

Chinese Chestnuts

Introduction

American chestnuts (*Castanea dentata*), once prominent in the eastern U.S. landscape, all but disappeared in the mid-1900s when chestnut blight eradicated nearly all of these popular trees. Blight resistant varieties of Chinese chestnut (*Castanea mollissima*) are a viable alternative for commercial chestnut production.

Chestnuts are low in fat compared with other nuts and are receiving attention from the health food industry. These nuts are eaten roasted, boiled, sautéed, and a few varieties (such as Qing) are consumed fresh. Chestnuts may be incorporated into various recipes, such as stuffing, vegetable dishes, casseroles, and desserts. Dried chestnuts can be ground into flour as a substitute for wheat flour or corn meal.

Marketing

The most promising outlets for chestnuts include the domestic fresh (roasting) markets, upscale restaurants, and ethnic/specialty food groceries. Chestnuts can also be used to make gluten-free chestnut flour for sale as a specialty food. Specific fresh chestnut markets include restaurants, roadside stands, on-farm markets, farmers markets, retail groceries, and specialty food retailers. A 2005 University of Missouri Center for Agroforestry survey of U.S. chestnut growers indicated that producers received the highest prices when marketing their chestnuts into the fine dining sector. While local sales are most common, many chestnut growers have also advertised their product online, selling beyond a 75-mile radius of their farm.

Chestnuts are often considered a holiday food item, so growers could take advantage of this potential market by timing



sales accordingly. Proper post-harvest handling, including cold storage and marketing the chestnuts from refrigerated containers at retail, is essential for maintaining post-harvest quality. A ready-to-use product will have more appeal to consumers. Since consumers are relatively unfamiliar with chestnuts, the producer will want to have recipes and instructions for use and handling to provide at the point of sale.

Market Outlook

Chestnuts have potential as a cash crop suitable for production on marginal land in Kentucky. Local growers who can consistently supply high quality, good tasting, and weevil-free chestnuts have the advantage of freshness over imported chestnuts that tend to be expensive and of sporadic quality. However, many U.S. consumers are unfamiliar with chestnuts since the decline of the American chestnut tree. Potential chestnut growers will need to be willing to educate and promote their crop to a new generation of consumers.

A survey of U.S. chestnut growers in 2005 indicated many producers received local prices

of more than \$3 per pound. Although there appears to be open market niches for chestnuts in many parts of the country, market channels for increased production remain to be developed. The agricultural cooperative Chestnut Growers, Inc., has in the past decade developed as a processing and marketing outlet in Michigan, allowing members access to a commercial-scale chestnut peeler for processing. Organic production also appears to be a viable niche for chestnut producers.

Production Considerations

Planting material and cultivar selection

Chestnut trees may be established from seeds, seedlings, or grafted trees. Planting grafted trees is preferred for consistency in yield, ripening, size, and quality of the nuts produced. While seedling trees are generally more readily available and less expensive to purchase, grafted trees come into bearing sooner than seedlings. Graft incompatibility can occur in some cultivars several years after planting.

There are a number of Chinese chestnut cultivars and hybrids that are well adapted to Kentucky conditions. Nut characteristics, such as size, flavor, cracking quality, and storage life can vary among varieties. It is particularly important to choose selections resistant to chestnut blight. Chinese chestnuts are self-sterile, so two or more different cultivars are required for good pollination. Refer to *Nut Tree Growing in Kentucky* (ID-77) for recommended varieties. Custom-grafted trees may have to be ordered a year in advance.

Site selection and planting

Chestnuts can be grown on land that is considered unsuitable for other crops, such as sandy or gravelly soils. Heavy, poorly drained sites should be avoided. Chestnuts prefer soils that are somewhat acidic (pH 5.5 to 6.5) and will not tolerate high pH soils. While trees are cold hardy when dormant, swelling buds are susceptible to frost damage in the spring. Do not plant in frost pockets or locations with poor air drainage.

Mature chestnuts require a final 40 feet by 40 feet spacing; however, it may take 20 or more years before trees actually fill this space. Some growers interplant chestnut seedlings at a closer spacing among grafted chestnuts. As the permanent grafted trees mature and come into full production, these filler trees are removed.

Trees are trained to a modified central leader shape, with only limited pruning needed on bearing trees. Young trees require protection against sunscald injury to their smooth bark. Supplemental watering helps promote tree growth and to reduce stress, especially in the first year. Once established, trees are relatively drought tolerant; however, irrigation will help bearing trees to produce larger nuts and improve nut fill.

