

The Silverwood Experiment



Silverwood is a 400ha property near Hororata in Central Canterbury. It was farmed for 60 years from 1937 by Frank White, who was prominent in the farm-forestry movement from its beginnings and well known to farm foresters throughout the country. Until age and ill health prevented him from travelling he was a regular attendee at NZFFA annual conferences.

Frank never married and had no living relatives in New Zealand. Throughout his life he retained strong ties to Lincoln University, where he was educated, and in the late 1990s, when he was approaching 90 years of age, he transferred ownership of the property to a trust on the understanding that on his death the trust would lease the property to the university “for experimental purposes”. He did not transfer ownership to the university but ensured that the farm would continue to be held in trust. He also instructed that an area of 4ha adjoining Leaches Road be made available to the Central Canterbury Farm Forestry Association for experimental planting.

For legal reasons it was difficult to separate ownership of the 4ha from the remainder of the property. The solution was for the Silverwood Trust to retain ownership of the land but grant Central Canterbury Farm Forestry long-term tenancy in the form of a forestry right, which gives the CCFFA Trust a right to occupy the 4ha and

grow trees on it for 100 years. This right will not expire until 2110.

Planting began in 2001 and initially efforts were concentrated on establishing a 2ha block of hardwoods because at that time little information was available about establishing hardwood trees on non-irrigated inland sites in Canterbury. Another factor to be taken into account was that although it is not specified in the lease agreement, there is an understanding that radiata pines will not be planted in the 4ha. This wish was made clear by Frank before any planting was done. His exact words were: “You can plant anything you like as long as it isn’t radiata.”

A hardwood establishment trial was supervised during the first two years of planting by a Malawian graduate student with the assistance of Professor Roger Sands, the then head of the Canterbury University School of Forestry. The trial looked at the effectiveness of various kinds of mulch, including recycled plastic baleage rap, straw, and herbicide treatment. Written results of this work are available from the CCFFA Trust on request.

The hardwoods planted were oaks, chestnuts, and walnuts (the latter with the aim of creating a food resource for CCFFA members and the long-term aim of growing high-quality walnut butt-log timber for high-value uses such as fine furniture and gunstocks).

**Mulching with
pea straw
helps to
conserve
summer
moisture for
native
plantings**



Market Prospects

The long-term intention was always to experiment with coppicing the chestnuts to produce ground-durable vineyard posts and to leave selected oaks to grow on through several rotations as standards for timber production. Coppicing with standards is an ancient form of forestry in Britain and Europe, where its history has been traced back for 3000 years, but is little known in New Zealand, where the forestry industry, and by association farm forestry, has traditionally been based on periodic clear felling and replanting rather than on natural regeneration from the cut stumps.

Although some of the traditional coppice products, such as charcoal and interwoven hazel hurdles, are now in

lesser demand there is rapidly expanding demand for such items as durable posts that need no chemical treatment, and hazel stems for garden stakes. Coppiced hazels produce tall, straight, slender stems with little taper, and a double row of hazels has been included in the planting for this purpose. The intention is to manage hazels on a four-year cycle, felling one plant in four every year. This is scheduled to begin in the coming spring. The aim with the chestnuts is a seven-year cycle and it is envisaged that the oaks will stand for at least three cycles. This is the most common regime suggested in British literature and our experiment will indicate whether it should be modified for New Zealand conditions. Unfortunately we have been unable to find any records of coppicing experiments in Canterbury other than the Brandenburg coppice planted in the 1980s at Lincoln University. The results from the Lincoln experiment are not applicable to Silverwood because a



Summer pruning under way at Silverwood. Hardwoods are pruned in summer because winter pruning encourages the growth of unwanted vigorous stem shoots, while summer pruning discourages it.

different range of species, including evergreens, conifers, and understorey forbs was planted at Lincoln, where the aim was to create an improved habitat for beneficial insects and birds, rather than poles and timber. Growth rates and closer spacings achieved in the deep, highly fertile Lincoln soil cannot be duplicated at Silverwood.

It is desirable for safety reasons to employ a qualified person for the coppicing, rather than use voluntary labour. Some of the cost may be recovered from the sale of posts to a grape grower but it is impossible to predict what, or if any, this return will be until the posts have been harvested and their quality has been assessed. It is unlikely that sales will cover more than a small part of the cost of felling and tidying up on the first rotation. Both yield and quality, and consequently returns as well, should increase dramatically from future rotations.

