

PINE NEEDLES FOR SEEDBED COVERING

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The benefits to be obtained from the use of pine needles for seedbed cover were particularly noticeable at the Clearfield State Forest Tree Nursery where severe and frequent rainstorms occurred during the spring and summer of 1956. The value of the protection offered to seedbeds and seedlings by the mulch of pine needles was studied in conjunction with operations in the Pennsylvania State Forest Tree Nurseries.

Counts and measurements were taken on four adjoining beds of red pine having two different bed coverings. Preparation of beds, seeding, and covering were done on the same day. Two beds were covered to a depth of 1/4 inch with a mixture of half sand and half sawdust, over which was placed a layer of burlap. The other two beds were covered with approximately 1/2 inch of red pine needles followed by 1/2 inch of half sand and half sawdust. Lath shades were used on the four beds to hold down the burlap and pine needle cover.

On newly seeded beds not covered by lath shades, several heavy rains washed away much of the needles, sawdust, and seed, prior to germination. The shades, however, on needle-covered beds broke the force of the rain and the sides of the lath shades prevented cross washing and breaking down of the berms. After germination, the shades and burlap were removed. The seedling stems then prevented the washing away of the needles and the needles in turn retained the sawdust.

The effects of the two types of seedbed covering on quantity and quality of germinated red pine seedlings 2 1/2 months old at the Clearfield Forest Tree Nursery in 1956 were as follows:

	<u>Burlap</u> <sup>2/</sup>	<u>Needles</u>
<b>Trees per square foot . . . . . number . . . . .</b>	<b>37.7</b>	<b>64.9</b>
<b>Tree height . . . . . inches . . . . .</b>	<b>1.32</b>	<b>1.56</b>
<b>Stem diameter . . . . . millimeter . . . . .</b>	<b>.58</b>	<b>.59</b>
<b>Trees with bent stems . . . . . percent . . . . .</b>	<b>18.0</b>	<b>3.5</b>
<b>Bed width . . . . . inches . . . . .</b>	<b>44.1</b>	<b>46.8</b>

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2/ Burlap removed after germination; only sand and sawdust cover remained.

Outstanding as the greater number of trees present on the needle-covered beds may be, more important is the number of trees that were not washed flat by sheet erosion and rilling. Erosion on the beds not covered by pine needles resulted in rounding off the berms, narrowing the beds, forming rills, some approaching gully size, and washing out many of the trees.

The greater height measurements recorded on needle-covered beds were probably due to greater moisture retention of the soil under the mulch of needles. The needles also served to hold the sawdust and sand mixture in place, thereby providing additional mulch. On beds from which the burlap had been taken, the sawdust was almost completely washed away, and adhering to the stems of the seedlings was a mixture of soil and sawdust that had been splashed up by the rains. This condition did not exist on the needle-covered beds.

Hand weeding of the needle-covered beds was easier and faster according to the weeder; the soil under the mulch tended to be more moist which permitted easier loosening of the roots in the soil.

Two possible disadvantages in the use of needles as mulch must be considered. One is the chance of introducing diseases such as needle cast; however, the needle cast fungi Lophodermium and Hypoderma can be controlled by fungicides. Another disadvantage is that pine needles may not be readily available in usable quantities, and the cost of procuring needles may make this type of cover more expensive than other types.

The possible advantages pine needles may offer as a seedbed cover are these:

1. Retain moisture; which lessens critical danger periods during droughts and reduces amount of irrigation needed.
2. Prevent hardening of surface soil, with greater precipitation absorption and less runoff.
3. Hold sawdust in place to provide additional mulch after germination.
4. Resist erosion and breaking over of seedling stems.
5. Build up organic matter.
6. Increase growth.
7. Reduce loss of berm and border seedlings.
8. Provide winter mulch, lessen frost heaving.
9. Eliminate removal operation.

Observations made during this study and data collected indicate that the benefits from the use of pine needles as a seedbed cover outweigh the disadvantages. It is interesting to note that since the pine needles are left on the beds after germination, cost of removal incident to most other coverings is eliminated. Also, since seedbed covering is only a fraction of the total cost of bed preparation and seeding, the higher quantity and quality of seedlings may more than make up any difference in the initial cost, particularly where risk of adverse weather conditions is a factor of production.