Pest management

Eliminating undesirable vegetation prior to planting is essential for tree establishment. Weeds should be controlled within 3 feet of young trees. Weed control strategies include the use of herbicides and mowing between tree rows. Chestnut blight is still present in the U.S., but disease incidence may be reduced by using blight-resistant varieties. Potential insect problems include aphids, Japanese beetles, and chestnut weevil. Insecticide applications will be required annually for weevil control and as-needed to control Japanese beetles.

Young trees are very prone to damage by animal pests, such as rabbits, mice, squirrels, and deer. These pests will need to be controlled to reduce nut losses. Deer repellents and tree shelters should be used until trees are large.

Harvest and storage

The first harvest for seedling chestnuts can be expected in 5 to 6 years. Grafted trees will begin to bear within 3 years, with larger commercial yields beginning 6 to 9 years after planting.

Chestnuts are hand-picked off the ground once they have fallen from the tree. Daily harvesting is necessary to prevent the fallen nuts from drying out and to ensure that area wildlife does not steal or damage the crop. Alternatively, where deer or squirrel losses are severe, nuts in burs may be shaken from the tree and gathered close to harvest.

Harvested nuts are separated from any debris gathered at harvest and cleaned so they are free of dirt. Promptly refrigerate (32° F or slightly above) in ventilated plastic bags. Nuts should not be allowed to dry out.

Labor requirements

Based on 1,000 to 2,000 pounds produced per

acre, labor needs are approximately 80 hours for establishment in the first 2 years, 25 hours for production, 70 hours per ton for hand harvest, and 16 hours per ton for packaging and grading.

Economic Considerations

Chestnuts require 3 to 6 years for establishment before any nuts may be harvested and 10 years before yields are significant. This delay will mean a period without any cash income, presenting a significant financial and production risk. For this reason, many current chestnut growers are experimenting with the crop as a hobby or source of supplemental farm income.

Initial investments for chestnuts include land preparation, the purchase of trees, and possibly the installation of an irrigation system. Other costs may include a good sprayer, a nut shaker, cleaning equipment, a grader, and cold storage. Significant costs may be incurred protecting seedlings from animal pests. Substantial losses due to graft incompatibility may also occur.

Chestnuts require approximately \$4,500 per acre in total establishment costs, including irrigation costs, for the first 5 years of grafted tree production. The first crop from grafted trees should be harvested 3 to 5 years after planting, at which time harvest costs will become a significant portion of production costs. Establishment costs could exceed \$4,500 per acre for more intensive production systems.

Chestnut wholesale prices are about \$1.50 per pound and retail prices can be as high as \$5.00 per pound. Based on a price of \$2.50 per pound, annual returns to labor, land and management of \$1,200 to \$1,600 per acre of chestnuts could be realized after year 7.

Financial returns may increase as trees mature and produce substantially greater yields of nuts per acre. Higher prices will also generate greater profitability from chestnuts. Product quality (particularly, weevil-free nuts) and market development will be crucial for chestnut profitability.

Selected Resources

- Nut Tree Growing in Kentucky, ID-77 (University of Kentucky, 2007)
<http://www.ca.uky.edu/agc/pubs/id/id77/id77.pdf>
- Chestnut Grower's Primer (Southeast Iowa Nut Growers, 2002) 1.34 MB file
http://www.agmrc.org/media/cms/The_Chestnut_Primer_2002_90B857872BE60.pdf
- Chestnut Growers of America
<http://www.wcga.net/index.htm>
- Chestnut Growers, Inc.
<http://www.chestnutgrowersinc.com/>
- Chestnut Market Analysis — Producers' Perspective (University of Missouri Center for Agroforestry, 2005)
http://www.agmrc.org/media/cms/chestnutmarketreport_3FE47A5CA2BFC.pdf
- Chestnut Market Opportunities — Accessing Upscale Restaurant Interest in Value-Added Chestnut Products (Southeast Iowa Nut Growers Cooperative, 2002)
http://www.agmrc.org/media/cms/chestnutmarkets_DC9308E633F95.pdf
- Chestnuts (Agricultural Marketing Resource Center, 2012)
http://www.agmrc.org/commodities__products/nuts/chestnuts.cfm
- Chestnuts (University of Missouri Center for Agroforestry)
<http://www.centerforagroforestry.org/pubs/chestnutpubs.php>
- Growing Chestnut Trees (Northern Nut Growers Association, Inc., 2009)
<http://www.nutgrowing.org/faqchest.htm>
- Growing Chinese Chestnuts in Missouri (University of Missouri Center for Agroforestry, 2012) 6.74 MB file
<http://www.centerforagroforestry.org/pubs/chestnut.pdf>

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*Reviewed by John Strang, Extension Specialist (Issued 2005, Revised 2009, Revised 2012)
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