has been consumed. Many chewing canes are also used for syrup production.

Crystal canes (typically commercial varieties) must contain a high percentage of sucrose since this is the sugar molecule that easily forms into crystals when concentrated during a heating and evaporation process.

Syrup canes contain less sucrose than crystal canes, but have additional kinds of sugar molecules that are not as readily crystallized, so when the juice

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is concentrated into syrup, there is a lower likelihood of crystallization as compared with a crystal or commercial cane.

"Backyard sugarcane" for hobby production is grown on farms ranging from a fraction of an acre to 1 or 2 acres and usually consists of either chewing varieties or syrup varieties. Most sugarcane for syrup production is grown in Georgia, Alabama, Mississippi, Louisiana, and North Florida, a region that is known as the "Sugarcane Syrup Belt".

## Varieties

Many old-named sugarcane varieties are still available, but often only from local sources, having been preserved by farmers or hobbyists. Good sources of seed-cane are the Classified Ads section of the *Market Bulletin* published by the Florida Department of Agriculture and Consumer Services, as well as farmer's markets and fruit/vegetable stands -- which often sell stalks of locally grown sugarcane in the fall of the year -- and various Web sites dedicated to the hobby of growing these older varieties of sugarcane.

The University of Florida/Institute of Food and Agricultural Sciences Gadsden County Extension Office manages sugarcane seed plots at the UF/IFAS North Florida Research and Education Center in Quincy, FL, (telephone 850-875-7255).

**Popular sugarcane varieties include the following:**

**Chewing Canes:** Yellow Gal (F31-407); CP57-603; NG57-258; White Transparent; Georgia Red; CP31-511; Home Green.

**Crystal Canes:** Any commercial variety from South Florida or Louisiana.

**Syrup Canes:** CP36-111; CP52-48; CP67-500; Louisiana Ribbon; Louisiana Purple; Louisiana Striped; POJ2878; Cayana; POJ 213; Green German; CP29-116.

Some of these varieties are interchangeable. As a result, some chewing canes may produce reasonably good syrups while some crystal canes may be considered satisfactory for a chewing cane.

Over time, the productivity of some varieties will naturally decline, succumbing to disease and other pressures, which in turn leads to declining popularity and fewer new plantings. For example, historical literature and lore attest to the popularity of Louisiana Ribbon, Louisiana Purple, and Louisiana Striped. However, these varieties are currently exceedingly difficult, if not impossible, to find.

At some point, a sugarcane variety may be lost altogether when seed-cane of that variety is no longer available. Ironically, some varieties get "lost" through a gradual change of names, when over time the variety becomes popularly recognized under a new name and no longer directly associated with its old name.

In selecting a sugarcane variety for backyard production, keep in mind that all varieties do not grow well in all locations. It will take some experimentation to determine which varieties are best suited for a particular growing environment.

## Site Selection

Avoid planting sugarcane along the edges of high-traffic sidewalks or pathways. Sharp-edged sugarcane leaves can injure pedestrians. Keep in mind, too, that some sugarcane varieties are prone to fall over (lodge) when mature and can, as a result, block sidewalks and pathways.

A well-drained, sunny location is desirable; the more sun the better. Sugarcane planted in partially shaded areas (such as near buildings, walls, or tall trees) will have reduced growth potential.

Additionally, periods of stress - such as too much or too little moisture, extended periods with temperatures below 70°F, and soil fertility and pH extremes (optimum range being pH 5.5-6.5) - will result in shorter inter-nodes and reduced growth.

Sugarcane produces an extensive root system. For this reason, soil should be thoroughly tilled and well worked in the area under as well as surrounding the seed-piece planting site. During the first three weeks after planting, flooded conditions can kill germinating buds and new shoots, so make sure good drainage is available if conditions require it.

Sugarcane can be planted to form natural windbreaks that surround your garden as a protective barrier. In many countries, vegetable and/or nitrogen-fixing leguminous crops are planted between the rows of newly planted sugarcane. Due to their shorter growing season, these intercrops can be grown and harvested before the sugarcane gets tall enough to shade them out.

## Planting Material

Sugarcane varieties throughout the world are actually different versions of a multi-species hybrid. For this reason, variety characteristics are not genetically captured in sugarcane seeds, and sugarcane does not breed true from seeds. Instead, variety characteristics are preserved through vegetative propagation, by re-planting part of the original sugarcane plant.

From this perspective, sugarcane varieties are considered clones from an original mother plant. In laboratory settings, tissue culturing is used to produce plants genetically similar to a mother plant. In a field scenario, mature sugarcane stalks (with viable buds) are obtained from a variety/clone of interest. When this seed stalk is planted, the emerging plants will be genetically identical to the mother plant.

