

# West Virginia's Blennerhassett State Park Black Walnut Project

## A Demonstration of Conifer Trainers with Delayed Black Walnut Plantings

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### Introduction:

I see a pleasant long term result for this project. Blennerhassett is already a very special place for existing and wannabe walnut growers. The 1935 plot is a rare and impressive planting. The word is getting out and I expect to be hosting some guided tours. With a successful new planting, Blennerhassett will really be the Mecca of black walnut growers. Everybody will have to see it once in their lifetime.



*The Blennerhassett mansion with tree measuring equipment and orange 5 gallon lunch bucket*



## **Objective:**

West Virginia has an abundance of small alluvial properties that are no longer sufficient to support an agricultural enterprise. Such properties soon become abandoned overgrown with invasives and low value explorer species. The objective of this project is to investigate and demonstrate how, on such properties, to reliably grow the most valuable native woodland timber product, that is veneer quality black walnut.

## **Background:**

Black walnut is a shade intolerant species. Not only are black walnut trees shade intolerant, so it is for every branch. The essence of starting veneer quality trees like the one on the left is to heavily shade the lower part of the tree and at a very early age. Such heavy early shading causes shade intolerant side branches to fail and be abandoned while small in diameter. At the same time the top must not be shaded, so stem volume growth can proceed as if in the open.

Black walnut itself does not produce sufficient shade to clear lower branches soon enough to produce veneer quality wood. Black walnut monoculture plantings require manual pruning for any hope of producing veneer quality. A tree like the one on the left is out of the question from a monoculture planting with any amount of labor.

There is a whole list of requirements for trainer species that can provide the intensity and geometry of shading needed. First the understory light level needs to be 7% or less. The vertical growth rate needs to challenge typical black walnut vertical growth, but not over top. Conifer's conical shape is the ideal geometry for lower shade and open sky above. The trainer species must be somewhat resistant to the juglone toxin that walnut produces in the soil. So far white pine and bald cypress have shown good results. The site needs to be conducive to both the trainer and the black walnut species. Whichever trainer species is used, the trainer needs to be in place and producing shade as the black walnut emerges.

## **Method:**

The first chore is to surround the project with deer fence. White pine, bald cypress trainers are to be planted at 8 foot spacing in rows 16 feet apart. The randomized plot layout is shown below. The plan includes control blocks for monoculture and no-delay planting. Watering and weed control may be required a few times during the first 2 years. The black walnut plantings are delayed based on the approach of the trainer shading in 4 stages. The first ¼ will be planted with no delay. The remaining 3 groups will be planted when trainer alleyways have closed to 8, 5, and 2 feet wide. Select black walnut plant seed source will be provided from the Hardwood Tree Improvement and Regeneration Center at Purdue University.

# Planting Details

	.... Block 6	Block 5	Block 4	Block 3	Block 2	Block 1	
	Control	Trainer 1	Trainer 2	Control	Trainer 2	Trainer 1	
Edge Buffer	T3 D2 T3	T1 D2 T1	T2 D8 T2	T3 D5 T3	T2 D0 T2	T1 D5 T1	Row
	T3 D2 T3	T1 D2 T1	T2 D8 T2	T3 D5 T3	T2 D0 T2	T1 D5 T1	1
Black Walnut Delayed Sub Block 1	T3 D2 T3	T1 D2 T1	T2 D8 T2	T3 D5 T3	T2 D0 T2	T1 D5 T1	2
	T3 D2 T3	T1 D2 T1	T2 D8 T2	T3 D5 T3	T2 D0 T2	T1 D5 T1	3
	T3 D2 T3	T1 D2 T1	T2 D8 T2	T3 D5 T3	T2 D0 T2	T1 D5 T1	4
	T3 D2 T3	T1 D2 T1	T2 D8 T2	T3 D5 T3	T2 D0 T2	T1 D5 T1	5
Black Walnut Delayed Sub Block 2	T3 D5 T3	T1 D0 T1	T2 D5 T2	T3 D8 T3	T2 D2 T2	T1 D0 T1	6
	T3 D5 T3	T1 D0 T1	T2 D5 T2	T3 D8 T3	T2 D2 T2	T1 D0 T1	7
	T3 D5 T3	T1 D0 T1	T2 D5 T2	T3 D8 T3	T2 D2 T2	T1 D0 T1	8
	T3 D5 T3	T1 D0 T1	T2 D5 T2	T3 D8 T3	T2 D2 T2	T1 D0 T1	9
Black Walnut Delayed Sub Block 3	T3 D8 T3	T1 D5 T1	T2 D2 T2	T3 D2 T3	T2 D5 T2	T1 D8 T1	10
	T3 D8 T3	T1 D5 T1	T2 D2 T2	T3 D2 T3	T2 D5 T2	T1 D8 T1	11
	T3 D8 T3	T1 D5 T1	T2 D2 T2	T3 D2 T3	T2 D5 T2	T1 D8 T1	12
	T3 D8 T3	T1 D5 T1	T2 D2 T2	T3 D2 T3	T2 D5 T2	T1 D8 T1	13
	T3 D8 T3	T1 D5 T1	T2 D2 T2	T3 D2 T3	T2 D5 T2	T1 D8 T1	14
							15
							16



