

History of Bessey Nursery

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Welcome to the Nebraska National Forest. The notion of having a planted forest on the treeless Sandhills of central Nebraska was first proposed by Dr. Charles E. Bessey, a professor of botany at the University of Nebraska. The idea of planting trees in Nebraska was not new. On the first Arbor Day in 1872, over one million seedlings were planted in Nebraska. Trees had been planted in the Sandhills through the Timber Culture Act (1873) with limited success and on a limited scale. In 1890, Dr. Bessey joined forces with Dr. Bernhard E. Fernow Chief of the USDA Division of Forestry to grow trees in the Sandhills of Nebraska. The site they selected was in northeast Nebraska, near Swan Lake in Holt County.

After considerable opposition from local ranching and farming interests, in the spring of 1891, several species of conifers were planted. These included Jack pine, red pine, Scotch pine, Austrian pine, ponderosa pine, Douglas-fir and arborvitae. After ten years those species with the highest rate of survival were Jack pine, Scotch pine, and ponderosa pine.

The success of this tree planting effort led to the establishment of three "Forest Reserves" for tree planting purposes. On April 16, 1902, by Presidential Proclamation, President Theodore Roosevelt created the Dismal River, and Niobrara River Forest Reserves. These Reserves contained 90,000 and 124,000 acres respectively. In

1906, the North Platte Forest Reserve was established. It contained 347,000 acres. The total area set aside for tree planting purposes was over one-half million acres.

Local legend has it that Teddy Roosevelt not only created the Dismal River Forest Reserve, but also visited the Forest Headquarters and planted a Colorado blue spruce seedling on site. Though the official designation is the "Dismal River Forest Reserve" (because the southern boundary is the Dismal River), the Headquarters was located on the Middle Loup River (the northern boundary), because it was a more-suitable nursery site.

The Dismal River Forest Reserve is located in the heart of the Nebraska Sandhills. The Sandhills region encompasses approximately one-quarter of the state. The Sandhills are rolling sand hills, with the principle vegetation being grasses, and the principle land-use being ranching. The purpose of the "planted forest" that Bessey and Fernow envisioned was to provide timber to homesteaders under the Kinkaid Act, and to provide timber for the railroad. In time, the forest became a laboratory of challenge and a training school for many foresters.

On September 6, 1902, the location of the first seedbed was staked. The bed was 136 feet by 136 feet. It was surrounded by five-foot woven picket fencing, and roofed with four-foot picket fencing.

The first seed sown on November 13, 1902. The species was ponderosa pine, with seed collected from the Pine Ridge region of northwestern Nebraska. The seed collection costs were \$1.36 per pound. The first out-planting of conifer seedlings produced at the Nursery was 1904. These were 1 -0 yellow pine (ponderosa pine), and did not fare well, as they were too small.

In the early days of the Nursery, each task was extremely labor-intensive. The implements were either horse-pulled, or man-operated. Early seedbeds were cultivated with teams of horses, and then seedbeds were prepared with side-boards, rulers and levels for exactness. Bird and rodent predation was discouraged with the use of horizontal overhead snow-fencing known as "Pettis frames" (Figure 1). Along with hand seeding, mechanical seeders were used. Planet, Jr. seed drills, still used by many nurseries today, were used to sow conifer seed in 1906 (Figure 2).



Figure 1. Horizontal overhead snow-fencing, "Pettis frames".



Figure 2. Planet, Jr. seed drill.

Following seeding, sand was used as a mulch. After the application of the mulch, a wheelbarrow sandhills of sulfuric acid was pulled by hand and applied over the conifer seedbeds to prevent "damping off" (Figure 3).

The success of the early plantings was 5 to 10 percent survival; seedling survival attained in 1911 was 85-90 percent. This dramatic increase is due largely to improved methods in the nursery. The most important improvement was the use of transplant seedlings. The first transplanting



Figure 3. Wheelbarrow of sulfuric acid pulled by hand over seedbeds.

was done in May, 1906. A transplant crew consisted of five men: two men would dig the trench; one man would place the seedlings in the transplant board; and then two men would set the transplant boards in the open trench, fill the trench with soil, and remove the transplant board from the seedlings. The average production per day for a crew of five men was 6000 seedlings.

Along with the practice of transplants, root pruning was a cultural practice that greatly increased out-planting survival. An L-shaped bar undercutting the seedlings at approximately eight inches was pulled by a block-and-tackle. This was a standard practice as early as 1905 (Figure 4).



Figure 4. Horse-drawn L-bar used to undercut seedlings.

