PLANTING PROPOSAL

Purpose: To make use of CSFS Boulder District's research planting program to replace a portion of a failed planting on the Bruce Victor property at minimum cost.

Research Objective: To compare survival and growth rates of ponderosa pines using various widths of weed barrier strips and to correlate survival and growth rates with strip width and distance from the end of the strip. A similar experiment is already running on a Heldt clay site; it is desirable to replicate it on a sand site.

Site description:

Location: NW1/4 NE1/4, Sec 23, T2N, R66W, S.P.M. The original planting is laid out east-west on the south side of Weld County Road 18 that runs along the section line 3½ to 3¾ miles east of US-85, between Weld County Road 31 and Weld County Road 33.

Description: A north-south driveway bisects the planting site, about 150 feet from the west end. This drive is the approximate boundary between soil types with Vona loamy sand on the west and Valent sand on the east.

The original planting, planted in the spring of 1994, was 82 feet wide by 2640 feet long. It had 22½-foot-wide buffer strips on either side. The actual area "prepared" was 37 feet wide. The outer-most rows were 24 feet apart and centered within the 37-foot strip, in effect producing buffers that were each 29 feet wide.

The site was prepared by plowing and disking, loosening the soil up to a condition that allowed it to blow. Trees were machine-planted with the blade set to a depth of about one foot, creating a trench with loose soil in which the trees were planted. Six-foot weed barrier strips were machine laid on top of the seedlings. The weed barrier machine anchors weed barrier by cutting a shallow trench, laying the edges of the weed barrier in the trench, then turning soil over the edge to hold it down. This works fine in heavy soils that stay where they're put, but in sandy soils the sand blows away followed by the weed barrier. This happened on this site.

In addition, broad-leaved weeds, particularly Russian-thistles, were allowed to grow up in the planting. These became a refuge for grasshoppers which then attacked the seedlings. The end result is that only a tiny few of the original seedlings survived.

The experiment requires undisturbed soil, excepting a plow layer. This requirement can be met by off-setting the rows in the experimental planting so the new rows are located between the original rows, maintaining the original 12-foot spacing.

The original planting had three rows. Nanking-cherry and hackberry had an average spacing of 4.80 feet (prescription: 5 feet) between seedlings. The Rocky Mountain junipers had an average spacing of 9.78 feet (prescription: 10 feet) between seedlings. The experimental planting will consist exclusively of ponderosa pines on a ten-foot spacing, except that surviving seedlings from the original planting will be preserved (With this design, these will not be closer to an experimental tree than six feet; potential tree-to-tree competition will be handled through statistics.)

The experimental planting will consist of six treatments with a ten-tree experimental unit. There will be four replications, requiring a total of 240 seedlings. The treatments are described below:

Control: These seedlings will be planted without any weed barrier.

Six-foot Squares: Each seedling will be provided with its own six-foot weed barrier square, independently anchored.

The Control and Square treatments will be assigned randomly to individual trees.

Three-foot Strips: Rows of ten consecutive seedlings, spaced ten feet apart will be treated with a three-foot-wide weed barrier strip. Each row will be twelve feet from other rows.

Six-foot Strips: Rows of ten consecutive seedlings, spaced ten feet apart will be treated with a six-foot-wide weed barrier strip. Each row will be twelve feet from other rows.

Nine-foot Strips: Rows of ten consecutive seedlings, spaced ten feet apart will be treated with a nine-foot-wide weed barrier strip. Each row will be twelve feet from other rows.

Twelve-foot Strips: Rows of ten consecutive seedlings, spaced ten feet apart will be treated with a twelve-foot-wide weed barrier strip. Each row will be twelve feet from other rows.

If three internal rows of the planting consist of six-, nine- or twelve-foot treatments and three outer rows consist of threes, controls and squares, the original intention of creating a three-row planting using six-foot minimum width weed barrier strips will be accomplished. The threes, controls and squares will be a bonus.

Altogether, the experimental portion of the planting will be 480 feet long and 72 feet wide with the county road right-of-way providing a buffer on the north and ten feet of the original buffer providing a buffer on the south. The remaining 2160 feet of length will be planted as a normal production planting in a subsequent year after the technique has been demonstrated on this particular property.

To ensure uniformity, all seedlings will be hand planted at measured positions in the planting. Weed barrier will be hand laid and anchored using 8" sod staples and three-foot lengths of re-bar driven at 20-foot intervals and tied together using ⅛" nylon rope or wire. To control grasshoppers, the entire experimental area will be mowed with a weed eater three times each summer. Growth measurements will be made at planting time and each October thereafter for a period of at least ten years.

Within the design specifications expressed above, all treatments will be assigned using a randomized block design.