Future Model

The Silverwood experiment could well become a model for future directions in farm forestry. Pressure for more environmentally sustainable products is already coming from overseas markets. There is every indication that a coppiced chestnut woodland producing durable posts will be a very valuable asset in the future. In Marlborough alone an estimated 20 million new, preferably untreated, vineyard posts will be required in the next 20 years.

Why Silver Wattle?

The other major trial in planning is aimed at long-term sustainability by determining the potential to grow high-quality silver-wattle timber on a dryland site subject to heavy winter frosts, with night-time air temperatures in July and August frequently dropping to -8 or -9 deg and occasionally dipping to double figures below zero. The altitude is 280masl and the mean annual rainfall is

830mm. Records kept since the 19th century at Terrace Station nearby indicate that on average the driest months are May, June, and September and the wettest December and February, but this small summer rainfall peak is offset by frequent drying nor'west and nor'east winds. The soil is Lismore stony loam, a type of modest fertility found over large areas of the Canterbury plains. Until the introduction of irrigation and new fertilising techniques that enabled wholesale conversions from extensive grazing to intensive dairying, silver wattle was widely naturalised on this type of soil on the lower plains, particularly in former plantation areas where it was originally planted more than 100 years ago as the basis for a tan-bark industry (which subsequently failed). About 100 years ago silver wattles were planted with ponderosa pine and other species in a mixed woodlot at The Point station, in Rakaia Gorge, inland from Silverwood. When measured in the early 1980s these had attained an average height of 58ft (18 metres). This indicates that it is likely to be a suitably hardy species for growing as an alternative to radiata pine in Canterbury.

Silver wattle is widely distributed in its native south-eastern Australia and Tasmania and some regional forms there are known to yield timber of good colour and high quality for furniture and joinery. Unfortunately, the early plantings in Canterbury were intended for tan-bark and firewood production, not for timber, and as a result virtually all the remaining remnants are of poor quality with crooked or multiple stems. However, improved strains selected for rapid growth and straight stems are known to have yielded fast-grown, high-quality timber in sites on Banks Peninsula since the 1980s. The aim of the Silverwood trial is to determine whether timber of similar quality can be grown on colder and more exposed sites. The plants will be supplied by Appleton's Nursery, Nelson. The seed was taken from a stand of trees selected for straight stems and rapid growth. The initial trial is planned to run for four years and will be measured twice a year to determine the effect if any, of initial spacing on height growth, stem diameter, and survival rates. The trial will be divided into three plots (i.e. the master plot, shown in the attached plan, and two replicates). Growth rates and form achieved during this initial phase will determine the silvicultural regimes to be applied during phase two. The



Frank White, then aged 90, tamping a marker post after planting the first two trees in the Silverwood experimental area: a pair of cork oaks, one of his favourite trees.

design of the trial will also allow for a range of different experiments after the initial phases are complete. Because silver wattles are known to be able to regrow from stumps, coppicing may well be a future option to maintain a permanently sustainable source of quality timber.

Other Projects

Since 2005 a selection of indigenous trees and shrubs known to have occurred in the past on the Canterbury plains has been planted in part of the Silverwood area of to demonstrate the potential of these species for amenity plantings or internal shelter on dryland sites.

A selection of vegetatively propagated cypress clones planted in 2010 has grown unexpectedly well. Some of the plants have already exceeded 2m. This trial was designed by Patrick Milne, a former NZFFA chairman, who also supplied the plants. The aim was to monitor a selection of clones for growth rates, form, and particularly canker resistance. One of the clones is a macrocarpa selected from an old agroforestry trial designed by the Forest Research Institute in the 1980s on the Silverwood property.

Part of the grant will be used for measuring and GIS mapping of the clones in this trial. This work is regarded as urgent because only a short time remains before competition will make it necessary to begin thinning them. The measurements and GIS mapping will be done by an independent contractor. The ultimate aim is to mill the cypresses on the site for sale as sawn timber. A small block of ground-durable eucalyptus species was planted in 2011. It is one of a number of similar trials throughout the country but to date the cost of plants, planting, and tending have been borne by Central Canterbury Farm Forestry. Although many of these eucalypts have been severely damaged by hares very few have actually died, and some are beginning to grow strongly. It is intended to monitor and measure their growth also, starting in the coming summer.

All data gathered at Silverwood will be made freely available.

Good form in a young oak. The remains of the mulch used to protect it during the initial experiment can still be seen

