ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

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The Alberta Tree Nursery and Horticulture Centre is a branch of the Plant Industry Division of Alberta Agriculture. This center and the Alberta Horticultural Research Centre, located in southern Alberta at Brooks, comprise the provincial government's program of support and involvement in horticulture. The Tree Nursery and Horticulture Centre is located approximately 3 km northeast of the present boundary of the rapidly expanding City of Edmonton. The grounds of the nursery occupy nearly one section of land. This extensive holding is used primarily for the production of planting stock, which Alberta Agriculture distributes to Alberta farmers and acreage owners through the shelterbelt program.

The first tree nursery, established in 1910, was under federal jurisdiction. In 1930, when the Province of Alberta assumed responsibility for the nursery, it was relocated to the Alberta Hospital. This site was inadequate for expansion needs, and it was moved to its present location at Oliver in 1949, hence the name Oliver Tree Nursery. During the last 30 years the grounds have expanded to their present size, with a net productive acreage of 220 acres. The nursery is open for public tours during weekdays. Anyone wishing a tour of the production facilities is encouraged to contact the nursery office.

DESCRIPTION

The permanent staff at the center consists of 30 technicians, 5 professional horticulturists, and 3 clerical workers. Seasonal workers are hired from April until December. During the busiest period the nursery employs up to 110 seasonal laborers. The most hectic time at the nursery is during the spring shipping of plant material. This is a 4-week period between April 20 and May 20. The second most active period is during October, when the plant material is harvested and graded.

During the late sixties and early seventies, all the buildings were replaced and new facilities were added. This renewal program is still continuing and additional storage and office space is planned. The present facilities consist of a packing shed and cold storage building, the seed extraction and seed storage facilities, and the machinery maintenance garage.

During Peter McCalla's long career as the head of the Horticulture Branch of Alberta Agriculture, he initiated the tree distribution program and coached the development of the tree nursery during the most hectic 25 years. Upon his recent retirement the arboretum and fruit orchard were named in his honor.

The nursery grounds are serviced with irrigation water from a storage reservoir of 30 acre-feet, which was created when the small Horse Hill Creek was dammed.

SHELTERBELT PROGRAM

The original function of the Oliver Tree Nursery was to propagate the plant material needed for the farm shelterbelt program. The production aim for the annual distribution is now 3.5 million seedling-sized plants. The establishment of farmstead windbreaks is commonplace throughout Alberta. A belt of trees around the farmhouse reduces the effect of the cold winter winds and by its shade and verdure creates a more pleasant environment for the farm family. The planting of trees and shrubs around the farmstead modifies air and soil temperatures and humidity. It protects the family and livestock from high winds, airborne dust, and drifting snow. It can also help reduce noise levels from adjacent roads as well as beautify the farmyard.

Establishment of field windbreaks is another important use of the planting stock distributed. Farmers can obtain the planting stock free of charge but are required to establish and maintain these plantings. The planting of field windbreaks helps control soil erosion, prevents the abrasive action of rapidly moving soil particles on tender seedlings, and reduces other harmful effects of blowing winds. Accumulation of snow behind windbreaks is beneficial for better retention of moisture, but it can also create problems if windbreaks are planted too close to traffic arteries. Wildlife plantings are occasionally requested, and some of the material is grown for this purpose.

The nursery distributes the plant material in the spring. An individual files an application for planting stock with the local District Agriculturist in the year prior to delivery of the planting stock. Processing of these requests is handled during the winter. In total, 33 tree and shrub species are propagated for the shelterbelt program. Smaller quantities of about 10 shrubs are propagated for wildlife promotion. Caraganas are produced in the greatest volume because of their usefulness in field windbreaks.

Most plants leave the nursery as 2-year-old seedlings, about 50 cm in height. The poplars and willows are 1-year-old rooted cuttings, while the conifers are 4-year-old transplants. All plant material is packaged in bundles of 10 for conifers and 25 for deciduous stock. The planting stock is graded prior to handling.

The agriculture zone of Alberta is subdivided into six regions. Every region consists of a number of counties or municipal districts. The county governments are directly involved in the shelterbelt plant activities. Tree planters are made available to farmers by county officials to assist in planting the seedling stock. In a few years time the newly planted shelterbelts will become functional and farmers will benefit from the protection they provide. The nursery recommends planting multiple-row shelterbelts and using conifers as part of the farmstead shelterbelt layout. This will make the windbreak more effective during the winter. Clean cultivation of the shelterbelt margin prevents weeds from becoming a problem. Nursery staff are available to help farmers design windbreaks and to plan their farmstead.