It was extremely important to supply water to the growing seedlings. The earliest irrigation sources were from windmills located adjacent to the seedbeds. Later, as more acres were under cultivation, irrigation was pumped from the Middle Loup River. This water was then used to "flood irrigate" the nursery seedbeds. In time, flood irrigation was replaced by overhead sprinklers; first with the "Skinner system" to our current system of ground irrigation lines, risers and oscillating watering heads (Figure 5).



Figure 5. Skinner irrigations system at Bessey nursery.

.A two-horse team hooked to a capstan bar tightened a cable that pulled the horizontal underground bar that "lifted" or harvested the seedlings. A crew then field-packed the seedlings immediately behind the bar. When the seedlings were packed, they resembled a "jelly-roll" (with the roots all to the center of the roll and seedling tops all to the outside end). The seedlings were then stored in a shed until spring planting. An ice-pond was created on the nursery for the sole purpose of cutting large blocks of ice out of the pond during the cold winter months. The harvested blocks were then stored until use in the spring to maintain seedling dormancy.

Once the seedlings were harvested, it was time for out-planting. Five tree planting camps were established on the Dismal River Forest Reserve (Figure 6). The field planting camps moved every two years, and would accommodate fifty men and thirty horses. The seedlings were transported to the field planting camps via flat-bed truck, buckboard wagon or pack trains. One pack horse could carry two one-thousand tree seedling packs.



Figure 6. Tree planting camp in sandhills (Compare to established forest in background of Figure 5).

The standard planting procedure was to plow a furrow, have the seedlings inserted into the planting trench, and close the furrow. Three men and six horses were needed to plow the furrow. One man holds the furrow plow while one man drives the team, and the third man operates the trencher. Two teams of three men and six horses worked together, plowing open the same furrow. In time, mechanization replaced the horses. Bulldozers pulled tree-planting

machines that made tree planting much more efficient. With this mechanization 10,000 to 20,000 trees could be planted per day. Of the 90,000 acres were available for tree planting well-over 20,000 acres planted to trees. Many species were planted (e.g.. red pine, Afghan pine, Austrian pine), but three species were proven to be most successful. These were ponderosa pine (currently 16,000 acres), jack pine (currently 2000 acres), and eastern redcedar (currently 2000 acres).

Seedlings produced at the Bessey Nursery were used for more purposes than simply foresting the Dismal River Forest Reserve. Seedlings were shipped via the railroad for reforestation purposes on various federal "Forest Reserves" throughout the Rocky Mountain region (Figure 7). For example, in 1905 one-year red fir seedlings were shipped to the Pike's Peak Forest Reserve; and in 1906, fifty thousand two-year bull pine were shipped to Wyncote, Wyoming.



Figure 7. Trains were used to ship seedlings to surrounding states.

During the Prairie State Forest Program of the mid-thirties, the Bessey Nursery was one of two nurseries supplying conifer seedlings for windbreak plantings on the Great Plains.

The Civilian Conservation Corps made many important contributions to seedling production and seedling planting during the 1930's. The CCC's had maintained a camp for over two years. In 1935, a swimming pool was constructed by the CCC that is still in use today. The swimming pool is the only pool managed by the Forest Service.

What does the future hold for the Bessey Nursery? The Nursery is the bareroot and container seedling production facility for the Rocky Mountain Region of the USDA-Forest Service. The Nursery is also the home of the Regional Tree

Seedbank and Extractory. In addition, the Nursery produces approximately three million seedlings annually for the Nebraska Forest Service for distribution to rural landowners in Nebraska. Due to its abundant source of good water, highly desirable production soils, and favorable climate, the Charles E. Bessey Nursery is poised to remain in the forefront of seedling production in the Great Plains and Rocky Mountain region.

What does the future hold for Dismal River Forest Reserve? Over time the Dismal River Forest Reserve became the Bessey Ranger District. Tree planting is no longer the dominant activity on the District, though seedlings continue to be planted on a limited scale (e.g.. to enhance wildlife habitat). As the District is a natural prairie, trees will give way to grass where no woody revegetation occurs. The only natural pine regeneration occurs on north-facing slopes, in depressions, in thinned tree stands, or in narrow bands between the plantation and the native grass. Eastern redcedar is the only conifer extending beyond its planted bounds. It is felt the long-term composition of the handplanted Forest will be dominated by eastern redcedar. With less than two percent of the land base in Nebraska in the public domain, recreation on the District continues to grow. Some of the recreation activities

include hunting, hiking, horseback riding, wildlife viewing, camping in developed sites and dispersed areas.

The spirit and vision of Charles E. Bessey extends far beyond the boundaries of the original Nebraska Forest Reserves of the early 1900's.

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