



3 REDWOODS

by W. J. Libby

Bill Libby amongst Giant Sequoia

In 1993, I wrote a note published in *New Zealand Forestry* 38(3) suggesting coast redwood as an addition to serious plantation forestry in New Zealand. Several friends and colleagues rather strongly suggested that I didn't know what I was about, so for the next 10 years I spent a lot of time checking out redwood in New Zealand. I stand by my original suggestion.

Redwood (*Sequoia sempervirens*) is much fussier about site and environment than is, for example, radiata pine. Plant it in the wrong place, it fails or grows very badly. Most important for New Zealand, it is much more sensitive to salt-laden and chronic winds than is radiata. But plant it in the right place, it is the most productive conifer currently on Earth. Annual growth rates over 30 m³/ha/yr are common, and over 50 has been recorded both in New Zealand and in French plantations. While it is not immune to all insects and diseases, there is no recorded incidence of an epidemic outbreak of either. Its wood does not compete directly with that of radiata or Douglas-fir, but is used for alternative and usually more-valuable products less susceptible to economic cycles.

Two series of redwood trials are now underway by members of the NZ Farm Foresters Sequoia Group, evaluating small clonal plantings in over 50 locations on both North and South Islands. These should provide better information as to likely performance of redwoods in different plantation environments, as well as demonstrating and beginning to evaluate some promising clones. Because redwood clones naturally, it is less a leap of faith to employ clones in plantations.

Giant sequoia (*Sequoiadendron giganteum*) is one of redwood's two closest relatives. It grows at mid-to-high elevation in California's Sierra Nevada Mountains. In trials in California, on the better sites, it outgrows all other montane species. An average growth rate of 44 m³/ha/yr has been maintained in a Belgian plantation for over 100 years, and growth of over 20 is recorded in French and German plantations. Less is known about its wood, but that of plantation-grown sequoia seems similar to and perhaps a bit better than that of plantation-grown redwood.

While checking redwood in New Zealand, I also kept my eye out for sequoias. As would be expected, sequoia can handle much colder temperatures than redwood, and it is perhaps the most wind-firm conifer on Earth. In the mid-1970s windstorm in central South Island, which uprooted or snapped off large areas of radiata and Douglas-fir, not a single sequoia in the region sustained any damage. In response to that observation, 5 trials were installed on South Island in the late 1970s. Of these, three are growing well, near Gore, Geraldine, and Hamner Springs. A high-elevation trial near Arthur's Pass is hanging in there, and may eventually grow well. The final trial, near Nelson, may have been badly sited, and it has failed.

Sequoia does not clone naturally, but stumps of young trees will sprout. This can be a problem when thinning in plantations less than about 20 years old, but older harvested trees rarely sprout. It has few insect and disease enemies, but low-elevation plantings are subject to a *Botryosphaeria* stress disease that can disfigure or even kill sequoias. Higher-elevation plantings seem safe. Sequoia is also less genetically variable than redwood, and thus there is less reason to select outstanding clones. Seedlings from one or several of the larger native groves seem a good bet for good plantation performance, and the trial near Gore has been thinned for production of perhaps even better seed. In the 1970s and 1980s, sequoia plantations often sulked for several years before beginning good growth. We have learned a lot about nursery care since then, and today in California planted sequoias typically survive in the high 90%, and begin rapid growth in the year they are planted. Like redwood, they do well on the better soils, and do poorly on poor soils.



Dawn redwood

Dawn redwood (*Metasequoia glyptostroboides*) is Earth's third redwood. It is native to one small valley and a few outliers in southern China. But in spite of having the smallest native range, it seems the most broadly-adapted of the three redwoods. Because seed supplies are short, it is generally cloned as rooted cuttings, but it does not naturally clone or sprout from the stump. Its wood is valued by the local Chinese, particularly for caskets, but little is known about plantation-grown wood. Interestingly, it rarely or perhaps never forks.

Redwood, Blue Lake, Rotorua