Backyard sugarcane hobbyists generally obtain cane stalks from desirable clones they already have, or they get the stalks from another willing grower who has the desirable variety/clone. Sugarcane that is vegetatively propagated will retain the characteristics of the mother plant and likely will not alter (in any genetic sense) over time.

Sugarcane stalks are segmented about every 6 inches by nodes. At each node is a potential growing point - the bud or "bud-eye". On adjacent nodes buds are located on opposite sides of the stalk.

At planting, cut each stalk into 2 - 3 foot sections ("seed-pieces" or "billetts"). To ensure that a few buds survive the stresses of the planting environment, aim for seed-pieces that have around six buds. Keep in mind that cutting long stalks into shorter seed-pieces actually improves bud germination along the shorter seed-piece.

Planting whole stalks is not recommended because of "apical dominance," a process in which buds closest to the cut ends tend to get activated while interior buds might not get activated. Thus, cutting longer stalks into shorter, 6-bud seed pieces will improve overall plant populations. Single-node pieces, which contain a single bud, can be planted in pots or trays and later transplanted at the target site.

## Storing Planting Material

Freshly cut stalks can be stored under cool, moist conditions for two weeks prior to planting. For storage longer than two weeks, dipping the seed-piece ends in hot paraffin will help protect the inner stalk from drying out. Shorter lengths of stalk can be stored in a plastic bag in a refrigerator whose temperature doesn't drop below freezing. Longer stalks can be "stored" (buried) in the ground to over-winter, followed by planting in the spring in the desired location.

## Planting

To ensure adequate development of underground portions of the sugarcane plant prior to a killing frost, planting in North Florida should occur in the period from mid-August through mid-September. Another option in this region is to plant after mid-November, so buds remain dormant during the winter, followed by germination in the spring.

Sugarcane can be planted as a single row (a typical configuration for windbreaks) or in multiple, parallel rows with a distance of from 4 - 10 feet between the rows. (Keep in mind, however, that when crop rows are spaced widely apart, the likelihood of weed growth increases as shade decreases between the rows of sugarcane plants.) In loam or clay-loam soils, dig a furrow 3 - 7 inches in depth. Dig a slightly deeper furrow in sand or in highly organic soils.

The amount of fertilizer to use for optimum growth will vary, depending on soil type, rainfall, sunshine, crop history, etc. To obtain reliable fertilizer recommendations appropriate for your growing environment, submit soil samples to a soil-testing lab that offers a calibrated soil-test. (See EDIS Publication SL129, *UF/IFAS Standardized*

*Fertilization Recommendations for Agronomic Crops,* [http://edis.ifas.ufl.edu/SS163\).](http://edis.ifas.ufl.edu/SS163)

A common practice for small plots is to loosely spread 1 pound of 8-8-8 fertilizer (or its equivalent) per ten feet of furrow. Given a row spacing of 5 feet, this application rate provides the equivalent of roughly 70 pounds per acre of the macro-nutrients nitrogen, phosphorous (as  $P_2O_5$ ) and potassium (as  $K_2O$ ).

Supplemental applications of nitrogen and potassium could be required during the 12-to-15 month growing season for a plant-cane crop. Keep in mind, however, that fertilizers applied after mid-July can lead to delayed maturity and decreased sugar content in sugarcane stalks harvested in early November.

Ideally, cover the fertilizer with 1-to-2 inches of soil and then lay the sugarcane seed pieces down lengthwise in the furrow. To prevent vacant areas - "skips," which are caused by uneven bud germination, a single row should be planted with two pieces of cane placed side by side, lapping the end of one piece with the middle of the neighboring piece. Cover the seed cane with loosely packed soil to a depth of 2 - 5 inches. It does not matter whether buds along the stalk are positioned downwards; the emerging shoot will naturally make its way to the surface.

## Early Care

Keep the soil slightly moist, but not wet. The early growth period of sugarcane is particularly sensitive to excessive moisture. Within 1-to-3 weeks, depending on soil temperatures, new shoots should emerge through the soil. The sugarcane crop that grows from the planted seed-cane during the first year is called the plant-cane crop.

As the shoots elongate, gradually add soil to the furrow until the furrow becomes slightly elevated. Hoeing or tilling the inter-row spaces for weed control will naturally build-up the furrow. A built-up furrow encourages earlier shoot growth and provides a method of early weed control directly around the emerging shoots.

New leaves emerging from the soil are susceptible to frost damage. However, it takes several weeks for the most vulnerable part of the shoot, the meristem (or growing point), to emerge from the soil. This normally occurring delay in meristem emergence means that early frost damage is usually not fatal since the buried and undamaged meristem will continue to produce new leaf tissue. Meristems are probably emerged by the time the leaves are 18 - 36 inches tall, at which time the vulnerable meristem can be severely injured by a frost. Once the shoots are 6 - 8 inches tall, they can tolerate standing water for short periods of time.

