**Figure 1.** The 1-, 2-, and 3-year bareroot seedlings were planted in a 12 x 12 ft (3.6 x 3.6 m) grid across a 4.8-ac (1.94-ha) abandoned agricultural field and were placed within 5-foot (1.5-m) plastic tree shelters. Photo by Mark Heitzman, 1993.

# Planted Black Walnut in Vermont: A 30-Year Experience

Mark Heitzman, M.D.

*Retired physician, Barre, VT*

## Abstract

Eastern black walnut (*Juglans nigra*) is not commonly found in northern New England, however, a warming climate may be altering its ability to survive and grow in this region. In 1993, more than 1,000 commercially obtained black walnut seedlings were planted on an abandoned agricultural field in central Vermont with the goal of timber production. Subsequent management of the site was conducted according to previously established guidelines, including the use of tree shelters, herbicide control of competing vegetation, pruning, and thinning. Survival was 85 percent over a 5-year period. After 30 years, the average diameter at breast height of the trees was 10.18 in (25.9 cm) and timber form was good. With care, black walnut can be established and thrive in northern New England. A regionally adapted black walnut seed source for future assisted migration efforts is now in place.

## Introduction

In the context of a warming climate, there are efforts underway in North America to extend the range of multiple hardwood and softwood species. A number of these efforts are documented in the Climate Change Response Framework (https://forestadaptation.org/) developed by the U.S. Department of Agriculture (USDA), Forest Service's Northern Institute for Applied Climate Science.

One of the goals of forest-assisted migration is to reinforce underrepresented populations currently at or near their range limit (Dumroese et al. 2015). In northern New England, eastern black walnut (*Juglans nigra*) is one such underrepresented species. Efforts to establish black walnut are currently underway in Ontario (Pedlar et al. 2023) and Quebec (Cogliastro et al. 2019, Truax et al. 2018). This brief report describes a 30-year experience with planted black walnut in central Vermont.

## Site Description

In 1993, approximately 1,400 black walnut seedlings were planted on a 4.8-ac (1.94-ha) abandoned agricultural field in Barre, VT (44° N, altitude 1,100 ft (335 m)). The baseline and early-year details of this project have been described previously (Heitzman 2001). The planting site was open, west-facing, and comprised of deep silt-loam soil. Commercially obtained bareroot seedlings from New York, Michigan, Minnesota, and Pennsylvania were planted in a 12 x 12 ft (3.6 x 3.6 m) grid (figure 1).

All the seedlings were placed within 5-foot (1.5-m) plastic tree shelters. Glyphosate application via backpack sprayer was performed annually for the first 7 years. Regular pruning was and still is performed to foster good timber form (i.e., straight boles with minimal knots).

## Results

Approximately 85 percent of the trees survived for the first 5 years, and mortality has since been minimal. The tree shelters effectively prevented deer browse but required considerable maintenance on this windy site. Insect damage (*Acrobasis* sp.) to terminal buds was common, as was dieback from late spring frosts, both of which have had adverse effects on timber form (figure 2).

Thinning operations in 2009 and 2019 reduced the stocking from 300 to 85 trees/ac (150 to 43 trees/ha). The average diameter at breast height (DBH) in the fall of 2023 was 10.18 in (25.9 cm), with DBH ranging between 6.8 and 15.3 in (17.3 and 38.9 cm) (figure 3). The trees began to produce a nut crop at 6 years old and have continued to do so, generally every other year. Overall, timber form is good, and the stand has some potential to be harvested for veneer.

Natural regeneration is occurring in the planting area, mainly due to caching of nuts by squirrels.

## Discussion

Guidelines for the establishment of black walnut stands have long existed (Beineke 1993). This 30-year enterprise demonstrates that an approach applied successfully in other parts of the United States and Canada can also work in northern New England. The key elements for success include a good site with considerable sunlight, seedlings appropriate to the latitude, effective weed control, and prevention of animal predation. If the goal is timber production, regular pruning is essential.

Whether black walnut will be included in assisted migration efforts in northern New England remains to be seen. This project provides, if nothing else, a sizable, regionally adapted seed source for black walnut that has been selected for timber form.

## Address correspondence to:

Mark Heitzman, email: xraymystery@aol.com

**Figure 2.** Black walnut terminal buds are vulnerable to late spring frosts (shown here) and insect damage. If the terminal bud dies back (left), it will resprout later in the season (right), but the timber form is compromised. Photos by Mark Heitzman, 1996.

**Figure 3.** This 30-year-old stand of black walnut now requires little maintenance apart from pruning and additional thinning. Photo by Mark Heitzman, 2023.

## References


Beineke, W.F. 1993. Black walnut plantation management. Purdue University Cooperative Extension Service. FNR-119. 11 p. https://www.extension.purdue.edu/extmedia/FNR/FNR-119.html.

Cogliastro, A.; Gagnon, D. 2019. Growth and stem quality of hardwood trees planted 18-29 years ago on abandoned farmland following recommended silvicultural practices. The Forestry Chronicle. 95(2): 66–75. https://doi.org/10.5558/tfc2019-014.

Dumroese, K.; Williams, M.I.; Stanturf, J.A.; St. Claire, B. 2015. Considerations for restoring temperate forests of tomorrow: forest restoration, assisted migration, and bioengineering. New Forests. 46: 947–964. https://doi.org/10.1007/s11056-015-9504-6.

Heitzman, M. 2001. Field note: observations on planted black walnut in Vermont. Northern Journal of Applied Forestry. 18(2): 44–45. https://doi.org/10.1093/njaf/18.2.44.

Pedlar, J.H.; McKenney, D.W.; Allen, D.J. 2023. Effect of tree species and seed origin on climate change trial outcomes in southern Ontario. New Forests. 55: 63–79. https://doi.org/10.1007/s11056-023-09965-x.

Truax, B.; Gagnon, D.; Fortier, J.; Lambert, F.; Pétrin, M. 2018. Ecological factors affecting white pine, red oak, bitternut hickory and black walnut underplanting success in a northern temperate post-agricultural forest. Forests. 9(8): 499. https://doi.org/10.3390/f9080499.