The actual growing of the shelterbelt plant material takes place in designated fields of the nursery. The soils of the nursery are of a heavy-textured black clay loam. Because of the heaviness of this soil, it is not ideally suited for nursery crop production, but the soil is fertile and proper management keeps it arable. As a rule, a nursery crop stays on the same field for 2 years. If a field is very heavy, run down, or infested with weeds it will be seeded to grass and left this way for a few years.

The normal rotation procedure is for a field to be in production 2 years and then given 1 year of rest. During this fallow season, the field will be given a dressing of peat moss, which is then rototilled into the soil. The field is seeded to oats, which is plowed under that same summer.

The deciduous stock is seeded in the fall, usually in the first week of October. Crops are row seeded, six rows to a seedbed. Since most seeds are stratified, a great deal of the seeding is done by hand. The seeded beds are covered with a light dressing of sand. An underground irrigation system is in place to maintain optimum moisture conditions. In 2 years these crops are mature and ready for harvesting.

In the past, coniferous plants were also seeded outdoors in seedbeds; however, the coniferous seedlings are now raised in containers. The survival rate of these container-grown transplants is close to 100%. Transplanting of spruce and pine starts in the middle of August and is usually completed by the second week in September. This planting stock will be harvested 3 years later. The fields are irrigated if rainfall is inadequate.

The propagation of willows and poplar by hardwood cuttings is another major activity in the plant propagation program. A stock of willow and poplar is kept at the nursery. In late September, year-old whips are tied in bunches before harvesting. The whips are harvested in the winter and cut into 15-cm sticks. The nursery requires approximately 1 million hardwood cuttings in order to produce 700 000 rooted cuttings the next fall. The cuttings are hand planted. This activity takes place from the end of May until the second week in June. Irrigation is utilized until sprouting of the cuttings is well established. Poplar cuttings can grow to a height of 3 feet before the middle of October. From the end of May until September, weed control is the most labor-intensive activity at the nursery.

Preplanting treatments of herbicides is a common practice for weed control. Chemicals may also be used on the established 1-year-old plants. Mechanical weed control is used on the established 1-year-old crops and transplants and has the advantage of breaking up the soil crust that readily develops on these heavy clay soils. Hand weeding is always a big job on the newly seeded fields. This can be a problem during extended wet periods when the weeds have an opportunity to get ahead of the nursery crop; however, the seedbeds are usually cleaned up during June.

The harvesting of all deciduous stock begins in October. Prior to hand lifting the crop, the plants are undercut with a shaking blade. The taller crops are cut back with a chopping machine that removes the upper portions of the plants. This results in plants with maximum heights of 50 cm. This plant material is then graded, bundled, and counted prior to storage. Stock is both outdoors and indoors. The heeling-in grounds contain about one-half of the crop by the middle of November. The remainder of the crop is stored in pallet boxes in a temperature-controlled building, where temperatures are maintained around 0°C. The roots are protected with a layer of peat moss.

Shipping of the plants usually starts the last week of April. The plant material, with moist peat moss around the roots, is wrapped first in polyethelene and then burlap. Each bundle is addressed to the individual farmer. The county officials collect their district's orders at the Alberta Tree Nursery and then distribute them to the farmers from their office. The nursery deals with about 75 districts in this manner.

An important segment of the nursery operation is the equipment maintenance garage, which is operated by three machinery maintenance mechanics. In addition to the maintenance and repair work, the garage workshop also builds specialized equipment.

The irrigation supervision and coordination are handled by one person. The nursery employs five gardeners and two supervisors, who are responsible for all tractor and spraying operations and shelterbelt maintenance.

PROVINCIAL PARKS PROGRAM

The provincial parks program is much smaller than the shelterbelt program. This material is all grown in large containers, either 1-, 2-, or 5-gal pots. The provincial parks organization requires larger planting stock 1 to 2 m in size. To maintain the natural settings of the parks, only native material is grown for this program. The management of the greenhouses is the responsibility of the technician in charge of the provincial parks program. The greenhouses are of a Quonset type and are heated with natural gas furnaces.

