Chapter 1 : Planting Stock and Quality

Frankel, Susan. Phoma blight: its history and control at the Humboldt Nursery. Forest Pest Management Report San Francisco, CA: State and Private Forestry, Forest Service, Pacific Southwest.

An Orchid nursery A tree nursery using gutters to decrease growing costs Nurseries can grow plants in open fields, on container fields, in tunnels or greenhouses. In open fields, nurseries grow ornamental trees, shrubs and herbaceous perennials, especially the plants meant for the wholesale trade or for amenity plantings. On a containerfield nurseries grow small trees, shrubs and herbaceous plants, usually destined for sales in garden centers. Nurseries also grow plants in greenhouses , a building of glass or in plastic tunnels, designed to protect young plants from harsh weather especially frost. While allowing access to light and ventilation, modern greenhouses allow automated control of temperature, ventilation and light and semi-automated watering and feeding. Some also have fold-back roofs to allow "hardening-off" of plants without the need for manual transfer to outdoor beds. Most nurseries remain high standard. Although some processes have been mechanised and automated, others have not. It remains highly unlikely that all plants treated in the same way at the same time will arrive at the same condition together, so plant care requires observation, judgment and manual dexterity; selection for sale requires comparison and judgment. The largest UK nurseries have moved to minimize labour costs by the use of computer controlled warehousing methods: Picking merely requires selection of a batch and manual quality control before dispatch. In other cases, a high loss rate during maturation is accepted for the reduction in detailed plant maintenance costs. Business is highly seasonal, concentrated in spring and fall. There is no guarantee that there will be demand for the product - this will be affected by temperature, drought, cheaper foreign competition, fashion, among other things. Annuals are sold in trays undivided containers with multiple plants , flats trays with built-in cells , peat pots, or plastic pots. Perennials and woody plants are sold either in pots, bare-root or balled and burlapped and in a variety of sizes, from liners to mature trees. Plants may be propagated by seeds , but often desirable cultivars are propagated asexually. The most common method is by cuttings. These can be taken from shoot tips or parts of stems with a node softwood cuttings or from older stems hardwood cuttings. Herbaceous perennials are also often propagated by root cuttings or division. For plants on a rootstock grafting or budding is used. Older techniques like layering are sometimes used for crops which are difficult to propagate. Conditioning[edit] With the objective of fitting planting stock more ably to withstand stresses after outplanting, various nursery treatments have been attempted or developed and applied to nursery stock. Buse and Day , [1] for instance, studied the effect of conditioning of white spruce and black spruce transplants on their morphology, physiology, and subsequent performance after outplanting. Root pruning and wrenching modified stock in the nursery by decreasing height, root collar diameter, shoot: Fertilization reduced root growth in black spruce but not of white spruce. Hardening off, frost hardiness[edit] Seedlings vary in their susceptibility to injury from frost. Damage can be catastrophic if "unhardened" seedlings are exposed to frost. Frost hardiness may be defined as the minimum temperature at which a certain percentage of a random seedling population will survive or will sustain a given level of damage Siminovitch , Timmis and Worrall Conifer seedlings are considered to be hardened off when the terminal buds have formed and the stem and root tissues have ceased growth. Other characteristics that in some species indicate dormancy are color and stiffness of the needles, but these are not apparent in white spruce. Forest tree nurseries[edit] Whether in the forest or in the nursery, seedling growth is fundamentally influenced by soil fertility , but nursery soil fertility is readily amenable to amelioration, much more so than is forest soil. Nitrogen , phosphorus , and potassium are regularly supplied as fertilizers, and calcium and magnesium are supplied occasionally. Applications of fertilizer nitrogen do not build up in the soil to develop any appreciable storehouse of available nitrogen for future crops. Fertilization permits seedling growth to continue longer through the growing season than unfertilized stock; fertilized white spruce attained twice the height of unfertilized. Nutrients in oversupply can reduce growth [9] [10] or the uptake of other nutrients. The runts at the lower end of the scale are usually culled to an arbitrary limit, but, especially among bareroot stock, the range in size is commonly considerable. The stock was regraded into large,

