

# Stool Bed Layering as a Means of Vegetative Propagation of American Hazelnut

Jason Fischbach, UW Extension Agriculture Agent, Ashland and Bayfield County  
Kelsey Brasseur, UW Extension Hazelnut Research Assistant

## Introduction

Northern Wisconsin is home to hundreds of square miles of American hazelnut (*Corylus americana*). These stands of wild hazelnut provide a great opportunity to discover locally-adapted, high-performing plants with potential to support a commercial hazelnut industry in the Upper Midwest. Since 2009, researchers with the University of Wisconsin have been screening the wild populations of American hazelnut in search of high-yielding plants for further evaluation in replicated performance trials. Once a high-performing plant is located, the challenge is to generate enough clones of the plant to allow for replicated evaluation across a range of environments. Stool-bed layering has worked with hybrids of the European and American hazelnut in controlled farm plantings, but has not been trialed in wild pure American plants (Fischbach 2009, Braun, 2008).

Stool bed layering or mound-layering is used to propagate willow, poplar, apple, and a wide variety of other woody perennial plants. The method consists of coppicing a plant to generate vigorous shoots from the crown. The shoots are then treated with a rooting hormone and mounded with a growth medium to produce rooted layers. In one year, the method can be used to generate 10-20 clones of the coppiced plant without killing the source plant.

## Stool Bed Layering Trials in Northern Wisconsin

In 2010, UW Extension researchers established two mound layering trials in NW Wisconsin. The trials consisted of 21 plants at a site in the Moquah Barrens in the Chequamegon-Nicollet National Forest and a site in the Brule River State Forest for a total of 42 plants. The plants were coppiced in the last week of April and covered with pure sawdust to a depth of 10 inches in an 18" diameter tree tube (Photo 2). In mid-July the plants were uncovered and the shoots thinned, leaving only the dominant and most vigorous stems. The basal 5 inches of each remaining stem was painted with a 10:1 dilution of Dip N Grow® (0.1% indole-3-butyric acid, 0.05% 1-naphthaleneacetic acid) and girdled with heavy-duty twist ties as close to the ground as possible. The tree tubes were then replaced and the stems were re-mounded with one of three rooting mediums: pure sawdust, pure sawdust mixed with water-retaining crystals, or a 1:1 mix of sawdust and peat moss. There were seven replications for each rooting medium treatment. The layers were left to root until leaf abscission and dormancy.



**Photo 1.** In open areas on sandy ground in NW Wisconsin, American hazelnut is the dominant species, forming dense thickets. Researchers have been screening these populations for high performing plants such as in this photo in the Moquah Barrens.



**Photo 2.** Tree tubes are used to hold the rooting medium around the new crown shoots. Each tube holds a mound 18" in diameter.

The rooted layers were harvested on Oct. 4th and 5th. Tree tubes were removed and the rooting medium was carefully cleared away from the stems. Layers were harvested at the girdle point, by either snapping them off or cutting just below the girdle if they were not easily snapped. The height of each stem was measured, and the number of rooted stems was recorded.

Applying the sawdust at the time of coppice severely suppressed new shoot growth. The majority of the stems that grew were around the edge of the sawdust mound. Averaged across location, the coppiced plants produced 4.8 stems large enough to apply rooting hormone and a twist tie with a range of 1 to 8 stems.



▲ **Photo 3.** A rooted layer in the Brule River State Forest.

Table 1 shows the overall rooting success of the layers in each of the three rooting medium treatments. A 1:1 mixture of sawdust and peat was the most effective rooting medium in these trials, with an average of just over 20% of treated stems producing roots. Stems in the sawdust/peat mixture were taller than in the other two treatments, with an average height of 20.1 inches in comparison to 18.1 inches for sawdust with the water retaining crystals and 17.7 inches for pure sawdust.

### Conclusions

The mound-layering protocol trialed here appears to have limited potential in producing multiple clones directly for replicated performance trials. With an average shoot production of 4.8 stems per plant and a rooting success of 20%, the method will produce, on average, only one rooted layer per plant. That said, individual plants produced up to 6 rooted layers per plant.

Using mound-layering for wild American hazelnut will likely require coppicing and mounding larger plants with greater crown surface area than used in this trial in order to generate enough rooted layers. Doing so will require transporting much larger volumes of rooting medium across rough terrain and may prove cost-prohibitive. Furthermore, because of the spreading growth habit of the plant, particularly in the nutrient poor sites, increasing the surface area of the mound layer will increase the chances of multiple genotypes growing in the same mound. Although mound-layering can be effective it will be important to invest in micro-propagation or stem cutting research to generate multiple clones of the select wild American hazelnuts.

Location	Treatment	Average % Rooting	Average Stem Ht (in)
Moquah	Sawdust	6	19
	Sawdust:Peat	21	19
	Sawdust:H2O	8	17.3
Brule SF	Sawdust	3	16.4
	Sawdust:Peat	20	21.1
	Sawdust:H2O	3	18.8

**Table 1. Average Rooting Percentages by Location and Rooting Medium.**

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