

QUALITY CONTROL FOR TREE PROCESSING AT

WIND RIVER NURSERY<sup>1</sup>

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ABSTRACT

Discusses some methods and procedures for seedling quality control at U.S. Forest Service, Wind River Nursery, Carson, Washington. Describes why and how the training of people and good communications with the field improves stock quality and thus field survival.

The Wind River Nursery is located on the Gifford Pinchot National Forest in the State of Washington. We are ten miles north of the Columbia River which separates Washington from Oregon. We are fifty miles east of Portland, Oregon. As to Mt. St. Helens, we are only 25 miles SE of the now famous mountain.

Our production has averaged thirty million seedlings annually the past eight years. Our production capacity is 18 million. We produce for 19 National Forests in Oregon and Washington, The Bureau of Land Management, and Bureau of Indian Affairs on both sides of the Cascade Range. We grow 15-20 species. Douglas-fir accounts for 55% of the production while true firs (*Abies*) account for about 25% of production. The remaining production is in pines, spruce, larch and cedars.

Annual precipitation is 110-120", including 80" of snowfall. The elevation is 1200-1300 feet. Our soils are derived from glaciated material and of course from volcanic origins. Consecutive frost free days are usually 120-150 days with warm, dry summer days with cool evenings in the 50's and 60's. Our winters are varied from being almost completely open to totally snow covered. Most years the snow cover is intermittent and winter temperatures are moderated by Pacific marine air.

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At Wind River Nursery we sow approximately 500 individual seed lots per year. The genetic origin may be adjacent to the moist Pacific Ocean at 1000' elevation to the much drier interior east of the Cascade Range upwards to 7000' elevation.

We would like to think that everything would go according to Hoyle, but realistically it never has and probably never will with the variables encountered in producing and planting seedlings.

To produce quality stock research specialists and experience have indicated the acceptable regimes of soil productivity, density parameters, pest control methods and cultural practices. Engineering has provided specific equipment and facilities that accommodate the sensitivity and perishableness of seedlings.

The nursery staff is assigned the task of assimilating and implementing this information through a systems approach at the nursery. Out of this comes a management plan that coordinates facilities, equipment, seedlings and people. The nursery employees anticipate and take corrective action prior to and during adverse weather conditions to protect the seedlings.

After all this has been accomplished to produce what we feel to be good planting stock we occasionally hear distant negative reports from the silviculturists and reforestation people in the field.

The field people have basically two complaints. One, you didn't accommodate our specific field problems; or two, nursery performance. There are several ways to respond to complaints. My personal preference for reducing the number and severity of complaints is what I refer to as the mutual triple E method - Educate, Enhance and Encourage, which boils down to communication and documentation.

Dealing with a problem is a lot like a geometry problem. You have to identify the given. There are many givens but the predominant given is the CUSTOMER who has to plant the seedlings. If you want to please management, please the customer.

There are probably as many approaches to pleasing the customer as there are customers, but the basic rules we work with are to be honest with the customer even when it hurts our pride and to communicate in such a manner that there are no surprises to the customer.

You can't deal with another person's problems until you have taken care of your own. So at the nursery we attempt to educate our employees so survival and growth in the field is enhanced. From this we are all encouraged.

Sometimes the simplest of items makes the difference between a great success and a satisfactory accomplishment. We have an orientation session for our employees at the time of employment which consists of an employee receiving a handout orientation book which gives information the employee desires

immediately. The employees are given a slide tape presentation and tour of the nursery and given general information as to their specific tasks and the importance of the roles they are playing in the reforestation effort. The positive results of their effort have played a significant role in our quality control program. The culmination of all the effort in producing the seedlings is left in the hands and minds of these temporary employees.

When employees are assigned to tasks such as pulling, grading, packaging and storage, written procedures and standards are again discussed.

In the processing building the employee is kept informed of changing specifications, and instructions by means of grading informational boards which provide information for all concerned. With this type of informational display it is amazing how well employees react and interchange with each other.

Our permanent employees, including equipment operators, maintenance workers, supervisors and laborers, participate in silvicultural training sessions and meetings, make visitations to various planting units, and meet with field people at the nursery. They become more knowledgeable so better leadership and decision making can be accomplished through the myriad of details encountered.

In dealing with over 100 customers there is always change in personnel. Some of the change brings inexperienced personnel. To assist the inexperienced person we have produced a stock catalog that is updated biannually. The stock catalog deals with very basic information as to nursery administration, field relationships and provided services and costs. The catalog's main intent is to present photographs of all the species and age classes and to correlate size and density. The person is better able to identify what the nursery is producing at any point in time and when ordering seedlings to be sown will not be surprised as to what they thought they should receive. The catalog has a soliciting intent; it suggests we are available for inquiries and assistance.

When sowing requests are made we urge our customers to specify the size class they desire. At first we had extremes. The customers are presently accomplishing a good job of specifying size classes and even justifying why they selected such a size class. We can't always deliver, but at least the customer knows we understand their problem and appreciates us striving to compensate for special requests. Within two to three crops their requests are usually met.