medium, and small fractions according to fresh weight. Without site preparation, large stock were more than twice the size of small stock after 10 years. The value of large size at the time of planting is especially apparent when outplants face strong competition from other vegetation, although high initial mass does not guarantee success. The field performance among various stock types in Ontario plantations was examined by Paterson and Hutchison The nursery stock was grown at Midhurst Forest Tree Nursery, and carefully handled through lifting on 3 lift dates, packing, and hot-planting into cultivated weed-free loam. Lifting date had no significant effect on growth or survival. The survival and growth of Engelmann spruce and subalpine fir outplanted in 3 silvicultural trials on such sites in gaps of various sizes were compared by Lajzerowicz et al. Concluded that plantings of conifers in clearcuts at high elevations in the southern mountains of British Columbia are likely to be successful, even close to timberline; and group selection silvicultural systems based on gaps 0. Gaps smaller than 0. Planting stock[edit] Planting stock, "seedlings, transplants, cuttings, and occasionally wildings, for use in planting out," [20] is nursery stock that has been made ready for outplanting. The amount of seed used in white spruce seedling production and direct seeding varies with method. Quality is fitness for purpose. A distinction needs to be made between "planting stock quality" and "planting stock performance potential" PSPP. The actual performance of any given batch of outplanted planting stock is determined only in part by the kind and condition, i. The PSPP is impossible to estimate reliably by eye because outward appearance, especially of stock withdrawn from refrigerated storage, can deceive even experienced foresters, who would be offended if their ability were questioned to recognize good planting stock when they saw it. Gradually, however, a realization developed that more was involved. The intuitive "stock that looks good must be good" is a persuasive, but potentially dangerous maxim. That greatest of teachers, Bitter Experience, has often enough demonstrated the fallibility of such assessment, even though the corollary "stock that looks bad must be bad" is likely to be well founded. The physiological qualities of planting stock are hidden from the eye and must be revealed by testing. The potential for survival and growth of a batch of planting stock may be estimated from various features, morphological and physiological, of the stock or a sample thereof. The size and shape and general appearance of a seedling can nevertheless give useful indications of PSPP. In low-stress outplanting situations, and with a minimized handling and lifting-planting cycle, a system based on specification for nursery stock and minimum morphological standards for acceptable seedlings works tolerably well. Length of leading shoot, diameter of stem, volume of root system, shoot: Schmidt-Vogt , [28] for instance, found that whereas mortality among large outplants is greater than among small in the year of planting, mortality in subsequent growing seasons is higher among small outplants than among large. Much of the literature on comparative seedling performance is clouded by uncertainty as to whether the stocks being compared share the same physiological condition; differences invalidate such comparisons. Quantification of root system morphology is difficult but can be done, e. The effect of sub-optimal conditions is to induce stress in the plants. The nursery manager aims, and is normally able to avoid stresses greater than moderate, i. The adoption of nursery regimes to equip planting stock with characteristics conferring increased ability to withstand outplanting stresses, by managing stress levels in the nursery to "condition" planting stock to increase tolerance to various post-planting environmental stresses, has become widespread, particularly with containerized stock. Outplanted stock that is unable to tolerate high temperatures occurring at soil surfaces will fail to establish on many forest sites, even in the far north. HSPs, present constitutively in black spruce and many other, perhaps most, higher plants [34] [35] [36] [37] are important both for normal cell functioning and in a stress response mechanism following exposure to high, non-lethal temperature. In black spruce at least, there is an association between HSPs and increased levels of heat tolerance. HSP73 was detected in black spruce nuclear, mitochondrial, microsomal, and soluble protein fractions, while HSP72 was observed only in the soluble protein fraction. Heat shock affected the abundance of HSPs depending on protein fraction and time of day. Without heat shock, nuclear membrane-bound HSP73 was absent from plants in the morning and only weakly present in the afternoon, and heat shock increased the abundance of nuclear membrane. In the mitochondrial and microsomal protein fractions, an afternoon heat shock reduced HSP73, whereas a morning heat shock increased HSP73 in the mitochondrial but decreased it in the microsomal fraction. In all instances, shoot and root heat tolerances were significantly greater in the

