

Chia

Cheryl Kaiser¹ and Matt Ernst²

Introduction

Chia (*Salvia hispanica*) is an annual plant in the mint family that is grown commercially for its seeds, which are rich in omega-3 fatty acids. Chia seeds also provide an excellent source of soluble fiber and antioxidants. Until recently, chia seed production was only feasible in tropical and subtropical latitudes due to the long growing season required to complete seed development. While chia plants grow well in temperate climates, they require short days to flower and are normally killed by frost before seeds mature. Researchers at the University of Kentucky (UK) have been engaged in groundbreaking chia breeding research. This has resulted in patented varieties of long day length flowering lines of chia capable of producing seed in the Commonwealth and the Midwest. After several years of research and field trials, chia is emerging as a viable commercial crop for Kentucky growers.

Marketing

UK's new early summer lines of chia have been licensed to Heartland Chia, a producer-owned company in Franklin, Kentucky. Heartland Chia's goal is "to provide a new crop opportunity for U.S. farmers while benefiting consumers, food and feed companies with a reliable, local, traceable supply of chia."¹ Heartland Chia provides growers with non-GMO seed and production advice to grow chia, then markets the chia they produce.



CHIA PLANTS IN BLOOM (LEFT) AND SEED (RIGHT)

Market Outlook

Chia is one of the highest sources of omega-3 fatty acids known. Currently with the high demand for chia relative to supply, chia seed and seed products (such as oil) have a much higher value than canola, soy, or flax. Human consumption of omega-3 has been linked to many health benefits, including a lower risk of heart disease, cancer, and possibly stroke, as well as improved brain functions. The health foods and nutraceutical industries are currently marketing raw chia seeds as a dietary supplement, as well as incorporating the seeds into snack foods, drink mixes, and cereals; milled chia is sold for use as flour. The global market for nutraceuticals is continuing to grow due to an aging population, interest from a broader spectrum of consumers in functional foods that include ingredients like omega-3 fatty acids, and increasing interest



¹Cheryl Kaiser is a former Extension Associate with the Center for Crop Diversification.

²Matt Ernst is an independent contractor with the Department of Agricultural Economics.

and use in preventative medicine. This market is expected to grow based on current nutritional trends. Increasing awareness of the health benefits of omega-3 foods has fueled an industry that is currently unable to meet the high demand. Chia is also used in pet and livestock feeds.

Chia is a good candidate for organic production, an added benefit in selling to the health food market. Currently there is little difference between the price returns of conventionally produced chia and organic chia because of the high demand and low supply. However, as supply increases, organic chia should bring higher price premiums.

Production Considerations

Crop description

Chia is an herbaceous plant with opposite, serrated leaves approximately 1½ to 3 inches long and 1 to 2 inches wide. Also known as “lime-leaf sage,” plants reach a height of a little more than 3 feet at maturity. High planting density can result in 5- to 6-foot-tall plants. Height also depends on planting date and day length. Clusters of blue to purple to white flowers develop on spikes forming at the end of each branch. Seeds are oval and approximately 2 mm (0.08 inches) long and 1 mm (0.04 inches) wide (similar in size to red clover or alfalfa seed). The shiny seed coat varies in color from cream to charcoal gray with darker irregular markings or specks. Brown seeds result from immature chia being harvested, or early frost before complete crop maturity.

Site selection and planting

Chia is a low-maintenance crop that prefers moderately fertile, well-drained soils. While moisture is necessary for seedling establishment, this crop is highly intolerant of wet soils. Seeds are planted into a fully tilled seed bed using a standard grain drill or planter with small seed metering capability; some adjustments to this equipment may be necessary. Because of the small seed size, precision planting is important to ensure good seed-to-soil contact. Chia is planted in May or June and harvested in October in Kentucky.



CHIA PLANTING.

Cultural requirements, such as plant spacing and nutritional needs, are still being refined. Chia has a lifecycle similar to soybeans, and is harvested early enough that it is possible to double-crop chia after winter wheat.

Pest management

Neither insects nor diseases have posed a problem in Kentucky to date. Weed management is most critical during establishment; however, weeds become less of an issue once the canopy closes. Despite the fact that chia is an aggressive crop, researchers are not concerned that it could become invasive or present a problem for subsequently planted crops; most commonly used herbicides tested against chia have succeeded in killing it, and mowing or light tillage can be effective in controlling any volunteers in subsequent years.

Harvest and storage

Chia is mechanically harvested with a standard combine, using small screens similar to those used with other small seed crops (clovers, alfalfa, timothy). Unlike other grains that may be stored on-farm immediately following harvest, chia is expected to go directly to the processor/cleaning plant after harvest, once it is dry of excess moisture.

Labor requirements

Labor needs are approximately 2 to 4 hours per acre for production and harvest. Some additional time may be needed in early stages of production for proper drill (planting) setup.

Economic Considerations

Initial investments are similar to row crop production, including land preparation and purchase of seed. Production costs for chia are estimated to be less than per acre production costs for soybeans, with harvest and marketing costs similar to those costs for soybeans. The UK Department of Agricultural Economics has projected no-till soybean variable costs in 2016 as approximately \$420 per acre, with fixed costs adding about \$50 per acre. Variable expenses per acre for chia are expected to be less than soybeans. Returns to land, capital and management for chia are projected to be higher than returns for soybeans grown on the same land.

¹From the Heartland Chia website, <http://www.heartlandchia.com/non-gmo-us-grown-chia-seeds>

Selected Resources

On the Internet

- Chia — A Possible New Crop for Kentucky? In Tobacco Tech (Kentucky Tobacco Research and Development Center, 2010) 4.26 MB file <http://www.ca.uky.edu/KTRDC/T.T.Aug.2010.pdf>



CHIA SEED SIZE COMPARED TO A DIME.

- Extending the range of an ancient crop, *Salvia hispanica* L. — a new ω 3 source (University of Kentucky, 2011) <http://www.uky.edu/Ag/Agronomy/PLBC/Research/pubs/Jamboonsri-12.pdf>
- Heartland Chia <http://heartlandchia.com/>; ckummer@heartlandchia.com
- Improvement of New Oil Crops for Kentucky (University of Kentucky doctoral dissertation by Watchareewan Jamboonsri, 2010) http://uknowledge.uky.edu/gradschool_diss/120/
- Kentucky Small Grain Growers Association <http://www.kysmallgrains.org/>

In print

- Chia: Rediscovering a Forgotten Crop of the Aztecs. Ricardo Ayerza and Wayne Coates. 2005. University of Arizona Press: Tuscan. 197 pp.

Reviewed by Tim Phillips, Associate Professor, University of Kentucky

Photos by Tim Phillips (bloom, pg. 1 & planting, pg. 2) and Anthony Clark (seed, pg. 1), University of Kentucky; and Maelor Davies, Kentucky Tobacco Research and Development Center (seed, pg. 3)

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