

Sweet Sorghum

This once-popular sweetener is finding its way back to our tables

by Hazel Freeman

Sorghum syrup is experiencing a welcome comeback. Once a common sweetener enjoyed by Southerners and some Midwesterners, sorghum went out of style by the early to mid-1900s when cheaper, easily accessible refined sugar became available. In recent years, its popularity is on the rise, in part due to those interested in producing more of their own food.

Sorghum has a lot going for it. It can be grown where there's a reasonably long growing season. For home use

it can be grown on a small acreage. It tolerates drought and heat better than corn and grows in less than ideal soil conditions. The sweet syrup has a complex, rich flavor and can be eaten as is or substituted for other sweeteners in cooking and baking. Sorghum syrup has also been shown to have healthful antioxidant qualities as well as iron, calcium, potassium, magnesium, protein and other nutrients. The demand for more natural sweeteners is another reason sorghum is becoming more popular.

Kentucky and Tennessee are the leaders in sweet sorghum production here in the U.S. They are part of



Sorghum in the field with seed heads and leaves removed.

Photo by Hazel Freeman



A mule provides the power to a sorghum press.

Rural Heritage Photo

a total of about eight southeastern and Midwest states that produce 90 percent of the sweet sorghum marketed. The number of acres under cultivation for different varieties and uses of sorghum are growing. Sorghum is once again being considered as a potential cash crop. In addition to the varieties that produce syrup, other varieties can be grown for grain or livestock forage, and some show potential as a biofuel. This article focuses on the production of sorghum for syrup.

What is sorghum?

Sorghum is a type of grass believed to have originated in northern Africa. Some might be familiar with grain crops such as millet, milo or maize. These grain types of sorghum are still a predominant source of both human and livestock food in Asia and Africa. Often eaten as couscous, ground into flours for breads and used as cereal grains, sorghum is a staple food to millions of people around the world. It's also used in the production of alcoholic beverages. Here in the United States, it's the third largest cereal crop.

Sorghum syrup may sometimes be referred to as "sorghum molasses." Pure sorghum and molasses are not the same things. Molasses is a by-product of the sugar cane industry and the making of sugar. Sorghum syrup is produced from 100 percent juice from the sweet sorghum plant.

Sweet sorghum grown for syrup looks similar to corn but can reach 10-plus feet tall. When mature, canes are



A close look at at a sorghum press at work.

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stripped of their leaves and seed heads and crushed, releasing the sweet juice, which is then boiled down into syrup. It takes about 8-10 gallons of juice to make one gallon of syrup.

Sorghum has unique features that help it tolerate dry periods and promote self pollination. As it grows it's covered with a heavy white wax called "bloom." This



Sorghum juice is filtered and captured into buckets as it pours out of the press. *Hazel Freeman Photo*

protective coating provides a shield against water loss during hot, dry conditions. Sorghum may stop growing during severe dry periods. Unlike corn, it doesn't usually wilt, although it may fold its leaves to further reduce water loss. Once moisture returns it starts growing again. Sorghum also carries both the male and female flowers in the inflorescence at the top of the plant, increasing its ability to self-pollinate. This usually results in a high percentage of pollination for seed production.

Where to begin

Making sorghum syrup is a lost art finding new interest. It does require some know-how to produce satisfactory syrup you'll want in your kitchen. Before growing sorghum, consider the length of your growing season. Sorghum is a heat-loving, warm-season crop. To germinate properly, the soil must be 65 degrees Fahrenheit or above, two to four inches deep. Once the soil is warm enough for planting you must have a long enough growing season remaining for the crop to mature.

Once germinated, the crop needs 90-120 days, depending on variety, of heat prior to the first killing frost. Shorter-season or longer-season varieties can be selected to suit the length of growing season. As with any crop, factors such as: variety grown, diseases, insects, weeds, soil type, weather conditions and final processing can all affect the quality of the end product. Older varieties are more susceptible to some diseases. Because of its extreme height, sorghum can be prone to lodging, or blowing over in high winds. Some seed varieties stand up better to wind than others.

Sorghum can be planted in a wide range of soil types. Like most crops, it grows best in fertile soil with adequate nutrients and enough moisture. Fertile soil that drains well should produce sorghum. Sorghum is similar to corn in its need for higher nitrogen to support its vigorous growth habit. The seed can be sensitive to fertilizer, so any fertilizer applied should be tilled or disked in below the planting depth of the seed prior to planting. Sorghum prefers a pH of 6.0 or higher.

Another important consideration before growing a sorghum crop for syrup is availability of equipment for processing. You don't want to grow a crop and have no way to turn it into syrup. Sorghum canes must be crushed and pressed to release the sweet juice and then the juice cooked down. This is done using a sorghum mill or press and a cooking pan or evaporator. These may not be readily available in your area and may require some hunting to find.

With the interest in sorghum growing, there are more small-scale sorghum processors that may come to your location to press and cook your sorghum. For first-timers it's best to have a mentor help you with your first crop. Make sure you have a commitment from the processor prior to growing your sorghum crop. Some communities organize a sorghum milling day or two where neighboring growers can all plan to have their sorghum processed at the same time.

