

Hybrid Hazelnuts:

An Agroforestry Opportunity



Hybrid hazelnuts offer a new agricultural opportunity — a system of woody agriculture that supplies food staples from domesticated woody perennial plants. Hazelnut plants can produce food for ready markets, lessen the use of chemicals, and reduce the loss of top soil commonly associated with the production of annual cereal grains. Once established, hazelnut plants yield delicious nuts for personal enjoyment or for commercial markets.



ARBOR DAY FARM
HAZELNUT RESEARCH FIELD

An Emerging New Crop

Hazelnuts (*Corylus* sp.), also known as filberts, are found throughout the world. Hazelnuts produce a sweet, tasty nut that can be used in confections, for oils, and in a wide range of food products.

Hazelnuts are a nutritious and high protein (19%) food. Hazel oil (79% mono-unsaturated) is an excellent cooking oil with a long shelf life. Hazels also are an excellent source of vitamins E and B₆. Meal left after oil extraction can be used as livestock feed.

The most commercially successful hazelnut species has been the European hazel (*Corylus avellana*). This species produces nuts of higher quality, larger size, and thinner shells than the two North American native species, the American hazel (*Corylus americana*) and the Beaked hazel (*Corylus cornuta*). However, the European hazel is less tolerant of cold temperatures and is susceptible to Eastern Filbert Blight. The American species grow well over a large part of the United States and Canada, tolerate varying soils and weather, are relatively pest free, and are resistant to Filbert Blight. All hazelnuts grow in clusters, each nut surrounded by a fibrous husk or involucre.

To combine the best characteristics of several hazelnut species, plant breeders have worked to crossbreed the European hazel with its two

American cousins. Research plots, like The National Arbor Day Foundation's Hazelnut Research Field at Arbor Day Farm, Nebraska, are helping scientists identify and propagate the most successful of these cold-hardy, disease-resistant hybrid shrubs. These and other research efforts have resulted in the development of superior hazelnut cultivars that may be suitable across much of the United States.



Research trials located across the Midwestern United States and Canada demonstrate the performance of hybrid hazelnuts.

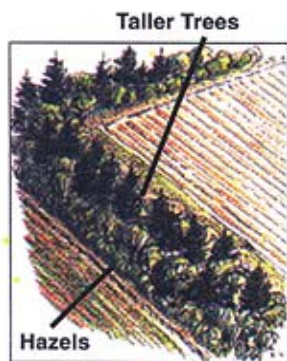
How to Grow Hybrid Hazelnuts

As an orchard

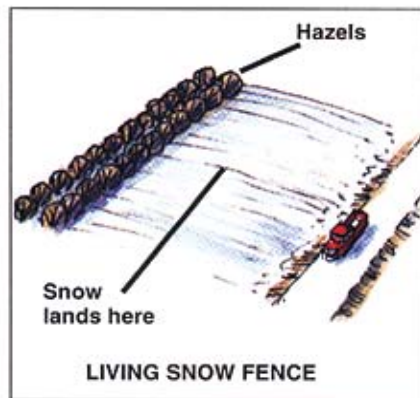
Since hybrid hazels may live for 30 years or more, it's important to choose a site well suited for their growth and care. Best nut production requires full sun, with recommended spacing of 8 feet apart within each row, and 15 feet between rows. Hazels have deep, fibrous roots and grow well in most soils. Avoid very heavy clays, shallow hardpan, and marshy soils. These shrubs dislike having overly wet roots, so make sure the soil has good drainage. Because warm days early in the season may cause premature blooming, avoid planting on land with southern exposures in regions where frost may be a problem.