## Notes:

1. Conduct a soil survey to determine nutrient levels and the black walnut site index.
2. A plot grid is laid out, which is somewhat like that shown above. The block arrangement is repeated in length to utilize the space available
3. During the summer prior to planting the trainers, the future rows are band treated with glyphosate and Surflan. The bands are 3 feet wide. The object is to kill green tall fescue and Johnson grass and the pre-emergent Surflan suppresses germinating small seeds in the soil.
4. The planting is surrounded by a deer fence 16 feet from the planting border to allow mowing. The fence is removed when the crop black walnut trees' DBH exceed 4 inches.
5. There are three flavors of trainers, T1, T2, and T3 as shown above
6. Trainer T1 is predominately white pine and is planted on a grid 8 feet apart in columns 16 feet apart
7. Trainer T2 is predominately bald cypress and is planted 8 feet apart in columns 16 feet apart
8. Trainer T3 is bed-run black walnut seedlings to act as monoculture control blocks and is planted 8 feet apart in columns 16 feet apart
9. A few dawn redwood, eastern hemlock, and European larch are scattered among trainers T1 and T2 to assess those species' suitability as future trainers.
10. Weed control for the first planting is as follows: During the first summer after transplanting, weeds are back-pack controlled using glyphosate and Surflan with a hand shield. In subsequent years, weed problems is assessed and treated if necessary. Weed control is discontinued once trees are well established.
11. There are four groups of "crop" black walnut sub-blocks: no-delay, and three delayed plantings, D8, D5, and D2. For clarity, these walnuts are all referred to as "Crop Trees", although many are to be culled. All crop trees are black walnut. At maturity, the plantation should be a black walnut monoculture.
12. The three trainer groups are planted at the outset.
13. The "no-delay" crop trees are planted at the same time as the trainers.
14. The crop tree group D8 planting is delayed until the aisle ways between trainer rows narrow to 8 feet.
15. The crop tree group D5 planting is delayed until the trainer aisle ways narrow to 5 feet.
16. The crop tree group D2 planting is delayed until the trainer aisle ways narrow to 2 feet.
17. The aisle ways between the blocks are left un planted for separation and general access.
18. Before age 20, partial and final crop trees are identified and the crop black walnut tree density is reduced by half, saving the better 2 crop trees in each 4 tree sub-block – one for partial and one for

final harvest. The culled trees are girdled, treated with Pathway, and left standing for wildlife habitat.

19. Before age 50, the partial crop black walnut are culled in place or removed leaving only the final best crop trees in each 4 tree sub-block giving a 32 x 32 feet final spacing or 43 trees per acre.
20. At 5 year intervals the crop black walnut's DBH, potential veneer and saw log lengths, height, crown diameter, and defects are measured and recorded. The general understory light attenuation percentage is also measured for each type of trainer.
21. At 5 year intervals final crop black walnut trees with crowns smaller than 2 x DBH are released by culling their most offensive canopy neighbor. This practice should eventually remove all trainers before crop tree age 50.
22. Pruning is at 2 year intervals. The pruning rules are as follows:
  - a. Codominant leaders of all crop trees are corrected while within reach of a pole saw. The tree ID and action is recorded.
  - b. Side branched of crop trees in the T3 monoculture control blocks are removed up to a point 1/2 the tree height while within pole saw reach. The total man-hours for the plot are recorded.
  - c. Side branched of crop trees trained in conifers blocks T1 and T2 are not manually pruned.
  - d. Lower dead branches of trainers are somewhat removed for access and aesthetics.
23. Individual crop trees are identified by block and row. Example: B04R19, which means: Block 04, Row 07. That tree position is shaded red in the layout above.
24. Direction committee consist of interested persons and includes members from the Park, University, USFS, the Walnut Council, The committee elects a chair person.
25. Record keeping includes measurements and necessary maintenance activities. The objective is to eventually provide data to assess the quality, volume, and silvicultural labor input for conifer trained vs. monoculture methods and delayed vs. no-delay economics. Aesthetic activity is not recorded.
26. The Direction Committee's main functions are managing the project details, to maintain a distribution list of interested people, and to issue electronic reports of measurement data and activities at 5 year intervals.