

# The Potential of Hybrid Hazelnuts in Agroforestry and Woody Agriculture Systems<sup>1</sup>

Philip A. Rutter<sup>2</sup>

**ABSTRACT:** Species hybrid hazelnuts (varying generations of *Corylus avellana* x *C. americana* x *C. cornuta*) show remarkable and imminent promise for development as both a specialty crop and eventually as a fully machinable agronomic staple foodstuff (woody agriculture). Grown as a bush, not a tree, with pruning replaced by a periodic coppice, the systems are currently just moving out of the research phase and into production plantings in several states. Drawing cold hardiness and disease resistance from native species growing as far north as Latitude 52N, the hybrids have demonstrated remarkably broad adaptation, toughness, and the ability to bear annually. The presentation will focus on the state of the art, current practices, and expectations for the immediate future of the crop.

Species hybrid hazelnuts, crosses of many generations among *Corylus avellana*, *C. americana*, and *C. cornuta*, have been bred and extensively examined at Badgersett Research Farm for nearly 20 years; our own lines were founded primarily on other breeders original crosses made in the 1930's and 1940's. Although the hybridization work is by no means finished, several general observations about the present performance and future possibilities for these plants can now be made.

While the hybrid populations include individuals showing extensive mixtures of the species definitive characteristics, and virtually any combination of traits can either be seen or could likely be generated, the populations at Badgersett will generally adhere to the following list of traits:

- form- multi-stemmed bush, (10-30 stems)
- height- 2-3 meters
- diameter- 1-2 meters
- age to bearing- 3 to 5 years
- productivity- commercial range
- nut type- commercial processing; some larger
- cold hardiness- absolute in Zone 4
- root system - fibrous, spreading, deep
- soil type- broadly tolerant; demonstrated on heavy clays, silt loams, sandy loams.
- disease resistance - Eastern Filbert Blight (EFB) resistant or tolerant
- not favored deer browse
- can survive in heavy sod; excellent root competitor
- full sun or partial shade (tolerates very heavy shade, but nut production becomes slight)
- tolerate drought and flooding, once established
- coppices very well

These hybrids differ substantially from the hazelnut cultivars presently grown in the Pacific Northwest; those plants are largely derived from southern

Mediterranean hazel populations, which are broadly susceptible to EFB, rarely hardy outside zone 5, and pruned into growing as small trees. The Badgersett hybrids contribute North American genes for cold hardiness and continental climate, as well as resistance to EFB; making it possible for the first time to grow productive hazels reliably outside the Pacific Northwest region.

While these hybrids must still be considered experimental, 20 years of preliminary testing has shown them to be extremely interesting and worthy of wider trials. Unlike other windbreak plants, these can offer farmers at least the chance of producing an annual money income, from the windbreak itself.

At present, plantings are made with seedlings, which have proven more predictable than might be expected. Mechanized planting is possible. Weed control during establishment has been most effectively achieved by mowing or cultivation; the hazels will generally survive even without weed control, although growth will be seriously slowed. Harvest at the moment is by hand, an easy and economic task for skilled agricultural workers; mechanical harvest is expected within a few years, using pickers similar to those presently developed for blueberries. Suitable agroforestry practices: windbreak plantings; living snowfence, riparian buffer strips, and ally cropping. Silvapasture might be possible with careful management.

Woody agriculture is distinct from agroforestry in that major food crop production comes from highly domesticated woody plants; these hybrid hazels may be the first such woody plants (besides palms) to make staple commodities production possible. Several whole-field plantings have already been made, those at

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<sup>2</sup>Badgersett Farms, Inc.

Badgersett Research Farm and Arbor Day Farm being the most advanced and most easily visited.

Markets- Hazelnuts are a worldwide commodity, presently consumed largely as a luxury food. Turkey is by far the biggest producer, Europe the biggest consumer. US production at the moment is approximately 1/10 of US consumption. No one familiar with hazel marketing doubts the ability of the market to absorb additional production, even without development of new products.

Plantings intended for profitable production have been and are now being made in Minnesota, Wisconsin, Nebraska, and Kansas, with substantial trial plantings in Iowa, Missouri, and the Dakotas. Smaller private

trial plantings exist in most states not quarantined, and several Canadian provinces.

When sufficient production is achieved, regional marketing cooperatives are planned, with the intention of marketing initial crops as value-added regional specialties, and developing new products and uses to absorb increasing production as it happens.

Remaining problems include developing economic cloning of superior individuals, machine harvest, and probably pests not yet encountered.

For more complete descriptions, discussion, bibliographies, and up-to-date news and information regarding the development of hybrid hazelnuts, and links to related sites, see our website at <http://www.badgersett.com> Or write to Badgersett Research Farm, RR 1, Box 141, Canton, MN 55922-9740.