

Stem Form and Fertilizer Effects on Black Locust Biomass Production on Mined Lands

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Biomass production on mined lands may become a economically viable method for producing relatively carbon neutral fuel stock for energy production or for carbon sequestration. Previous research trials at the Powell River Project (Wise, VA) have indicated that black locust (*Robinia pseudoacacia*) is a species of interest for production of biomass on mined lands, because of its high planting success, rapid growth, and relatively dense wood compared to other more commonly grown biomass species such as hybrid poplar (*Populus trichocarpa* L. x *Populus deltoides*).

Black locust's generally poor stem form is a disadvantage when using it for biomass production. In open growing conditions it can grow multiple stems and could be more costly to harvest or transport compared to single stem trees. This study is intended to test if improved stem form can be achieved through nursery selection. Treatments include black locust seedlings that were culturally selected from parents with superior stem form vs. standard seedlings. We also included an additional fertilizer treatment on half of each of these seedling types to test for limitations due to soil quality.

We included three sites, in Wise County, VA, as replicate blocks for this study. In December, 2007, each site was disked and ripped to till under existing vegetation and to alleviate possible compaction, leaving loose soil material for tree planting and root growth. This was accomplished with a heavy forestland disc harrow used to break up the soil, followed by a second pass to deep till and mound the tree planting row. In the fall of 2009, 2 m diameter circular planting areas were sprayed with 2% glyphosate to remove competing vegetation. In March of 2010 we planted the seedlings at 2.44 m spacing with standard black locust trees as border trees between measurement trees. In order to reduce site quality heterogeneity at each site we included two replications of the seedling type and fertilizer treatment at each site (Figure 1). After planting we applied 118 ml of 19:19:19 granular fertilizer in a 0.3 m circle around each seedling in one half of the treatment plots. Treatment combinations and locations were randomly assigned to each treatment plot using a random number generator. Each treatment comprised a 5 x 5 square plot of trees giving 50 measurement trees for each treatment combination at each block.

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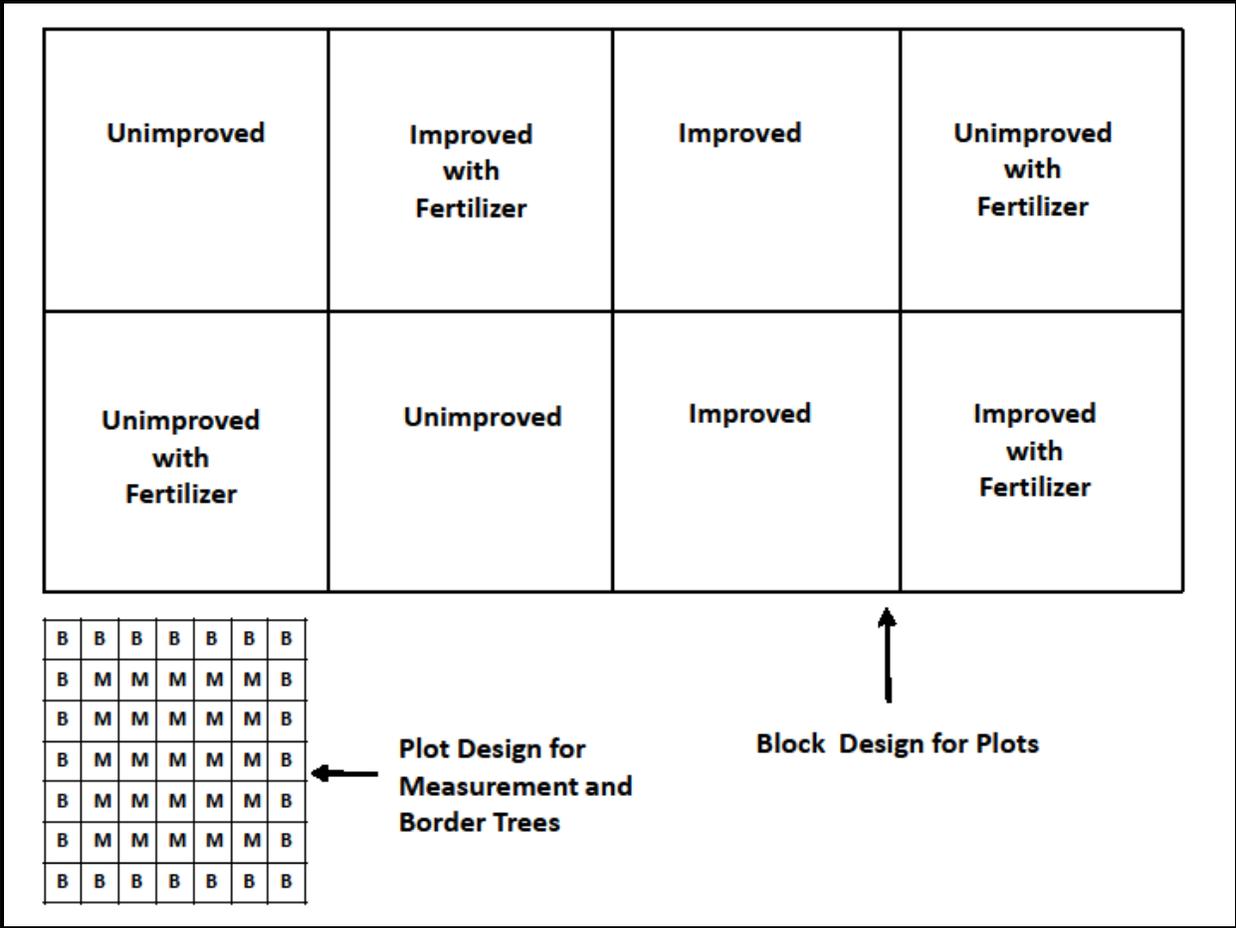


Figure 1. Example of block and plot design for black locust biomass production trial on mined lands in Wise county, VA. Three replications of this study design have been installed; treatments are randomized within each replication.