afternoon than in the morning. Planting stock continues to respire during storage even if frozen. Navratil [40] found that closed containers in cold storage averaged internal temperatures 1. Depletion of reserves can be estimated from the decrease in dry weight. The propensity of a root system to develop new roots or extend existing roots cannot be determined by eye, yet it is the factor that makes or breaks the outcome of an outplanting operation. The post-planting development of roots or root systems of coniferous planting stock is determined by many factors, some physiological, some environmental. New root growth can be assumed to be necessary for successful establishment of stock after planting, but although the thesis that RGC is positively related to field performance would seem to be reasonable, supporting evidence has been meager. The physiological condition of seedlings is reflected by changes in root activity. This is helpful in determining the readiness of stock for lifting and storing and also for outplanting after storage. Simpson and Ritchie [46] debated the proposition that root growth potential of planting stock predicts field performance; their conclusion was that root growth potential, as a surrogate for seedling vigor, can predict field performance, but only under such situations as site conditions permit. In its present form, RGC testing is silviculturally useful chiefly as a means of detecting planting stock that, while visually unimpaired, is moribund. When seedlings exceed 20 bars PMS in storage, survival after outplanting becomes problematical. The Relative Moisture Content of stock lifted during dry conditions can be increased gradually when stored in appropriate conditions. During the growing season, g increased to about 0. Minimum xylem pressure potential PSIm was initially During the first half of the growing season, PSIm was below turgor loss point. The osmotic potential at turgor loss point decreased after planting to In the greenhouse, minimum values of PSIT were Available turgor TA , defined as the integral of turgor over the range of RWC between PSIb and xylem pressure potential at the turgor loss point was 4. The stomata of both white and black spruce were more sensitive to atmospheric evaporative demands and plant moisture stress during the first growing season after outplanting on 2 boreal sites in northern Ontario than were jack pine stomata, [50] physiological differences that favoured growth and establishment being more in jack pine than in the spruces. During the first growing season after outplanting, containerized seedlings of both species had greater needle conductance than bareroot seedlings over a range of absolute humidity deficits. Needle conductance of containerized seedlings of both species remained high during periods of high absolute humidity deficits and increasing plant moisture stress. Bareroot outplants of both species had a greater early season resistance to water-flow through the soilâ€”plantâ€”atmosphere continuum SPAC than had containerized outplants. Resistance to water flow through the SPAC decreased in bareroot stock of both species as the season progressed, and was comparable to containerized seedlings 9 to 14 weeks after planting. Bareroot black spruce had greater new-root development than containerized stock throughout the growing season. The greater efficiency of water use in newly transplanted 3-year-old white spruce seedlings under low levels of absolute humidity difference in water-stressed plants immediately after planting [52] helps explain the commonly observed favourable response of young outplants to the nursing effect of a partial canopy.

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Chapter 2 : CiteSeerX â€” IMPROVING PLANTING STOCK QUALITYâ€”THE HUMBOLDT EXPERIENCE

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March 01, By Deborah Catalano Ruriani No tags available Inventory accuracy is vitally important; the challenge lies in achieving it. Out-of-stock items cause profit loss, but paying for inventory storage and transportation also impacts the bottom line. To guide your company in the right direction, Mike Honious, vice president of engineering, Ozburn-Hessey Logistics, shares 10 practical ways to improve inventory accuracy. Pick a quality program and stick with it. Make sure everyone in the company supports the program and uses it. Know what you are up against. What is your current inventory accuracy rate? Once you establish a bench mark, set an improve ment goalâ€”aim either for a specific percentage or dollar figure. Check your results often to make sure you achieve and sustain improvements. Keep your processes simple. Examine your entire supply chain. Create and measure a "perfect order" metric from point of origin to final destination. This allows you to track inventory performance across your entire network and improve accuracy throughout the supply chain. Duplicate these successes and share improvement strategies so all areas of the organization can benefit. Also, hone your forecasting skills and help business partners, vendors, and customers do so as well. Establish product traceability during the distribution life cycle. Include your entire inventory pipelineâ€”inbound and outbound shipments as well as inventory in the DC. Never move product unless the action is authorized and recorded. Select technology that fits your needs. A variety of inventory systems exist, from simple paper to advanced RFID technology. It is affordable and accurate when used properly. Implement a continuous cycle-counting program. Using cycle counting to maintain high levels of accuracy is one of the best ways to identify problem areas. An effective cycle-counting program eliminates the need for physical inventory expenses. Make sure your employees are trained and informed. Choose supply chain partners who offer systems that interface with your inventory system. Many inventory issues stem from data and transmission failures. Working with capable supply chain partners and using compatible systems helps improve end-user delivery accuracy and customer service. Make sure everyone through out the organization owns inventory accuracy. Every business unit with in the company should understand its impact on inventory accuracy. Many companies overlook the simple truth:

Chapter 3 : 5 Ways to Improve Quality | calendrierdelascience.com

APPENDIX A. HUMBOLDT ORIGINS Humboldt Nursery was the outcome of a meeting on Douglas-fir regeneration policy, held at Willow Creek, California, October 30, Present were.