HYBRID HAZELNUT BUSHES



WINDBREAK



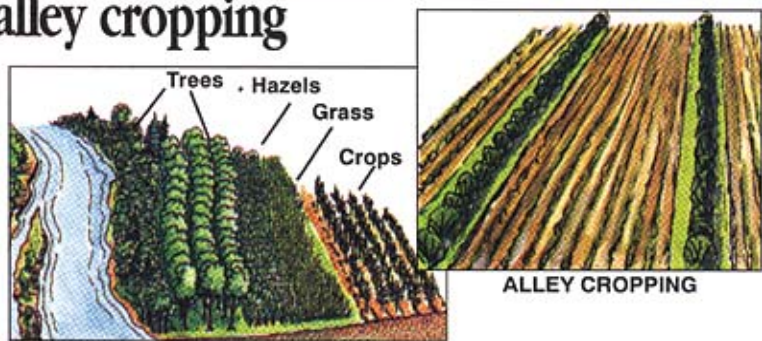
LIVING SNOW FENCE

As a windbreak or snow fence

Because hazelnut bushes are quite dense, they can make an effective income-producing **windbreak** in both summer and winter. Most hybrid hazelnuts will reach a maximum height of 8 to 15 feet. They are most effective in blocking wind when used along with taller trees. Make sure the taller tree rows are at least 15 feet away and will not shade the hazels. A **living snowfence** can be created using one or two rows of hazels, with plants staggered to create a denser barrier to wind and blowing snow. This kind of snowfence is cheaper to maintain than lumber or metal ones, provides year-round wind protection, and supplies food and cover for wildlife.

In riparian forest buffers and alley cropping

Riparian forest buffers consist of rows of trees, shrubs and other vegetation planted near streams or lakes to trap soil, chemicals and nutrients, store water, reduce floods and erosion, provide habitat for wildlife, and enhance recreational opportunities. Used in a riparian forest buffer, hybrid hazels help provide all these environmental benefits, while at the same time producing additional income for landowners through nut sales. **Alley cropping** uses widely spaced strips of trees or shrubs, with annual crops grown in the alleys between the strips. Hazelnuts grown in alley cropping strips can provide additional income from annual nut harvests.



RIPARIAN FOREST BUFFER

ALLEY CROPPING



PIVOT IRRIGATION CORNERS



HAZELS ENHANCE WILDLIFE HABITAT

For odd corners and other uses...

Hazelnuts may provide an income-producing capability for small, difficult-to-farm parcels of land, such as those created by pivot irrigation systems, or when unusual topography is unsuited for cultivated crops. In whatever location they are planted, hazels provide year-round cover for many kinds of wildlife.

Planting hazels

Spring is the best time to plant seedlings. Be sure to use a reputable nursery who can ensure that you are getting hazelnut cultivars best suited to your region's soils and climate. Hybrid hazelnuts are generally supplied as seedlings, rooted layers, or grafted seedlings. Some nurseries ship their hazelnut plant material in the early spring while the plants are still dormant. Others ship leafed-out seedlings in containers. If you can't plant immediately upon delivery, place dormant plant material in a refrigerator and store at a temperature of 38° F. Keep leafed-out seedlings in light shade at ambient temperatures, but keep from freezing or drying out. Mid-summer planting increases plant stress and reduces growth and survival.

For bareroot seedlings, dig a hole that is large enough to easily accommodate the roots. Turn the soil and break up any large clods. Rough up the sides of the hole to aid in root penetration. For tubelings (containerized seedlings), check with your nursery supplier for the appropriate planting methods and tools.

Plant the hazelnut plant no deeper than it was grown in the nursery. Do not plant too deep, nor too shallow! Back fill with the soil taken from the hole. Take care to keep the seedling in an upright position and after filling, firm the soil around the roots. Avoid crushing the root mass, but also avoid leaving large air pockets next to the roots.

Water immediately to settle soil and remove air pockets.

Caring

For the first year or two, most of the energy of your seedlings will go into the production of roots. When the plants are well established and anchored, you should see a surge in growth, followed by the development of flowers and nuts in 4-5 years. Typical annual growth rates are 4 to 6 inches in the first year and 18 to 24 inches once established.