Planting

Once a seed variety is selected to suit the length of growing season, determine the optimum planting dates for your area to ensure the crop reaches maturity prior to frost. Checking soil temperature will help you decide



One type of setup for cooking sorghum. *Hazel Freeman Photo*

exactly when the soil is warm enough to plant. In most states with a growing season adequate for sorghum, mid-May is usually when the soil temperature reaches 65 degrees. For growing zones further north, planting may have to wait until early June. Planting in warm soil gives the seedlings a quick start and increases their chances of getting ahead of weeds.

Prepare the seed bed as if planting for corn and incorporate any fertilizer below the seed planting depth. Space rows wide enough to allow for weeding, anywhere from 24 to 40 inches apart. Plant three to four seeds per linear foot, with the goal of two to three plants per foot. Planting seeds too thick will result in a stand of spindly canes. It's more desirable to have larger canes that produce more juice. Plant seeds about one inch deep in medium to heavy soil and 1½ to 2 inches deep in light sandy soil. A half-pound of seed should plant six 100-foot rows. These six rows, under good growing conditions, should produce about 50 gallons of juice, which should cook down into four to five gallons of sorghum syrup. For one acre, plant 10 to 15 pounds per acre.

Watch it grow

If the seedlings get a head start on weeds, the crop may only require minimal weeding. Avoid deep cultivation once the plants get some size as this can cut off the spreading root system. Sorghum produces its own weed suppressant in a chemical called sorgoleone. Sorghum, like most plants, has an array of insect pests that can decrease yields. In most cases, when growing for home use these pests don't do significant damage.

Lodging, where the tall plants fall over, usually due to high winds and driving rain, is a possibility. Often the plants turn back upwards even though they won't stand straight and tall again. This shouldn't interfere with hand harvesting of the crop. Birds are usually not a problem with sweet sorghum varieties. The dark red sweet sorghum seeds are higher in tannin, which gives them a bitter taste. The lighter seeds of grain-type sorghum are more attractive to birds.

By late summer, seed heads form and begin to turn reddish in color. Maturing seed heads signal the time for syrup production is near. As seeds turn darker brown or red they can be checked for the proper ripeness, or "milk" stage, by squeezing a seed kernel between your finger and thumb. When squeezed, a milky fluid will be released from the seed. The cane itself can also be tasted for sweetness. The milk stage signals the canes are



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Here an open flat pan is used to cook the sorghum juice down. *Hazel Freeman Photo*

near their maximum level of sweetness and should be harvested for pressing within the next couple of weeks. Mature seed heads are a good indication the canes are ready to harvest.

Harvest

Harvest before a killing frost if possible; if not, harvest immediately after the freeze. If it's not possible to harvest prior to a freeze, strip leaves off prior to the freeze to lessen the damage to the canes. Some growers remove the seed heads at the milk stage and let the canes stand for another 2-3 weeks. Other growers wait until the seed heads are mature and remove the seed heads a few days prior to or at the same time of cutting the canes. When mature, dried seed heads can be saved for next year's seed. Cut canes stored for more than about seven days and canes subjected to a freeze will produce less syrup.

Canes can be processed in two ways, remove the leaves prior to harvest, or let the leaves remain on the canes. If leaves are left on, drying time should be allowed. Pressing sorghum with green leaves attached can contribute a bitter taste to the syrup. For small-scale operations, it's relatively easy to remove the leaves a few days prior to cutting the cane.

During the week or two prior to harvest, strip the leaves from the canes using yardsticks or sturdy sticks. Walk along the rows and whack the leaves off where they attach to the cane. Two people working in opposite directions can remove leaves quickly. Due to their brittleness they break off easily. If you choose to let the leaves remain on the canes, cut and shock the canes, and allow at least a week of drying time.

A few days prior to, and up to the day of pressing, canes should be cut off just above the ground. Use a machete, scythe or some sharp implement. A weedeater with a steel blade works well. Have wagons, trailers or truck beds available to stack bundles of cane, making sure the canes all face in the same direction. It's easier if the pressing and boiling operation can take place in the same locale as the crop being harvested to reduce the amount of hauling and moving of the canes.

Press – Cook – Bottle

Plan an entire day to press, cook and bottle the syrup. Mill and cooking pan should be in place the day before and ready to go the day of pressing. Plenty of dry wood needs to be on hand to fire the pan for the day. Presses in the past were operated with animal power. Some processors still uses horses, or draft animals to power



Sorghum cooking in the pan. *Hazel Freeman Photo*



Bagasse, the crushed canes leftover from the process, are used as compost on garden beds. *Hazel Freeman Photo*

their presses. For those who don't have animal power, a riding lawn mower works well. Buckets and strainers for catching and filtering the juice should be on hand as well as food grade storage containers to hold filtered juice prior to it going into the cooking pan. Talk with your processor in advance of pressing day to make sure you have everything needed.

