

Sweet Sorghum for Syrup

Introduction

Sweet sorghum (*Sorghum bicolor*) is primarily grown for the sweet juice that is extracted from the plant's stalks. Stalks are crushed and the extracted juice is cooked down to a thick, sticky syrup. The syrup is sometimes incorrectly referred to as sorghum molasses.

Marketing and Market Outlook

Kentucky leads the country in sweet sorghum production; syrup produced here in 2008 was worth over \$12 million. The Commonwealth, together with its neighboring states, produces over 90 percent of the total domestic sorghum syrup output.

Growers need to find their own market outlets, whether this means locating a processor for their canes or determining market outlets for the syrup. In some cases, the syrup can be processed at a central plant that is owned by an individual, corporation, or cooperative. The majority of Kentucky growers, however, process their own syrup. Processing and production is risky without a marketing plan.

Potential syrup markets include roadside stands, on-farm sales, local retailers, and the Internet. While the market in some areas of the state has become fairly saturated, there is the potential of marketing sorghum at farmers markets in the Cincinnati and



Louisville areas, as well as those in Paducah and Hopkinsville. The big market potential, however, is in the eastern and western United States. The marketability of sorghum in such states as Texas, New Mexico, California, and Florida is currently being investigated.

Production Considerations

Cultivar selection

Producers will want to select well-adapted cultivars that contain a high percent of extractable juice and that will produce quality syrup. Good standability and resistance to the major sorghum diseases occurring in Kentucky will also be important. Cultivars will also vary in their maturity and adaptation to local growing conditions.

The University of Kentucky has recently released the first male-sterile hybrid, KN Morris. This vigorous hybrid yields 25 percent more juice than other non-hybrid cultivars, resulting in more syrup. No seed formation means the crop has better standability in windy locations and experiences less lodging.



Site selection and planting

In general, loam and sandy loam soils are best for the growth of sweet sorghum for syrup production. Most of the well-drained silt loams in Kentucky will produce excellent sweet sorghum when properly fertilized. Clayey soils usually produce poor stands, poor yields, and poor syrup. Soils high in organic matter are also thought to have a detrimental effect on syrup quality. This crop should not be grown on land following a tobacco crop; however, sweet sorghum can be successfully grown after corn or soybeans.

Sorghum tolerates drought and high temperature stress better than many crops, but it does not grow well under low temperatures. The optimum time to plant sweet sorghum in Kentucky is from May 1 to May 20 (soil temperature greater than 65° F) for the full-season varieties and before June 10 for the earlier maturing varieties. Sorghum can be direct-seeded or transplanted using the tobacco float system.

Pest management

Kentucky's major sweet sorghum diseases are leaf anthracnose, red stalk rot, and maize dwarf mosaic virus. Control of these diseases is mainly through the selection of resistant varieties and crop rotation. Insects do not usually cause a serious problem on sweet sorghum in Kentucky. There are few herbicides currently registered for use on sweet sorghum for syrup, making cultivation the best means of controlling weeds. Transplants will shade out undesirable vegetation more quickly than direct-seeded plants. Fields heavily infested with johnsongrass and bermudagrass should not be planted to sorghum.

Harvest and storage

The stalks may be harvested by hand; cut with a mower or binder and picked up; or mechanically cut with a modified silage chopper. If leaves are removed from plants prior to processing, stripping should be done while the stalks are standing. If leaves are not removed, they should be allowed to dry before squeezing the juice from the stalks.

The seed head and peduncle are removed before processing. This can be accomplished either prior to harvest with a mechanical deheader; by hand shortly after cutting the stalk down; or with a chain saw after the stalks are loaded on a wagon. Early deheading will result in a higher sugar content in the syrup. University of Kentucky research shows the best time to dehead is when the seed is in the late milk stage, about 2½ weeks prior to harvest. The head should be cut off at least below the top node. The KN Morris hybrid, which lacks seeds, does not have to be deheaded prior to processing; however, the chaff from the seedless head can plug screens as the juice is passed into the container.



Labor requirements

Preharvest labor for sorghum production is estimated at nearly 4½ hours per acre. Harvest requires approximately 60 hours per acre for hand cutting and deheading. The use of a corn binder to cut the stalks can reduce this harvest time to 25 hours per acre, while mechanical harvesting will further reduce the harvest time to less than 10 hours per acre. An additional 20 hours per acre will be needed if the canes are stripped before they are cut; however, the majority of Kentucky growers do not strip the canes.

Economic Considerations

Although the acreage in Kentucky is small, sweet sorghum constitutes a meaningful cash crop for most of its producers. Updates for changes in labor and fuel costs from University of Georgia production budgets estimate total fixed and variable costs between \$840 to \$1,000 per acre,

depending on the harvest method. Mechanized harvest of stalks using a corn binder can decrease labor harvest costs by about half.

At a price of \$15 per gallon, a yield of about 70 gallons per acre will be needed to break even for all variable and fixed costs if canes are not stripped before they are cut. The average yield for sweet sorghum is 175 gallons per acre; however, yields can go as high as 200 to 300 gallons per acre. If producers can obtain prices of \$20 to \$25 per gallon of sorghum syrup, net returns of more than \$2,500 per acre are possible at yield levels of 175 gallons and above.

Selected Resources

- Growing Organic Sorghum for Syrup (Kentucky State University, 2006)
<http://organic.kysu.edu/Sorghum.shtml>
- Kentucky Foundation Seed Project: KN Morris Hybrid Sweet Sorghum (University of Kentucky)
<http://www.ca.uky.edu/pss/index.php?p=703>
- National Sweet Sorghum Producers and Processors (NSSPPA website)
<http://www.ca.uky.edu/NSSPPA>
- Processing Sweet Sorghum for Syrup in Kentucky, AGR-123 (University of Kentucky, 2000)
<http://www.ca.uky.edu/agc/pubs/agr/agr123/agr123.htm>
- Production of Sweet Sorghum for Syrup in Kentucky, AGR-122 (University of Kentucky, 1994)
<http://www.ca.uky.edu/agc/pubs/agr/agr122/agr122.htm>

- Enterprise Budget: Sorghum (Leopold Center, Iowa State University, 2010) 1.5 MB file
<http://www.leopold.iastate.edu/sites/default/files/pubs-and-papers/2010-03-alternative-enterprise-budget-sorghum.pdf>
- Growing Sweet Sorghum for Syrup (University of Georgia)
<http://www.ces.uga.edu/Agriculture/agecon/pubs/sweetsorg.htm>
- Sorghum - for Syrup (University of Wisconsin and University of Minnesota, 1990)
<http://www.hort.purdue.edu/newcrop/afcm/syrup.html>
- Sweet Sorghum Culture and Syrup Production, ANR-0625 (Alabama Cooperative Extension, 1991)
<http://www.aces.edu/pubs/docs/A/ANR-0625/index2.tmpl>
- Sweet Sorghum Production (Kinney Family Farm, Evansville, IN)
<http://www.herculesengines.com/sorghum/default.html>

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