Cultivate shallowly, 2-3 inches per year for the first 2 or 3 years. Very little pruning should be required, and it is normal for root suckers to appear and form a multi-stemmed bush. It is very important to keep the area around the hazelnut weed free out to about 3 feet. Newly planted hazels also may need supplemental water during the first 1 or 2 years. And because of their large leaves, establishing your hazelnuts in an area protected from wind will reduce water stress and leaf shredding, and increase survival and growth.

Hazels are relatively pest free. Although they are not favored as a deer browse, deer will sometimes feed on fast growing plants. Consider wire barriers or repellants.

Mice, voles and rabbits may eat stems in winter, but the plants recover very quickly. Keeping grass short can discourage mice. Older hazel shrubs can be invigorated by pruning to the ground to encourage growth of new stems. Squirrels and chipmunks will steal nuts, particularly if planted near woods, but not as much if planted in open fields.

Insects cause few problems for hazels, but several kinds of weevils attack the nuts. Bud mites can be especially serious. The main disease of concern is Eastern Filbert Blight, which attacks the susceptible European species. Several American hybrids are resistant to this malady.

Studies conducted in Minnesota have shown that the fall application (early September) of 15-5-20 fertilizer at a rate of 20 lbs/1000 square feet to established hazels resulted in consistently better nut crops and more vigorous bushes. New plantings generally do not require fertilizer for the first several years.



PLANT HAZEL SEEDLINGS AT THE SAME DEPTH AS WHEN THEY WERE GROWN IN THE NURSERY

Harvesting

With good care of vigorous seedling stock (proper planting at the right time, vigorous planting stock, adequate weed control, and supplemental watering during the first few years), hybrid hazels will begin to yield nuts after 4 or 5 years.

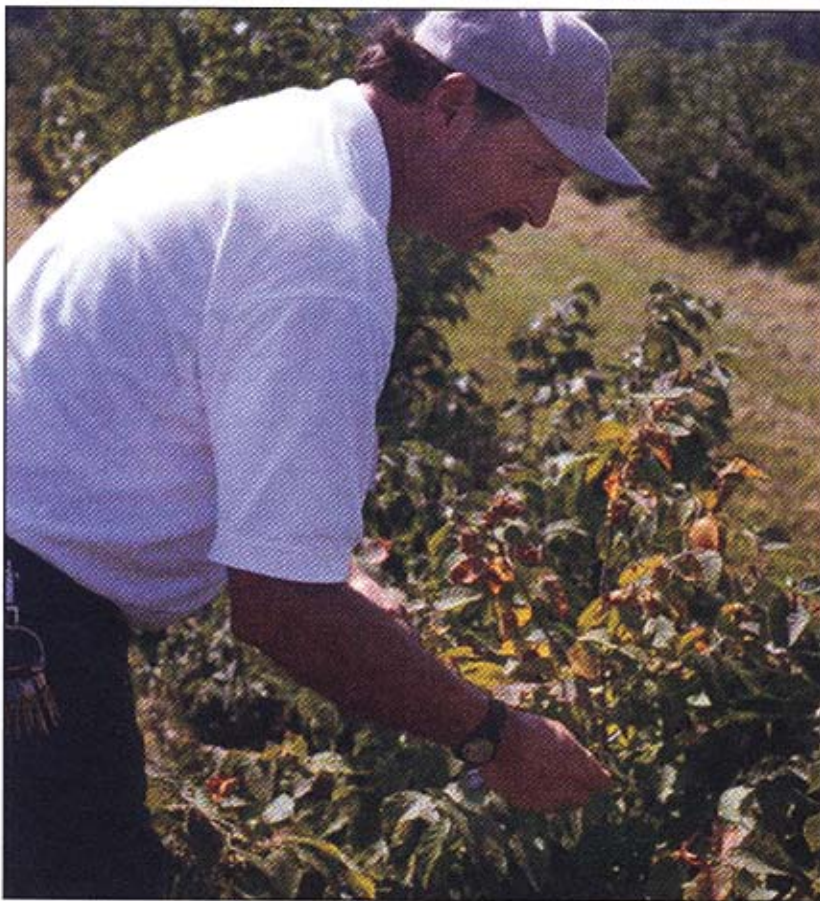
Preliminary data from test plots in Southeast Minnesota indicate that an average acre may produce 800 to 2,000 pounds of nuts per year, depending on the cultivar, weather, and other factors. Nut production can be cyclical, with heavy production one year and lighter production the next. Full sun is needed for maximum production.

