



Timber Queensland Growth Scholarships

Mechanisation Of The Pruning Regime

An in depth study into emerging mechanical pruning options

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A Timber Queensland Growth Scholarship offers funding to Queensland based forest and timber industry professionals and workers who are in their early or mid career years. Growth Scholarships facilitate access to learning experiences and opportunities that will foster a passion for working in the forest and timber industry and enhance career pathways. This report was completed post learning project activities.

Introduction

I was honoured to receive a scholarship to investigate mechanical pruning innovations for *Araucaria cunninghamii*, a species grown in Australia for high-value appearance-grade butt logs. Achieving this quality requires pruning of lower limbs at around 10–15 years of age, depending on site productivity and target pruning height. Traditionally, this has been a labour-intensive and costly operation, carried out in three stages to minimise stress on the tree, control the size of the knotty core, and reach a pruned height of 6.1 metres. This process is often paired with a pre-commercial thinning (PCT) to enhance the growth of premium clearwood logs, emulating the prized timber characteristics of old-growth *Araucaria*.

As part of the scholarship, I travelled to Europe to explore advancements in mechanised silviculture. In Germany, I attended the KWF Tagung Field Days in Schwarzenborn, where I observed cutting-edge forestry machinery and sustainable management practices. I also participated in a field visit to Schmallenberg, gaining insight into practical applications of equipment in small-scale forest operations. In Sweden, I visited Holmen's nursery, where I learned about advanced nursery practices and observed bioenergy residue collection and mechanical planting systems. In Finland, I toured Risutec's headquarters and manufacturing plant, where I was presented with a prototype pruning machine designed for excavator mounting. I also joined a field visit showcasing forest mounding and residue harvesting equipment.

These international experiences provided valuable perspectives on how mechanisation can be adapted to Australian conditions. A key outcome has been our successful collaboration with Risutec, which is now developing a mechanical pruner attachment for excavators tailored to *Araucaria* plantations. HQPlantations is currently in the final stages of contracting to commence construction, marking a significant step toward transforming pruning operations and improving the economic viability of producing high-grade pruned logs in Queensland.

Focus of Learning Project

The primary goal of my learning project was to explore and evaluate innovative mechanical pruning technologies and silvicultural practices that could enhance the efficiency and cost-effectiveness of managing *Araucaria cunninghamii* plantations in Australia. Specifically, I aimed to identify mechanised solutions that could support the production of high-value, appearance-grade pruned butt logs—while reducing labour intensity and improving operational consistency.

By visiting leading forestry events and operations in Germany, Sweden, and Finland—including the KWF Tagung Field Days and Risutec—I sought to gain insights into global best practices in mechanised silviculture. My objective was to assess how these technologies could be adapted to Australian conditions, particularly in the context of pruning and pre-commercial thinning, to support sustainable and profitable plantation management.

Significant Learnings & Outcomes

My learning project provided valuable insights into how mechanised silviculture can be adapted to improve the management of *Araucaria cunninghamii* plantations in Queensland. At the KWF Tagung Field Days in Germany, I observed a wide range of forestry machinery—from large-scale harvesters to compact, affordable equipment designed for small-scale operations. This diversity reflects the structure of German forestry, where many forest holdings are under 5 hectares. In these regions, forestry is not only a profession but a point of pride—every farmer sees themselves as a forest owner and steward of the land. This cultural connection fosters a strong commitment to sustainable practices and innovation.

While hand pruning remains the dominant method across much of Europe—typically using a combination of chainsaws and pole saws—the safety concerns associated with this practice are not widely regarded as significant within the region. Despite growing interest in mechanical pruning, the momentum for widespread adoption is likely to come from outside Europe, where labour costs and safety standards drive innovation more aggressively. Notably, Europe has a proven track record of ingenuity in forestry equipment manufacturing. The region's engineering capabilities mean that European manufacturers can design and build virtually any specialised machinery required, including custom solutions tailored to international markets. This flexibility and expertise make Europe a valuable partner in advancing mechanised silviculture globally.

I also visited Risutec operations in Sweden and Finland, where I saw advanced mechanised systems for planting and tending. These technologies offer promising solutions for reducing labour costs and improving the consistency of silvicultural treatments, particularly in pruning and pre-commercial thinning.

How Will This Benefit Queensland's Forest & Timber Industry?

The lessons from Europe have clear relevance for Queensland. Mechanised pruning and thinning could significantly reduce the cost of producing high-value pruned *Araucaria* logs, making the process more accessible and scalable. Importantly, the prevalence of small-scale forestry in Germany—supported by smaller, more affordable equipment—demonstrates that a lower barrier to entry can encourage a more diverse and resilient forestry sector. This contrasts with the high capital investment required for large machines.

By fostering a stronger cultural appreciation for forestry and supporting scalable mechanisation, Queensland's forest and timber industry can become more innovative, inclusive, and economically sustainable.

A major outcome of the project has been our successful collaboration with Risutec, which is now leading to the development of a mechanical pruner attachment for excavators. This innovation is designed specifically for Australian conditions and aims to streamline pruning operations in *Araucaria* plantations. HQPlantations is currently in the final stages of contracting to commence construction, marking a significant step forward in bringing this technology into operational use. This partnership represents a practical and scalable solution that could transform pruning practices and improve the economic viability of high-quality timber production in Queensland.

Conclusion

This scholarship journey has provided invaluable insights into the future of mechanised silviculture and its potential to transform *Araucaria cunninghamii* plantation management in Queensland. By engaging with leading forestry operations and manufacturers across Germany, Sweden, and Finland, I was able to explore a wide spectrum of technologies—from compact equipment suited to small-scale forest owners to advanced automated systems for planting, tending, and pruning.

The cultural pride in forestry observed in Germany, where even small landholders view themselves as forest stewards, highlights the importance of fostering a similar mindset in Australia. This cultural connection, combined with scalable mechanisation, can help build a more resilient and innovative forestry sector.

A key outcome of this project is our successful collaboration with Risutec, which is now developing a mechanical pruner attachment for excavators tailored to Australian conditions.

With HQPlantations in the final stages of contracting to commence construction, this initiative represents a major step forward in reducing labour costs, improving safety, and enhancing the quality of pruned logs.

The knowledge gained through this scholarship will directly benefit Queensland's forest and timber industry by supporting more efficient, cost-effective, and sustainable practices. It also opens the door for greater diversity in forestry businesses, thanks to the availability of smaller, more affordable equipment. Ultimately, this project lays the groundwork for a more competitive and future-ready industry—one that values innovation, stewardship, and high-quality timber production.

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