Enter your email to reset your password Or sign up using: Staff Getty Every business owner likes to think that he or she has a commitment to quality. If that were truly the case, of course, no product would ever disappoint, and no service would result in a complaint. So how can you improve quality at your company? Here are 5 steps you can take to put you on the right path. Edwards Deming, the father of the quality movement, famously laid out 14 points for managementâ€"chief among them, the notion of "constancy of purpose. Unless a business views quality as its single, non-negotiable goal, workers will inevitably feel the need to make tradeoffs and quality will slip. It means that the long term benefit of the organization is not sacrificed to hit quarterly targets. If you are, you should tell your staffâ€"and then think about how you will handle the first conflict between your stated objective and a pressing deadline or an attractive short cut. The Power of Purpose 2. If you are going to commit to quality, first you must define exactly what quality is. Standards are set and, if too much deviation occurs or if quality appears to be trending in the wrong direction , the manufacturing process is altered. Tracking quality is admittedly more difficult in a service business, and efforts by groups such as the International Organization for Standardization known as ISO to create meaningful benchmarks beyond manufacturing have had mixed results. One way to gauge customer satisfaction and, by extension, the quality of your service is by tracking what is called a net promoter score. Devised by a Bain consultant named Fred Reichheld, a net promoter score keeps tabs on the number of customers who would recommend a business to their friends. A customer who answers 9 or 10 is seen as a promoter; a customer who answers 7 or 8 is seen as passive; and a customer who gives a company a score of 6 or lower is seen as a detractor. By subtracting the number of detractors from the number of promoters, a company arrives at its net promoter score. How to Address Quality Issues 3. An old saw of the quality movement is that any business with a quality control department is doomed to poor performance, for it has demonstrated to every other employee that quality is not his or her chief concern. Instead, quality experts recommend that businesses train workers at all levels to look for ways to improve quality and to ameliorate problems. Training takes on several dimensions. For starters, you should set up a new-employee initiation program that trains workers to focus on quality issues from their first day on the job. Different CEOs have different perspectives on how best to do this. He personally leads all new-employee orientation training sessions which last several days because he believes an employer never has a better chance of instilling values and a sense of purpose than right after he or she has hired a new employee. Let them know what problems you have had in the past, how you corrected these problems, and where your company stands with respect to its quality goals today. You should also go over your definition of quality in detail, and show them how you measure quality see the previous section. By tying individual behavior to an overall system of work, and then showing where that system can, on occasion break down, you will be giving workers the information they need to be good stewards of your business. Your staff members may roll their eyes at the introduction of such a dated technique, but organizing employees into quality circles can be an effective way to identify and address problems. Simply put, quality circles are groups of employees who are encouraged to assess processes and recommend improvements, all with the goal of promoting quality, efficiency, and productivity. The concept was developed by Deming in post-war Japan, and made its way to the United States in the late s. At one point, half of all large corporations had adopted quality circles, but then interest in them faded. Quality circles, by any other name, are teams of workers who are given the authority and responsibility for making a business better. Once you have invited workers to join a quality circle, provide them with adequate resources to pursue their analysis, and schedule a time in the future at which they may present their findings. Remember, the purpose of the exercise is less to solve a particular problem than it is to engage workers in the process of finding and addressing concerns. How to Set Up Quality Circles 5. Have the right attitude. Too many people turn the quest to improve quality into something oppressive. No less an authority than Deming rejected the idea that the quality management had to be dreary

and involve a lot of negativity. This attitude is not necessarily easy to adopt and runs afoul of some of the basic management practices we take for granted. For example, Deming was not a fan of performance reviews, as the writer John Case has explained.

Chapter 4 : Plant nursery - Wikipedia

Abstract. Abstract: A seedling testing program was developed to improve the survival and growth potential of planting stock produced in the USDA Forest Service Humboldt Nursery, situated on the Pacific Coast in northern California.

Chapter 5 : Quality Plant Stock | Sunnyview

efforts aimed at improving planting stock quality, he must increas- ingly strive to develop techniques for producing an array of prod- ucts that are more closely matched to specific site requirements.

Chapter 6 : Improve Plant Growth Stock Photos & Improve Plant Growth Stock Images - Alamy

the potential role of nurseries in improving access to high quality planting stock and promote appropriate silvicultural systems to improve the productivity of.

Chapter 7 : Improving Inventory Accuracy - Inbound Logistics

of planting stock quality and its prediction (Sutton,). Part A of this three-part paper is an account of tests of root growth capacity (RGC) (Stone and Jenkinson, ; Burdett,) on sub-samples of planting stock used in.