

Domestication of Radiata Pine

Reviewed by Brian Swale

Authors: Rowland D. Burdon, William J. Libby and Alan G. Brown
Year: 2017
Pages: 480
ISBN: 978-3-319-65017-3
Publisher: Springer Nature (Forestry Sciences, Vol 83)

First impressions – it's heavy, it's expensive and at \$400 hard copy it is nearly a dollar a page. The quality is excellent; it has been superbly printed and bound. It has been said of Beethoven that none of his music had too many notes, or too few. Similar could be said of this book. The English is concise and taut. With a broad audience in mind it is written throughout in plain English. It is a great pity the price is so high; as a result the wide readership that lead author Rowland Burdon hopes for may well never materialise.

Rowland and I are of an age – we joined the New Zealand Forest Service as so-called Technical Trainees in the 1956 intake and met at the Forestry Training Centre at Whakarewarewa, Rotorua. He had genetics as a career focus from an early date, which was different from the rest of us trainees, and has maintained that focus.

The *Introduction* covers the processes of domestication and a historical preview of the radiata pine story. The *Early History: 7,000,000 Years Ago to 1901 C.E.*

chapter describes five small native forests – three in California and two on Mexican islands. It delves into their probable and known history at the hands of indigenous Americans and later colonisers, also covering the expected effects of the utilisation of these small forests on residual tree genetics. This is very good historical research.

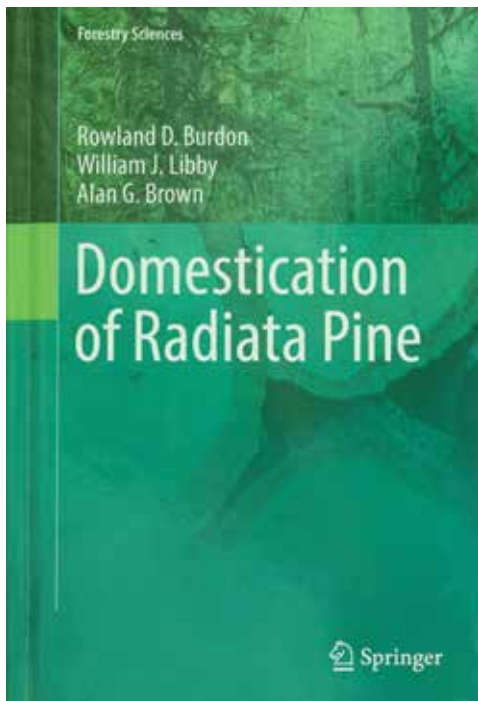
The *Early Plantation Period: 1902–1951* chapter covers early strategic planning for major plantations and the use of indigenous forests, as well as the choice of radiata, especially in New Zealand. Detailed information is given about radiata pine forestry in Chile, Australia and elsewhere.

The Beginnings of Genetic Improvement: 1952–1968 outlines genetics theory, covering concepts and principles that are vital for quantitative genetics and breeding, and then discusses their application to radiata pine. It also contains detail on intensive breeding, including choice of traits, seed orchards, genetic trials and mating designs.

In *Development of the Management Concept While Tree Improvement Shifts Gears: 1969–1983*, it is noted that in order to take advantage of improvements in radiata pine genetics it was soon evident that many forest management processes needed to be altered. This took time, and trial and error. This period was one of intensive learning, and the development and application of new techniques, and it was an exciting time for those involved.

Towards More Precise Genetic Control: 1984–1997 is perhaps the most complex chapter. The author has written about a bewildering collection of changes to forest ownership, which predictably interacted with experiments and functions such as seed orchards on land and in forests with altering ownership or custody. The advent of many private companies, where formerly there were mostly just three main players (including the NZFS), led to significant loss of information sharing. Nevertheless, major advances on several genetic fronts were achieved. This included propagation technology, systems for guaranteeing genetic quality, more focus on the genetic improvement of wood properties, and the commencement of molecular genetics programmes with radiata pine. Computer models were also developed to assist growers make better decisions on silvicultural strategies.

A Wild Ride; 1998 Onwards commences with reference to the December 1997 IUFRO conference 'Genetics of Radiata Pine', which may have been the last such conference untrammelled by the proprietary prohibition of the use of company research findings. In addition, forest ownership was very fluid, beginning with the axing of the state's NZFS. Much the same applied to forestry research organisations and their funding models. Organisations investing in forestry (to primarily finance areas such as superannuation funds)



became more common. The existence of coordinated forestry objectives for the benefit of the nation largely vanished, except for research using plots located in ex-state forests where their existence was protected by covenant. This chapter covers a wide range of topics including LIDAR, but most of the focus is on a range of genetic experimentation processes.