Harvesting and processing hazelnuts can be labor intensive. Hazelnuts need to be removed from the involucre (husk) before going to market. Harvesting and processing machinery specific to bush-type hazelnuts is still in the developmental stages.



RECENTLY HARVESTED HAZELNUTS

Are Hazelnuts for You?



TENDING THREE-YEAR-OLD HAZELNUTS

In much of the United States, successfully growing hybrid hazels for commercial nut production faces several challenges, including development of cost effective harvesting and processing methods, and insufficient regional testing of hybrid hazelnut cultivars. Until recently, there were no commercial hazelnut plantings east of the Rocky Mountains, which means that development of networks of local markets or purchasers is still in its infancy. Producing, harvesting, processing, and marketing hybrid hazelnuts will clearly require patience and ingenuity.

Markets

Hazelnuts already have significant national and international markets. Most commercially-grown hazelnuts are used in chocolate confections; added to cereals, cookies, breads, and

other staples; sold as roasted and salted nuts; and made into flavorings for products ranging from hazelnut oils, coffee, syrups, and even beer.

Oregon is the major producer of hazelnuts in the United States. In the summer of 2000 the average wholesale price for unshelled hazelnuts (produced in Oregon) averaged around 75 cents per pound. Shelled hazels from Turkey were running about \$1.45, and shelled nuts from Oregon ranged from \$1.90 to \$2.00 per pound (UNL, 2000). Shelled hazels are generally sold for roasting or as chocolate covered hazelnuts packaged in decorative boxes and tins. A recent market assessment for hybrid hazelnuts in the Midwest indicated they are especially suitable for confectionery applications.

Hazelnuts also can be an important and unique component of a pick-your-own orchard. Being shrubs, they are easy to pick, and the nuts are relatively easy to crack and eat.

Selected Resources

- Badgersett Research Farm: <http://www.badgersett.com/#anchor156234>
- Grimo Nut Nursery: <http://www.grimonut.com>
- *Forest Farming*. 1984. Douglas, JS and R A de J Hart. Intermediate Technology Publications, Exeter, UK.
- *Hazelnut Market Research Report*. 2000. Univ of Nebraska – Lincoln UNL Food Processing Center. Lincoln, NE.
- *Hazelnuts*. In: *Fruit Breeding, Vol. Three: Nuts*. 1996. by Thompson, M.M., Lagerstedt, H.B., and S.A. Mehlenbacher. Janick J. and Moore J.N. eds. Wiley & Sons.
- *Income Opportunities in Special Forest Products: Self-help suggestions for Rural Entrepreneurs*. 1993. Thomas, M.G. USDA Forest Service, Ag. Info. Bulletin 666
- *Market trends and marketing consideration for hazelnuts*. 1991. Ricks, D. and Cely P. Staff Paper No 91-34. Michigan State University, Dept. of Ag. Economics. East Lansing MI.
- Northern Nut Growers Association: <http://www.northernnutgrowers.org>
- Oregon Hazelnut Industry Web site: <http://www.teleport.com/~hazelnut/index.htm>
- Oregon Hazelnut retailers: <http://www.hazelnut.com/store/order.html>
- *Positioning Hazels for Large-Scale Adoption*. 1998. Pellett, H.M., Davis, D.D., Joannides, J.L. and J.J. Luby. University of Minnesota. St. Paul, MN.
- *The Hazel Tree*. 2000. Farris, C. Northern Nut Growers Association, Townsend, DE
- *Tree Crops: A Permanent Agriculture*. 1929. Smith, J.R. Harcourt, Brace, & Co.

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