

FORESTRY FACTS



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Walnut Tips

Choosing the Right Seed(lings) For Your Woodland

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INTRODUCTION

Black walnut continues to be one of the most valuable hardwood trees in Wisconsin. It is usually found in mixed hardwood forests on rich, well drained soils. In Wisconsin, black walnut's natural distribution is limited to the southwestern one-third of the state.

On a good site, black walnut can grow more than 100 ft. tall, and exceed 30 inches in diameter. Large, veneer-quality trees have been known to fetch as much as \$20,000 - \$30,000 for an individual tree.

This potential for profit, along with black walnut's wildlife

and aesthetic attributes, has prompted many people to consider planting walnut on their land.

One of the most important decisions when planting black walnut (or any species) is the origin of the seed or seedlings you are going to use. On the one hand, obtaining seed from a local source is important, because these trees are more likely to be suited to the local growing conditions. On the other hand, there may be faster growing, non-local sources which can survive the local conditions, and yield a profit in less time.

To answer some of the questions concerning adaptability and growth rate in black walnut, and to improve the quality of Wisconsin's forest nursery walnut seedlings, the Wisconsin DNR, in cooperation with the

University of Wisconsin-Madison, established a trial planting using black walnuts from several different locations in its natural range.

WDNR/UW Walnut Trial

In 1976, black walnut seed was collected from individual trees in Illinois, Indiana, Minnesota and Wisconsin, then planted at the Wilson State Forest Nursery in Boscobel, WI. One year later, the surviving seedlings were planted at Wyalusing State Park in southwestern Wisconsin (Grant County).

During their first winter, seedling mortality was noticeably higher among the Illinois and Indiana seedlings than among the Minnesota and Wisconsin seedlings. As a result, several of these poorly adapted families were not included in the Wyalusing planting.

FAMILY in tree improvement jargon refers to a group of trees which have the same mother but different fathers. For example, if you collect seed from underneath a single walnut tree, these would be considered a family, because you know they all fell from the same tree, but you don't know which trees provided the pollen.

SEED SOURCE refers to a group of families from an area with roughly the same local growing conditions, for example soil type or climate.

At the time of planting, an ideal walnut site was not available to us, and as a result growth rates at Wyalusing have been relatively slow.

Since its establishment, the planting has been measured twice. First, in 1985 (10 years from seed) and again in 1995 (20 years from seed). These measurements included an evaluation of height and diameter growth, as well as an evaluation of stem form.

In 1997, the planting was thinned to reduce competition and to encourage growth. In this thinning, the poorest individuals within each family were removed from the planting. In some cases, a family's performance was so poor that the entire family was removed.

WHAT DID WE FIND?

Growth. We compared the

growth of each family to the average growth of all families in the Wyalusing planting.

By 1995, the average height of all trees was 17.7 ft. This is a 79% increase above the 1986 average of 9.9 ft.

The tallest family averaged 21.5 ft. and originated in Warren Co., IN; this family was 22% taller than the "average" family in the planting. An Iowa Co., WI, family was a close second with an average ht. of 21.3 ft., or 19% taller than the "average" family.

In 1995, 8 of the 10 fastest growing families, and 16 of the top 20 families were from Wisconsin or northern Illinois seed sources (Table 1).

During the past 10 years, many families which had ranked high in 1986 did not keep pace with their earlier performance and declined in the rankings.

The first and third-ranked families in 1986 did not change in 1995. Of the 10 tallest families in 1986, only one improved its position by 1995, and this family originated in Iowa Co., WI.

The remaining seven families ranked in the top ten in 1986, most notably the Indiana families, declined. For example, family #66 from Warren Co. IN, fell from ninth place in 1986 to sixty-fifth place in 1995, while family #84 (White Co. IN) declined

from eighth to thirty-eighth place.

The shortest family, which originated in Trempeleau Co., WI (13.1 ft.), was only 74% as tall as the "average" family.

Minnesota Families.

A total of 10 Minnesota seed sources, all from Houston Co., were included in the planting, but in 1995 only three of these families ranked in the top one-half of all families.

This result is not surprising, because families with a northern origin rarely perform better than local or southern seed sources. This may explain in part why a Trempeleau Co. family was the shortest in the planting.

Form. We found no relationship between stem form and seed origin, which suggests that you are just as likely to have straight growing trees if your seed is from Wisconsin, as you are if your seed is from Minnesota, Indiana or Illinois.



Approx. natural distribution of black walnut in Wisconsin.

We also found no relationship between stem form and tree height. The taller trees had good and bad form, as did the shorter trees. For tree improvement purposes this is ideal, as it allows you to select the tall trees which also have good form.