The actual cooking down of the juice takes someone who has experience. Similar to making maple syrup, there are things that can go wrong if you don't know what you're doing. Better to have an experienced syrup maker on hand than ruin your syrup and possibly your pan. If you can't find someone who has made sorghum before, refer to the Additional Resources sidebar where you can find resources with additional information and details about the process. You may also be able to

Sorghum Varieties

When selecting a variety, consider the length of growing season for your area and choose a variety suited for syrup. This is just a sample of seed varieties available. For seed sources visit: National Sweet Sorghum Producers & Processors Association: <http://nssppa.org/>. Some seed catalogs also carry sorghum seed.

Dale – About 120 days. Late season variety with good disease resistance. Upright growth resists lodging. Produces high-yields of juice.

Della – About 114 days. A mid-season, disease resistance variety.

Sugar Drip – 110 days. An early variety that produces mild, high quality, light amber syrup. It is more susceptible to sorghum diseases.

Black Amber – 99 days. An heirloom variety, with black seeds.

Rox Orange – 100 to 110 days. Can be grown for forage and syrup. Resists lodging. R.H. Shumway carries this variety in larger quantities. <http://www.rhshumway.com/>.

attend a festival where sorghum is being made to see the process in action and ask questions.

The crushed stalks left from the sorghum processing are referred to as bagasse. Some sweet sorghum growers chop, shred or ensile the bagasse and feed it to livestock. Although it's not considered a highly nutritional fodder, some livestock will eat it. Most research on feeding bagasse is done on beef and dairy cattle. Some animals

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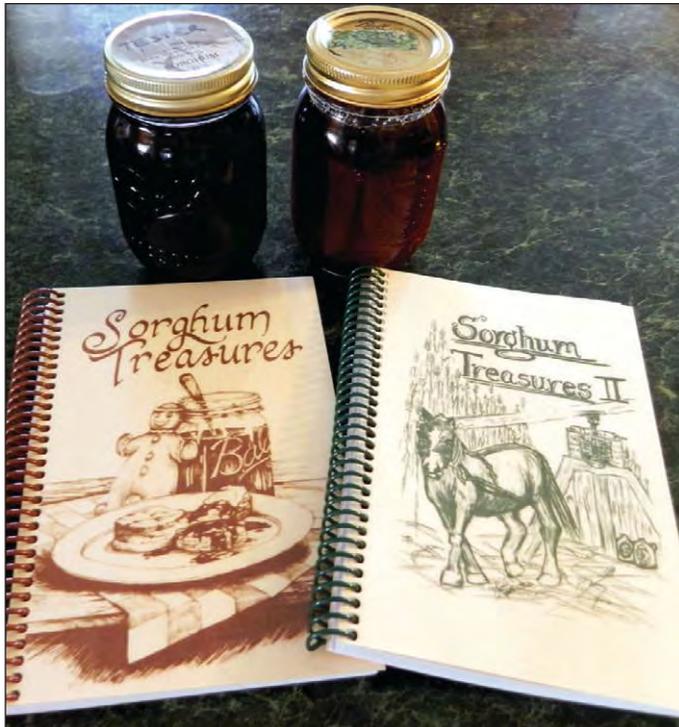
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Sorghum syrup can be used and enjoyed in many recipes. *Hazel Freeman Photo*

Sorghum Cooking Tips

Sorghum can be drizzled on biscuits or pancakes, added to baked beans, used in homemade barbecue sauce and substituted for other sweeteners in baking and cooking.

The following tips come from the National Sweet Sorghum Producers & Processors Association. This site also has nutritional information and cookbooks available for purchase.

Sorghum does not need to be refrigerated. It doesn't mold like maple syrup, but may sugar like honey does. If it turns to sugar reheat it and it returns to a liquid.

If purchasing sorghum syrup, be sure the label says 100% pure sorghum.

Due to sorghum syrups being a liquid, if using it to replace another sweetener in a recipe you may have to reduce the other liquid ingredients. It's best to replace only 50 -75 percent of the sugar in a recipe with sorghum.

might be sensitive to this type of fodder, so learn more about correct handling of bagasse prior to feeding it as fodder. A caution, when green sorghum is grazed or fed during a drought, or after a series of frosts, it may contain elevated levels of prussic acid, which can poison livestock. See the Additional Resources for more information on prussic acid.

Chopped or shredded bagasse can be added to compost piles, or returned to the field to be re-incorporated into the soil as organic matter. RH

Additional Resources

- National Sweet Sorghum Producers & Processors Association: <http://nssppa.org/>
- University of Kentucky College of Agriculture Cooperative Extension bulletin. <http://www.ca.uky.edu/agc/pubs/agr/agr122/agr122.pdf>
- The Kerr Center for Sustainable Agriculture's guidebook: *Sweet Sorghum Production and Processing*. <http://www.kerrcenter.com/publications/sorghum/sorghum.html>
- Livestock and Prussic Acid Poisoning, Ohio State Extension <http://beef.osu.edu/library/prussic.html>

Hazel Freeman lives in Woodsfield, Ohio.

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