The Living Plantation Museums

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Why Living Plantation Museums?

The evolution of plantation forestry in New Zealand is unique. In contrast to last century, there are now few examples of either earlier management practices or many of the field trials that were so important in developing an understanding of silvicultural principles.

This inability to demonstrate earlier management practices, as well as the evolution of our silviculture, could well result in the gradual loss of the reasoning behind current management practice. Once it is lost, there is the potential for history to be repeated. Ideally, future generations of foresters, forest managers, plantation investors and the interested public should be able to not only experience the earlier plantations but also better understand the evolution of radiata pine silviculture.

With the support of plantation owners I have now established three Plantation Museums:

Brooklands (4 Kilometres north of Waingaro Springs on Highway 22) and owned by New Zealand Forestry Group Ltd. Museum established in the winter of 2002.

Kaingaroa (on the volcanic plateau) and managed by Kaingaroa Timberlands). Museum established in the winter of 2004.

Tangoio (north of Napier - 7 kilometres north of the Whirinaki mill and off highway 2) and on land owned by Roger Dickie and Vern Paulus. Museum established in the winter of 2004.

The arrangement for all three museums is the same. I am responsible for the museum management with all expenses paid by the forest owner (who also retains ownership of the museum). I am very grateful for the continuing support and interest of the plantation owners.

The Plantation Museums are not a trial of possible regimes- their primary objective is to illustrate the evolution of radiata silviculture.

The layout of all three museums is similar:

Each begins with small plantings of 12 tree species - four indigenous and eight exotics (including Larch, Douglas fir, Tasmanian blackwood, Eucalyptus species, coastal redwood and radiata pine). Some tree species in all three examples have failed (this was typical of early plantation experience). The species comparison is to demonstrate that radiata pine was the most successful species (and the most responsive to management). All other plantings in the museum are of radiata pine.

Radiata pine treatments that illustrate the evolution of silviculture

Over the last century dozens of management regimes have been proposed for radiata pine. Many proposals were minor variations of other regimes and most were never practiced on any scale. It is impractical (and would serve little purpose) to include all of these regimes in the Museum.

The Museum is my personal interpretation of how the silviculture (management) of radiata pine evolved and includes examples of what I consider were the significant changes in our plantation management. The museum is more about the philosophy supporting what has been done than about how we actually did/do things operationally. Because sawlogs have always been, and still are, the primary objective of plantation management, the Museum concentrates on the evolution of sawlog regimes, especially regimes that include pruning. Although it was advocated and practiced in the 1960s, pruning above 6 metres is now rare. None of the regimes in the museum have any pruning above the first log. The museum does not do justice to the very comprehensive research done on agroforestry in the 1970s and 1980s. Plantations and pastoral farming are practiced on the same property but most land owners now prefer to keep the two land-uses more or less separate; there appears to be little interest now in managing stands to maximise returns with a combination of trees and grazing.

Plot 1 - 1900.

The first State plantations were established in the 1890s and the first two decades of the 20th Century. These plantations were established at 6600 trees per hectare (1.2 metres, or 4 feet, square). In the Museum this planting was replicated with either broadcast sown GF0 or as low a GF rating as possible. As the original plantings were to be left to nature (i.e. to be left untended) the Museum examples will be neither thinned nor pruned.

In 1920, because of the cost and the small area that could be planted, the initial stocking was reduced to 3000 trees per hectare.

Plot 2 - 1920

Planted (again using poor planting stock) at 3000 trees per hectare (1.8 metres, or 6 feet, square). This plot is representative of radiata pine plantings at the beginning of the first planting boom of the late 1920s. Again neither thinning nor pruning is scheduled.

In the late 1940s and the early 1950s these maturing stands were “thinned” by the sirex wood wasp.

Plantation managers realised they had to artificially thin before the thinning was done by nature. The sawing of mature plantation grown trees failed to yield any clearwood. To yield clears, it was realised that trees would have to be pruned artificially.

Plot 3 (a, b and c) - 1949

Ure (1949), was one of the first foresters to propose a pruning and thinning regime for radiata. In the absence of a market for small thinnings, Ure proposed multiple pruning combined with early "thinnings to waste" (but he called them "unproductive thinnings"). To be followed by two (later reduced to one) production thinnings (for pulp and pulp/sawlogs).

3a will be pruned as proposed by Ure but left unthinned (to demonstrate that selectively pruned stands should be thinned).
3b will be thinned but not pruned (not actually practiced, but will demonstrate that there is no natural pruning).
3c will be pruned and thinned as prescribed by Ure (although in practice it was rare for the thinning(s) to be done on time).

The continuing failure of production thinning to be done profitably and the realisation that a higher stocking resulted in either smaller diameter trees at clearfelling or longer rotations, resulted in the research based Direct Regime of Fenton and Sutton (1968).

Plot 4 1968

This example was planted (with quality nursery stock of GF 11 rating) at 1500 trees per hectare (3.7 x 1.8 metres), early pruning, early "thinning to waste" to a final crop stocking of 200 trees per hectare (without any production thinning).

Experience of the regime, especially on ex-farm sites, suggested that a higher stocking might be more profitable. Then follows comparison of different final crop stockings.

Plot 5 (a, b, c and d). A range of final crop stockings

5a, **5b**, **5c** and **5d** planted (with high quality GF stock), at 300, 600, 900 and 1200 respectively. To be treated on the Direct Regime to final crop stockings of 100, 200, 300 and 400 trees per hectare (cuttings and seedlings in alternate rows).

In the Brooklands and Tangoio museums these tree stockings can be seen from one viewing position:

In 1999 Dyck and Thomson of Carter Holt Harvey Forests (CHHF) proposed planting superior container grown cuttings at a final crop stocking of 500 trees per hectare (there was be no subsequent tending). They ignored research experience where planting had been done at very wide plantings. As the CHHF regime may be appropriate for the selected planting stock, the same regime is attempted with alternative planting stock.

Plot 6 (a, b and c) - the CHH Millennium Regime

500 trees per hectare planted with no further treatment (but with three different tree sources).

6a - CHHF container grown cuttings,
6b - high quality cuttings (GF+), and,
6c - the poorest quality seedlings.

My hope is that the museums will illustrate more than just the evolution of radiata pine silviculture (e.g. the importance of the tree stock, the planting method).

Pruning and thinning has already commenced in Brooklands and will begin as scheduled in the other two museums. As the museums age, greater differences between the radiata treatments will become apparent. My vision of being able to compare different radiata regimes at the same age and on the same site has become a reality.

References

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