RECOMMENDATIONS

Obviously, there is no formula you can use to guarantee success with your black walnut planting. However, the WDNR/UW planting and others like it suggest some guidelines you can follow to maintain good survival among your seedlings, and at the same time increase your growth rates.

First, choose seed or planting stock which has a local or slightly more southern origin than that of their planting site. Going north for your seed might result in high seedling survival, but it almost never results in faster growth.

Second, if you decide to use southern seed sources, remember there is a limit to how far south you can go without jeopardizing the survival of your planting.

A good rule of thumb in Wisconsin is to select seed/seedlings which originates no more than 150 miles to the south of your planting site. Northern and North-Central Illinois would definitely be included in this area.

After 20 years, the difference in height between the best and worst seed sources is almost double (Table 1). In our opinion, no one can afford to tolerate such a loss in productivity due to a factor so easy to control.

Finally, there are a number of grafted and clonal black walnut seedlings available on the market and we encourage you to experiment with these in your plantings. At the Wyalusing planting for example, an Indiana family continues to out-perform all local sources.

However, if Wisconsin black walnut growers choose to use these seedlings, we recommend they do so in combination with more local seedlings. This will reduce the risk of mortality and dieback in the future.

We expect the Wyalusing planting to begin producing seed within the next 2-3 years. When this happens, Wisconsin's black walnut growers will have a source of improved seedlings which are proven to be suited to growing conditions in southern Wisconsin.

DID YOU EVER WONDER WHY?

Trees can grow faster if you plant them north of their origin? Well, they are not really growing *faster*, but they are growing *longer*.

Over time, trees from say, central Illinois have adapted to a growing season which is a few weeks longer than the season here in Wisconsin. Consequently, these trees 'shut down' a little later in the fall than the local trees.

This may not seem like much of an advantage from one year to the next, but over the tree's lifetime, it can result in a significant increase in growth.

Table 1. The rank and average height of the ten tallest and shortest black walnut families of Wyalusing, WI in 1986 and 1995
 (Note the change in origin of some of the best families in 1985 compared with the best of 1995)

ORIGIN (county)	RANK		Mean Family Ht. (ft.)	
	1986	1995	1986	1995
Warren, IN	1	1	12.5	21.5
Peoria, IL	2	4	12.4	20.7
Putnam, IL	3	3	12.4	21.1
Grundy, IL	4	22	12.2	18.9
Hamilton, IN	5	21	11.9	18.9
Iowa, WI	6	2	11.8	21.2
Warren, IN	7	17	11.6	19.2
White, IN	8	38	11.3	18.3
Warren, IN	9	65	11.3	17.1
Morgan, IL	10	16	11.3	19.2

ORIGIN (county)	RANK		Mean Family Ht. (ft.)	
	1986	1995	1986	1995
Warren, IN	1	1	12.5	21.5
Iowa, WI	6	2	11.8	21.2
Putnam, IL	3	3	12.4	21.1
Peoria, IL	2	4	12.4	20.7
Houston, MN	36	5	10.2	20.2
Iowa, WI	29	6	10.3	20.2
Schuyler, IL	22	7	10.5	20.0
Kankakee, IL	12	8	11.0	20.0
Richland, WI	17	9	10.6	19.9
Iowa, WI	39	10	10.1	19.9

ORIGIN (county)	RANK		Mean Family Ht. (ft.)	
	1986	1995	1986	1995
Houston, MN	87	82	8.4	14.5
Iowa, WI	88	85	8.2	14.4
Iowa, WI	89	50	8.2	16.6
Buffalo, WI	90	78	8.2	14.7
Trempel, WI	91	95	8.2	12.1
Buffalo, WI	92	90	8.0	13.8
Buffalo, WI	93	58	8.0	16.3
Houston, MN	94	92	7.3	12.8
La Salle, IL	95	94	7.3	12.2
Buffalo, WI	96	died	6.7	0.0

ORIGIN (county)	RANK		Mean Family Ht. (ft.)	
	1986	1995	1986	1995
Iowa, WI	75	86	8.8	14.3
Houston, MN	73	87	8.8	14.1
Grant, WI	65	88	9.0	14.0
Iowa, WI	81	89	8.7	14.0
Buffalo, WI	92	90	8.0	13.8
Trempel, WI	71	91	8.9	12.8
Houston, MN	94	92	7.3	12.8
Grant, WI	83	93	8.7	12.5
La Salle, IL	95	94	7.3	12.2
Trempel, WI	91	95	8.2	12.1