

CLEARING THE FIELD

The Latest Techniques in Stump Removal

By Gary Chastagner and Jim Puffer

(Editor's Note: The full text of the article, entitled "Noble Fir Stump Removal – A Comparison of Stump Grinding & Excavation," appears in the Summer 2005 issue of Christmas Tree Lookout Magazine. It has been adapted for the American Christmas Tree Journal.)

Annosus root rot has recently become a major problem in many noble and Fraser fir plantations in the Pacific Northwest. Stump removal before planting is commonly recommended as one approach to minimize development of this disease in forest settings.

However, little information has been available thus far on the effectiveness of grinding or removing stumps before replanting Christmas Trees in diseased fields.

Washington State University (WSU) researchers recently discovered that in three fields, annosus root rot had killed 10 to 20% of the trees where the old stumps were not removed prior to planting. In areas where stumps had been removed before planting, mortality was reduced by 74 to 94%.

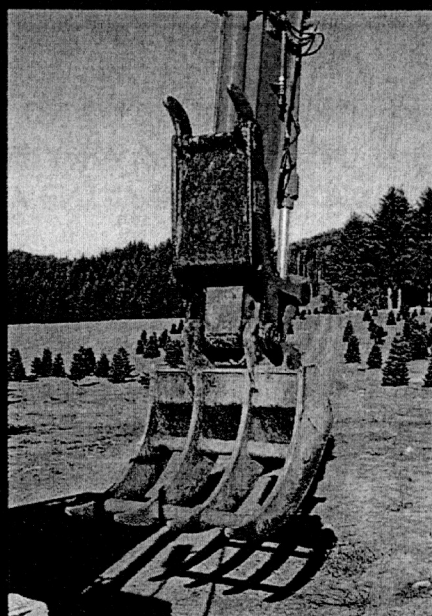
Christmas Tree growers currently use different types of equipment to remove stump and root material. Some wish to renovate their fields to improve drainage, soil structure and to allow for the planting of a cover crop before establishment of the next tree crop.

Others attempt to remove as many roots as possible to reduce the chances of reinfesting new plantings with annosus. These growers are more interested in techniques that will remove as much of the root material as possible.

Comparing Stump Removal Methods

Last summer a replicated trial was established in a recently harvested noble fir field in Oregon to compare the effectiveness of several commonly used methods of removing stumps and roots.

Twenty-four plots measuring 30' x 30' were laid out. The diameters of nine stumps within the central 18' x 18' area were measured. Then four of the plots were assigned to each of the treatment methods so there were no differences in the



Overall, the excavator with the "brush rake" removed the most material with the least amount of soil. This treatment was clearly the most effective in removing the large residual stumps and root pieces that are most likely to allow disease to survive for extended periods of time.

stump diameters between the different treatments.

Five different approaches, including the use of two different grinders, were tested in the removal of stumps and root systems.

1. A Felcon grinder was used to grind the entire area within four plots.

2. An Evergreen grinder was used to grind an 18-inch-wide strip down the centers of the rows of stumps in one set of four plots.

3. The Evergreen was used to grind the entire area within another set of four plots to compare this "broadcast" treatment with the job done by the Felcon grinder. All grinding was done to a depth of 8 inches.

4. The stumps in one set of four plots were extracted using a track hoe that was equipped with a "fin-ish bucket."

5. The stumps in another set of four plots were extracted using a track hoe equipped with a "brush rake."

In order to determine the total amount of stump and root biomass potentially present in each plot, nothing was done to the final set of

four "biomass plots."

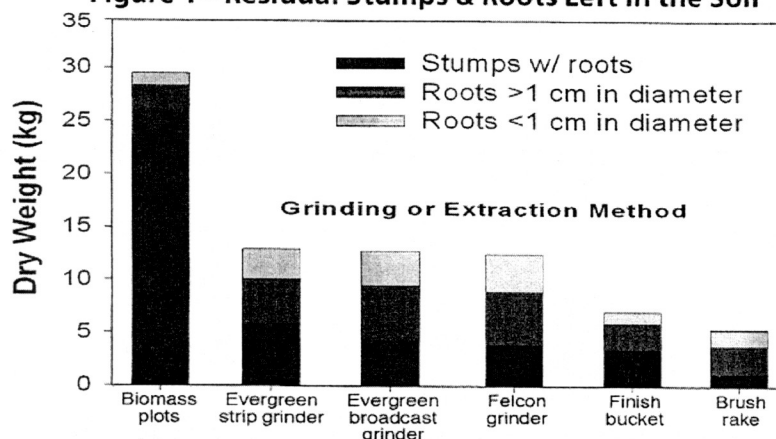
Following completion of the treatments, trenches were dug around the edges of the central 18' x 18' area that contained the nine stumps. A backhoe was used to dig out all the soil within each plot to a depth of 3 feet.

All of the residual pieces of stumps and roots were collected and dried to 10% moisture content in a WSU lab. To compare the effectiveness of each treatment, the dried material was sorted into pieces less than 1 centimeter in size and greater than 1 centimeter. The weights of the different sizes of material were compared between the treatments and the untreated "biomass" plots.

Results

The weight of the stumps and roots in the untreated "biomass" plots averaged almost 30 kilograms (66 pounds). (See Figure 1) As expected, all of the different approaches to remove stumps decreased the weight of the debris com-

Figure 1 – Residual Stumps & Roots Left in the Soil



pared to the biomass plots.

The weight of the residual stump and root pieces left after grinding was higher than either of the stump extraction methods. This is an important point for fields that have annosus root rot infestations.

It is unclear if these small root pieces would reduce the effectiveness of the grinding treatments since the long term survival of annosus is likely to be limited. The disease is more likely to spread to newly planted seedlings from larger residual stumps that remain after treatment.

Debris remaining in the Evergreen strip treatments was higher than in the broadcast treatment. In all of the grinder treatments, one of the potential problems was that only the tops of some of the stumps were ground off. The root systems below the 8-inch grinding depth were left largely intact.

Some of the stumps recovered from the grinding plots had taproots that were 5 to 6 feet long. The presence of these larger root pieces would probably decrease the effectiveness of grinding to reduce the presence of the disease.

The use of the excavator resulted in the least amount of residual material that remained in the plots (5 to 7 kilograms compared to the 12 to 13 kilograms in the grinding plots). Overall, the excavator with the "brush rake" removed the most material with the least amount of soil. This treatment was clearly the most effective in removing the larger residual stumps and root pieces that are most likely to allow the disease to survive for extended periods of time.

The physical act of removing the larger pieces with the excavator also disturbs and loosens the soil without the potential loss of soil structure that can occur with grinding. This aids in the renovation of the soil, which in itself is likely to improve the growing environment for a future crop of Christmas Trees. 🌲

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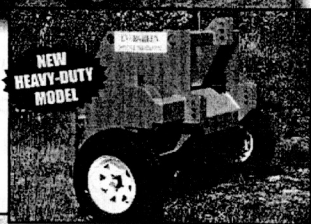
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