

Evaluation of Select Accessions* of Hazelnuts in Bayfield County



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Introduction

One of the major obstacles for the developing hazelnut industry in the Upper Midwest is the lack of high-quality, locally-adapted cultivars. The only commercially available hazelnut cultivars are European (*Corylus avellana*) and Turkish (*Corylus colorna*) hazelnuts, but most are highly susceptible to the lethal endemic fungal disease Eastern Filbert Blight (EFB) and none are suitably winter hardy for Wisconsin. The two hazelnut species native to Wisconsin, American (*Corylus americana*) and Beaked (*Corylus cornuta*), are well adapted to local environmental conditions and have resistance to diseases such as EFB, but produce relatively small nuts compared to their European cousins. Work is underway to develop commercially viable hazelnut cultivars using two approaches.



Photo 1. Mound-layering a high-performing hazelnut to propagate clones for further evaluation of the plant in replicated performance trials.

1. Screening Hybrid Hazelnut Plantings for Superior Plants

Researchers and plant breeders have been propagating hybrids of European and American hazelnuts in an effort to combine the superior nut production of the European with the hardiness and disease resistance of the American. Survey work has identified more than 50,000 of these hybrids being grown by early-adopters in WI, MN, and IA. Because each hybrid is seedling-origin, every hybrid hazelnut is genetically unique, providing an excellent opportunity for mass-selection to find superior plants. Since 2003, Dr. Lois Braun with the University of Minnesota has been working with growers in MN and WI on evaluating these hybrid plantings for superior plants. Based on yield data for at least three years, Dr. Braun has been using mound-layering to propagate the highest performing plants from these plantings for further evaluation in replicated performance trials.

2. Screening Wild Populations of American Hazelnuts

Starting in 2009, researchers in Wisconsin have been screening wild populations of American hazelnut in Central and Northwest Wisconsin for high-yielding plants. The first selections were made in 2010 and will be propagated for inclusion in the replicated performance trials. See Research Bulletin #15 for more information.

Performance Trials in Northern Wisconsin

Given the extensive populations of American hazelnut in Bayfield County and the potential for hazelnuts to be a viable crop in the region, two replicated performance trials have been established in Bayfield County. The first, established in the spring of 2009 on private land in Port Wing, holds 45 plants with 3 replications each of 15 accessions. The second, established in the spring of 2010 in Bayfield holds 184 plants with 71 accessions collected from 17 sites in MN and WI. Individual plants have been selected



Photo 2. The Hazelnut Performance Trial in Bayfield, WI at the Chequamegon Foods Farm was prepped and planted in the spring of 2010. The trial currently includes 84 wild and hybrid accessions collected from 23 sites.

primarily from hybrid plantings in Minnesota, including those in: Staples, Rosemount, New Prague, Lambertton, Montevideo, Lake City, Elba, and Wycoff. Plants have also been selected from a planting in Viola, WI. Thirteen wild American plants selected from the 2010 screening work from six locations in Northwest, Wisconsin were added in October.

For the Port Wing trial, plants were harvested as rooted layers and transplanted in late-May, 2009 with three replications of each select plant. Rows were covered with landscape fabric and light woodchips. For the Bayfield trial, plants were harvested as rooted layers from stool-beds in the fall, overwintered, and planted in May 2010. Plants were mulched heavily with wood chips to ensure a weed-free establishment period. The October-planted accessions were dug as rooted layers in early-October from stool-beds and transplanted in late-October. To evaluate susceptibility of each plant's resistance to EFB, a pre-cut stem inoculated with EFB was twist-tied to each plant, ensuring exposure to the disease. As regional hybrid and wild populations are screened over the next few years, additional high-performing plants will be added to the performance trials.



Table 1. Replicated performance trials are essential to determine whether a high-performing hazelnut plant such as shown here is high-performing due to genetics or environment. Photo courtesy of Mark Shepard.

As the plants mature, they will be evaluated for vigor, yield, disease resistance, and other performance characteristics with the ultimate goal of selecting the highest-performing plants for possible cultivar development.

* In plant breeding, the term “accession” refers to an individual plant that is being evaluated for a set of characteristics. Typically, an accession is selected from mass populations and may or may not have known desirable attributes. For these trials, each accession was selected from larger populations based on superior yield compared to neighboring plants.

Thanks to the Chequamegon Food Cooperative and Morning View Farm for their participation and in-kind support for these trials.

Upper Midwest Hazelnut Development Initiative

The Upper Midwest Hazelnut Development Initiative is a collaboration of researchers in Wisconsin and Minnesota working with early-adopter hazelnut growers to develop the fledgling Upper Midwest hazelnut industry.

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