The *In Retrospect* chapter details the amenity of radiata pine to domestication, commercial forestry as a business model, the role of radiata in the development of plantation forestry, forest management systems (including the tending regime conundrum), and the modelling of growth and outturns. The final chapter – *The Future* – looks at most aspects of forestry, with radiata as the prime concern. Sections include: Domestication gaps and their implications; Main issues and drivers of the future (why will the species be grown, where, and how will it be grown, what will be the course of continuing genetic improvement, and what will be the impacts of institutional and political factors); and the Clonal forestry goal.

One aspect of this book, which sets it apart from many other books in this field, is that the professionals who did the work are actually named. Since many readers will not have easy access to much of the literature, this is a due recognition of achievement. Compare this aspect of authorship with one where significant developments in forest management processes are noted in passing, but the professionals who created them (and who mostly did not record the events in published papers) go unrecognised. I personally knew very many of the scientists named in this book and find this aspect very satisfying.

This book had a very long gestation period, starting with Ib Thulin in the 1970s. After Thulin's death William Libby had a major role in assembling the material, but eventually (due to other work constraints) this fell to Rowland. All three authors are to be highly commended, but this book will remain a fitting, lasting monument to his lifetime of expert research, insight and leadership in this most important facet of exotic forestry in New Zealand.

At this point it is important to digress from purely reviewing this book. To remind the current readership about the history of involvement of a major state organisation – the NZFS – in both exotic and indigenous forestry in New Zealand, and the huge changes wrought by political upheaval in the 1980s, it is worth mentioning other significant books which cover this background. *Domestication of Radiata Pine* is an important member of this cohort. A list of these publications is given below in the 'Further reading' section and this book is an important member of this cohort.

Alex Entrican (b. 28 January 1898; d. 21 April 1965), father of Elizabeth Orr who is one of the authors in this list, was Director of the Forest Service from 1939 to December 1961 and a university-trained engineer. He understood the value of such training and persuaded T.T.C. Birch, then Director of Training and of Research, to initiate a process of selecting candidates for university-

level degree training, first in New Zealand and then to complete a degree overseas in forestry management. The reason was there was at that time there was no such faculty in New Zealand because both schools had been closed due to the 1930s economic depression. He wanted our government-owned forests to be managed in a science-based professional manner. Hence, the NZFS developed a cadre of such staff who adopted the group title of 'Forester'. The NZFS was a team of 3,000 and benefited from widespread cooperation and sharing, and sites and effort were willingly made available in support of the common goal of progress for the sake of New Zealand.

In conclusion, the depth of research into historical and political matters is excellent (in addition to general forestry and genetics), and the authorship is meticulous. For these facts alone this book will endure.

Note that this book is print on demand (my volume was printed in Australia). For those who cannot afford the hard copy price mentioned above, Amazon have been selling very low numbers at give-away prices and also have an e-version at lower cost.

Further reading

- Birchfield, R. and Grant. I. 1993. *Out of the Woods: The Restructuring and Sale of New Zealand's State Forests*. ISBN 1-86956-087-6, p.69.
- Boyd, Joan. 1992. *Pumice and Pines*. ISBN 9781869560331.
- Healy, Brian. 1982. *A Hundred Million Trees: The Story of N.Z. Forest Products Ltd*. ISBN 0-340-245443.
- Kirkland & Berg. 1997. *A Century of State-Honed Enterprise: 100 Years of State Plantation Forestry in New Zealand*. ISBN 0-9583341-3-7.
- Levack, Hamish, Poole, Lindsay and Bateson, Julian. 2006. *The Great Wood Robbery? Political Bumbling Ruins New Zealand Forestry*. ISBN 0-958-248621X.
- McEwen, Mary. 2005. *Charles Fleming, Environmental Patriot – A Biography*. ISBN 1-877333-23-9, p.321.
- Millen, Julia. 1999. *Through Trackless Bush: The Story of the New Zealand National Forest Survey 1946–1855*. ISBN 0-473-05253-9.
- Orr, Elizabeth. 2017. *Keeping New Zealand Green: Our Forests – And Their Future*. ISBN 978-0-947495-46-2.
- Roche, Michael. 1990. *History of New Zealand Forestry*. ISBN 0-477-00004-5.
- Spiers, Jim. 2019. *When Forestry Was Fun: The Evolution of a Forest Engineer*. ISBN13-9780473481971.

Brian Swale retired from active participation in forest management 34 years ago. He obtained his Masters in Forestry from the University of Oxford. As a professional forester he worked for the NZFS at Balmoral Forest, Ashley Forest and Kaingaroa Forest. He was based at the Canterbury Conservancy as an NZFS Senior Forester, after which he worked at MAF Fisheries. Email: bj@caverock.net.nz