

Site Selection and Preparation for Christmas Tree Plantings



Guide H-410

The land you select will determine the success of your tree-growing operation. Under natural forest conditions, trees sometimes grow on harsh sites where no other vegetation can grow. On a commercial scale, however, everything must be done to accelerate the growth of trees. The shorter the time from planting to harvest, the greater the potential profit.

The following environmental conditions need to be considered before trees are planted:

1. Elevation
2. Aspect
3. Slope
4. Soil properties
5. Irrigation water availability
6. Existing vegetation

Elevation

Elevation is the height of the site above sea level, in feet or meters. This factor determines which species is best suited to a given site. At 3,000 to 5,000 feet, Afghan pine does extremely well. The greatest diversity of native and exotic trees can be grown at elevations between 5,000 and 8,000 feet. These include ponderosa pine, blue spruce, Douglas fir, white fir, Scotch pine, and Austrian pine. At sites with elevations above 8,000 feet bristlecone pine and limber pine are the only conifers recommended. Although others will grow, the growth rate will be too slow for a commercial operation (see figure).

Aspect

Aspect indicates the direction of a downward slope. Under natural conditions, ponderosa pine will be found growing on all aspects (north, south, east and west), while blue spruce, white fir, and Douglas fir are generally confined to north and east slopes. Generally speaking, south and west slopes face the

hot afternoon sun, and consequently, soil moisture evaporates more rapidly than on north and east slopes. With less loss of moisture, soil and air temperatures tend to be proportionally lower on the north and east aspects.

Ponderosa pine is a drought-tolerant species; therefore, it can be grown successfully on southern and western slopes. It is also somewhat shade tolerant, allowing it to grow on north and east slopes. Scotch and Austrian pines should only be attempted on south or west slopes. Firs and spruces are limited to north and east slopes, due to their high water requirements and their preference for partial shade and cool soil. Under careful management it is possible to grow spruces and firs on south or west slopes.

Slope

Slope is the incline from a horizontal plane. Preferably, tree plantations should be on level or nearly level land, to facilitate cultural and harvesting operations. Such operations become increasingly difficult as slope increases, and land with slopes greater than 30 percent should be avoided.

Air Drainage

Air drainage refers to a site's capacity for air exchange. This is important during spring frosts after trees start to grow. Cold air is heavier than warm air and it tends to move along the land surface the way water does. Sites that trap this cold air, such as river bottoms or flat valley floors, are known as frost pockets. It is necessary that cold air move from a tree plantation to land and valleys at lower levels, to avoid freeze injury. Firs and spruces are susceptible to spring frost and, therefore, should not be planted in such frost pockets. Pines are more frost resistant and can, therefore, be planted on such sites. On a slope, firs and spruces should not be planted lower

than 50 feet above the base of the slope, especially where cold air drains slowly from a valley floor.

Soil Properties

Soil type and characteristics greatly influence growth of conifers, as they do any other plant. Care should be taken when selecting the land where the trees will be planted. The most important soil factors in selecting a planting site are drainage, water holding capacity, texture, depth, inherent fertility, and pH.

On poorly drained soils, water stands on the surface for days, and water movement through the profile is slow. This means that a large percentage of the air spaces in the soil are filled with water. Tree roots need air, and lack of it will cause severe stunting or even death. On the other hand, soils that allow water to drain rapidly through the profile tend to be droughty, and more frequent irrigation is required during peak use, April to July. Deep soils that are relatively free of rocks are easier to work and usually have a more uniform distribution of soil moisture. Water-holding capacity is the soil's ability to hold water against the pull of gravity. Soil with high clay content can hold more water than sandy soil. Water adheres to the surface of soil particles, and because clay particles are smaller than sand, there are more of them in areas of equal size.

Texture refers to the proportion of sand, silt, and clay present in a soil. Soils classified as sandy loam, loam, or silt loam have the best physical characteristics for growing trees. Trees can also be grown on loamy sand with careful water management. Pines will do exceptionally well on adequately watered sandy loam soils.

The amount of nutrients present in the soil determines soil fertility. Soil tests indicate if nutrients need to be added. The tests also determine pH, the degree of soil acidity or alkalinity. Soils with a pH of 6.1 to 7.3 are best for growing conifers, although Afghan pine will grow on more alkaline soils (pH of 7.9 to 8.4).

The subsoil is probably more important than the upper layer of soil in growth and production of trees. When the subsoil is hard, drainage will be poor and roots will grow shallow. Trees may grow satisfactorily for a few years then become weak; if a dry year, a very wet year, or a severe winter occurs, they may die.

Existing Vegetation

All perennial vegetation must be eliminated. This is much easier before the trees are planted than afterwards. In addition, every effort should be made to prevent reestablishment of perennials on planted sites.

Planning

Once the site has been selected, a map should be made to scale and the land divided into growing blocks. Growing blocks should be separated by roads or access lanes. Careful thought should be given to road layout, since this will facilitate the movement of machines needed for cultural work and harvest operations, and they will also serve as fire breaks. Blocks should be 20 to 25 rows wide and may be any length.

Site Preparation

The site should be deep plowed and disked a year before planting. If the soil has moderate to high clay content, it is recommended that a cover crop be grown the year before the trees are planted. This will be turned under when the land is prepared for planting the seedling trees. It is especially important to fallow land that has grass-alfalfa vegetation. It is also a good idea to put in irrigation ditches prior to planting, so the trees can be irrigated immediately after planting.

Well prepared land speeds the planting operation, facilitates irrigation afterwards, and most important, increases survival by giving trees loose soil that does not impede root development.

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