## Formation of the Stool

As the new shoot grows, buds form at each stalk joint (node), with buds on adjacent nodes located on opposite sides of the stalks. After several weeks, these newly formed buds (still located 3 - 7 inches underground) will sprout, forming secondary shoots. These shoots in turn will form buds that produce tertiary shoots. These secondary and tertiary shoots are called tillers, and the primary shoot plus all of the tillers are called the stool.

The tendency to form tillers is variety specific and varies from few to many tillers. However, many growers believe that scratching or cultivating the soil around the young tillers will lead to increased tillering. Although anecdotal evidence supports this assertion, this practice will not likely have the same outcome across all varieties and growing environments.

Sugarcane is a multi-year crop, and the harvested stool is the site for next year's re-growth. New primary shoots emerge each year from the basal (bottom or lower) buds on stools that remain from last year's growth. Over time, this growth and re-growth pattern gradually elevates the crown of the stool and expands the stool's circumference.

While the stool typically gets bigger over time, the combined effects of winter and mechanical damage lead to declining basal-bud viability. Eventually, stalk production declines, so expect to replant every 5 - 10 years for good ratooning varieties. Keep in mind, however, that some sugarcane varieties are infamous for their inability to

“ratoon;” such varieties have to be replanted more often.

## Pest Management

In sugarcane, weeds are controlled by hand weeding, cultivation, mulching or chemical control. (Although EDIS Publication SSAGR09, *Weed Management in Sugarcane*, was written with South Florida commercial sugarcane in mind, this publication -- available on the Web at <http://edis.ifas.ufl.edu/WG004> -- may also be of interest for those cultivating sugarcane at home.)

Additionally, sugarcane varieties are bred to be resistant to common plant diseases. Nonetheless, proper phyto-sanitary procedures - such as disinfecting garden tools and harvesting equipment - should be followed to avoid the spread of these diseases. Unfortunately, no fungicides on the market are specifically designed to control disease pathogens that infect backyard or heirloom sugarcane varieties.

Insect pests of sugarcane include soil-inhabiting wireworms and grubs, a stalk borer, mealy bugs, termites and aphids. Generally, chemical control of insects is not recommended since many pests are adequately controlled by natural predators, parasites, and/or changing seasonal conditions. Additionally, sugarcane growth is so rapid that the plant can typically tolerate considerable insect infestation and still produce a satisfactory crop.

If the decision is made to apply a chemical pesticide, be sure that the pesticide is legally labeled for your application situation, and be careful to strictly follow all label instructions and precautions. Although the following EDIS publications were written with South Florida commercial sugarcane in mind, these articles may also be of interest for those growing sugarcane at home – *Miscellaneous Insect Pests of Florida Sugarcane*, available on the Web at <http://edis.ifas.ufl.edu/SC014>, and *Insect Management in Sugarcane*, available on the Web at <http://edis.ifas.ufl.edu/IG065>.)

Rodents and rabbits are often the most serious pests that backyard sugarcane enthusiasts encounter. To some extent, these large pests can be managed by installing physical barriers.

## Harvesting

Given a reasonable planting date the preceding year, sugarcane will be ready for harvest anytime after November 1, but keep an eye on the weather since you'll want to harvest before a killing freeze. Keep in mind, too, that harvesting too early reduces current yields and increases the potential for winter injury since young re-growth is vulnerable.

Using a sharp knife or lopping shears, cut the mature stalks as close to the ground as possible. Typically, sugar concentration is highest in the basal (bottom or lower) portion of the stalk. Trim off the green, upper portion of the stalk that lacks sugar-accumulating nodes. Next, either squeeze/crush the stalks for juice collection or cut the stalks into smaller pieces for chewing enjoyment.

## Over-Wintering

Once the plant-cane has been harvested, some thought must be given to the care of the stubble (remnants of the plant cane) over the winter. Some sugarcane growers in North Florida, after trimming each row of sugarcane stubble close to the ground with a rotary mower, will place a small mound of soil over the row for protection against excessively cold weather. On the other hand, scientists at the UF/IFAS North Florida Research and Education Center (Quincy) do not mound-up their sugarcane rows, and these scientists report no significant winter-injury.

Re-growth in the spring, called the stubble or ratoon crop, will emerge through the soil in 1 - 3 months in response to warmer soil temperatures. Fertilize the ratoon stubble crop once re-growth has begun. Apply nutrients at the same rate as applied to the plant crop. Sprinkle the fertilizer over the top of the stubble row or apply as a side-dress.

These guidelines should help you to enjoy many years of trouble-free cane production for syrup or chewing.