The basic container used for the greenhouse propagation is the SpencerLemaire container, also call a root trainer. This is a thin-walled, hard plastic container that opens up like a book. Different sizes of the container are available. The size of the container used is based on the needs of individual species. The major crops grown in the greenhouses are coniferous plants. A crop will be grown during summer or winter for a period of up to 7 months, after which the plants are hardened off in lathhouses covered with shade cloth.

The containers are sown with several seeds per cavity. The number of seeds is based on the germination tests. This procedure then requires hand thinning of the seedlings. Irrigation and fertilizer applications are automated. Natural light during the winter moths is supplemented with artificial lights. Weed and pest control are necessary. When the seedlings are transplanted into large containers they are moved to the lathhouses. The plants are watered with overhead sprinklers, and shade cover is provided.

Large-sized container production is rapidly expanding in Alberta; however, we have little experience in this area of nursery production. The key to success lies in the ability of the plants to survive the winter months. The nursery is continually improving its overwintering procedures. Good cover is essential.

All seeds used in the propagation work are collected and cleaned by the nursery. In order to have a reliable supply of seed every year, a seed bank with a minimum of a 3-year supply of most seeds is maintained. The seed extraction plant was once heavily involved in a reforestation program. Every year seeds from thousands of bushels of spruce and pine cones were extracted. This activity has now been transferred to the Pine Ridge Forest Nursery at Smoky Lake.

The Alberta Tree Nursery has a well-equipped seed lab where all collected seeds are tested for seed viability. Seedlots are prepared for seeding through stratification. The nursery maintains a program of seed sales to commercial nursery operators. A seed exchange service with other stations is maintained. Some seeds are difficult to germinate. The nursery is continually searching for solutions to these problems. Different methods of stratification and different times of seed collecting are two areas under investigation.

OTHER ACTIVITIES

Applied research is another aspect of the nursery operation. The research program delves into various production problems. Other areas of applied research conducted at the nursery include the response of seedling stock to various fertilizer applications and the screening of herbicides for nursery use. Decreasing the mortality rate of stored planting stock is another ongoing project.

Another area of investigation is the vegetative propagation of bush fruits and woody ornamentals. As a consequence of this work, the nursery was assigned the task of producing a large number of Saskatoon plants for the Peace River Fruit Growers. Interest in this native fruit has resulted in the development of improved cultivars, which are now being vegetatively propagated. Saskatoon softwood cuttings root readily, but the plants tend to go into a deep dormancy after the initial rooting. The nursery is examining various ways of breaking this dormancy. The research section has also done a considerable amount of work on finding improved ways of rooting native junipers.

Research on vegetables is a recent addition to the activities of the Alberta Tree Nursery and Horticulture Centre. One ongoing project is the evaluation of mulches and plastic tunnels on a variety of vegetable crops. In our cold northern climate, plastic mulches have proven to increase yields and advance the date of harvesting by controlling soil temperature and conserving moisture.

Miscellaneous plant propagation activities include the production of Arbor Day trees, production of seedlings for Indian Affairs, and the provision of planting stock for municipal parks. The Arbor Day program entails the annual production of approximately 40 000 Colorado spruce seedlings for the school boards. Many of the ornamental blue spruces in Alberta are a result of this program.

Finally, the Alberta Tree Nursery and Horticulture Centre maintains orchards for fruit testing and seed collection and an arboretum. Alberta is not an area noted for its tree fruit growing, but a half century of plant breeding has resulted in the selection of a number of hardy apples, crabapples, plums, and apricots. The test orchard at the nursery includes many of the hardy apples and plums. The nursery continues to monitor the performance of these trees. This orchard will be gradually expanded to cover a 2-acre site.

The seed orchard was established to provide a source of seed for the shelterbelt program. The 3-acre arboretum is another test site for the shelterbelt program. The performance of the trees and shrubs is recorded. This arboretum will also have an extension function. Once it is fully established, applicants for the shelterbelt program will have an opportunity to view mature specimens.

Other extension activities include pruning workshops. Several workshops are offered throughout the province by the professional staff of the Alberta Tree Nursery and Horticulture Centre. The Horticulture Branch, through the District Agriculturists, offers courses to amateur gardeners. These courses are coordinated by the nursery. The staff serve as resource people for these courses. They also provide information to commercial vegetable growers, nursery operators, and sod growers.

The Alberta Tree Nursery and Horticulture Centre offers services in the areas of production, research, and extension in order to achieve greater economic returns and to improve the quality of life for Albertans.