In most cases it has been my experience that positive relations turn sour when the nursery fails to communicate with field units the identification of a problem lot far enough in advance so timely, corrective adjustments can be made. When a problem lot has been reported in a timely

manner, by working together to make the best out of a bad situation, a high level of trust is maintained. All of us have a certain amount of flexibility. The field people at least like to have an adjustment period where they may be able to enhance a poor situation.

A very good informal communication is to encourage field visitation to the nursery where first hand observations can be made of the forthcoming seedlings. Any stock or logistical support problems can be dealt with very satisfactorily far enough in advance so surprises are eliminated or reduced in scope. It has been our experience that this visitation is probably the most cost effective ingredient in all the steps of reforestation. In addition, the visitation establishes a long-range relationship by keeping current on subtle changes both at the nursery and in the field.

The key to success is for the producer of stock to totally inform the customer of the condition of the customer's trees. It's a humbling experience, but we found the customer to be a very adept person in reconciling nursery performance to planting site conditions. It's much easier for the producer to describe the lot of seedlings rather than have the customer explain his varied site conditions.

Visitation works in reverse; we, the people who produce seedlings make numerous visitations to the planting sites. When you see the effects of big game browsing, vegetative competition, restricted planting spot selection, extremes of sites and weather it makes you think twice about your grading specifications and the withholding of information that may be important for the survival and growth of the seedling.

Sometimes the best laid plans go astray. When this happens individuals like to know what went wrong. Thus we provide a seedling information card that tells our actions in mathematics. For example, if the density is too high we can determine the reason and the accountable individual. The seedling information card is a historical record of the seedling lot as to cultural practices, allocations, inventory and occurrences that affected the seedling's condition.

In addition, a silvicultural sheet is used to document the conditions, the steps and the responsible person(s) through lifting to delivery. Hopefully the customers will do the same on their end of operations. This has helped greatly in determining any planting loss so the problem can be identified and corrected. It has greatly helped reduce customer suspicion of the nursery activities and conditions. It has increased awareness that an accumulation of little misdeeds reduces survival and growth.

We monitor plant moisture stress in the field prior to lifting as required and always upon receipt at the pre-cold storage rooms. At readings of 8-10 PMS, pulling crews are alerted and necessary adjustments are made to hold PMS under 8. If this cannot be accomplished we stop field operations at a 12 PMS reading.

Our laboratory personnel also determine the shoot-root ratio by a volumetric measure of water displacement.

At any time during our operations that we suspicion any ill effects to seedlings, we order a seedling vigor test to determine if trees were stressed and estimate predicted field survival. This test requires 4 weeks for bud burst and 8 weeks for predicted survival. The time lag is long but understanding can be gained as to why the plantation failed or succeeded. I prefer this delay rather than lingering doubt as to what was the real problem. The BLM is testing a planting contract this year where tree planters will be paid on the survival and growth of their planting and care of the plantation over a three year period. To remove any claims as to the quality of seedlings furnished the seedling vigor test will be used in all their contracts. This seedling vigor test was developed by Professors of Forestry, Richard K. Hermann and Denis P. Lavender, at Oregon State University, School of Forestry. In a private communication with Bill Lopushinsky, Plant Physiologist at Forestry Science Lab at Wenatchee, Washington he felt this was the best test we now have available as it helps the forester to understand the performance of a plantation.

In the conditioning and processing of seedlings we feel refrigeration and humidity are most important in maintaining seedlings that have to be stored up to six months.

Temperatures and humidities are constantly monitored and documented. Flucuations are only about one degree for temperature and 5% for relative humidity.

Our processing room is made up of 8 grading tables. A quality control person is assigned to each table. This person is accountable to employees being informed of specifications and instructions. Some lots are graded into different sizes, or combining of species if desired. The conveyor belts have target lines for various root lengths. Water is available for moistening or washing. A underground tunnel runs beneath the processing building. It is used to dispose of culls, soil, debris and excess water. Between each seedling lot, culls are placed into the tunnel to avoid potential contamination to the seedling lot.

We identify all bags to be shipped to field with appropriate nomenclature which includes table number. This is in the event of a complaint so we can track the responsible quality control person to identify and correct the problem. Every step of our nursery operations includes monitoring by the certification agency for the State of Washington.

Deliveries are made in refrigerated trucks. We attempt to deliver in one day. Temperatures are monitored by thermographs placed in strategic parts of the load. Our people are instructed to handle the bags as if they were soft-shelled eggs.

Slide Presentation.

I have appreciated this opportunity to present this paper on Quality Control at Wind River Nursery. As is the usual case, I have learned much more than I have given. Reforestation is big business and dealing with a perishable commodity intertwined with sometimes uncontrollable and unpredictable variables, quality control of all activities must be communicated and documented so a cost-effective job is accomplished. Quality Control comes about through communication with people.