Your fairy godmother and the magic stocking

Piers Maclaren[1]

If your fairy godmother were to whisper in your ear, what would she say? What advice would she give regarding the final-crop stocking in a radiata pine direct clearwood regime?

To answer this question, in 1985 we established 17 final-crop stocking trials throughout the country. Each was about 5 hectares in area and contained two replicates of the following treatments: 600, 400, 200, 100 and 50 stems/ha. Many eyebrows were raised over the latter, but one rule of science is that you test ridiculous extremes. We also discovered a similar number of stocking trials that others had established, often for unrelated purposes. Most of our trials are now mature, and some are being felled as you read this. What are the results?

Before we give the answers, you should appreciate the emotional baggage attached to the issue of final crop stocking. Neil Barr used to preach (I use that word advisedly) low stockings, and described his followers as "radicals" as opposed to the despised "conservatives". At first, various FRI scientists including - I'm embarrassed to say - myself, provided some tentative support for his crusade. His influence was such that thousands of hectares of forest were established and tended according to his philosophy. There was also a huge backlash from the anti-Barr, anti-SILMOD "conservatives", which continues to this day.

Some results of our trials were predictable, and others surprising. First, you get more wood at higher stockings - unless you go to unlikely extremes. Second, higher stockings give you smaller diameter trees. Third - in contradiction to European forestry wisdom but in accordance with the views of the unwashed public - stocking had a great influence on height growth. For example, there was a seven-metre difference in site index at Tikitere across the range of stockings, even in undamaged trees.

Fourth, and "conservatives" will nod their heads here, the lower stockings led to inferior wood quality. Trees were inferior not just in obvious external features, such as sweep or excessive branching, but also in internal quality such as outerwood density and resin pockets. Lower stockings were far more prone to wind damage.

So where does all this leave us? If the objective is to maximise volume, then maintain high stockings while watching for windthrow, disease or stand stagnation. But the goal is normally to maximise profitability by growing clearwood, not just to maximise volume. At very high stockings there is very little useful clearwood in the sheath surrounding the defect core.

The fairy godmother whispers: "400 is too many". If this applies to a fertile ex-pasture site like Tikitere, it is even more applicable to less fertile sites.

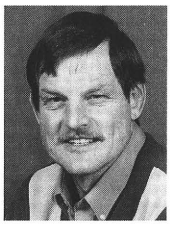
And what about the lower end of the stocking spectrum? You get impressive butt-logs but rubbishy top-logs. The premium for large piece size must be very high to compensate for the lack of pruned volume per hectare, the poor quality of the top logs and the overall reduction in internal wood quality. Crunching the numbers, it seems that stockings below 200 stems/ha on farm sites are hard to justify under any scenario. Fairy godmother: "don't drop below 200".

The message went out to farm foresters, and there was a stampede towards higher stockings. Unfortunately the godmother's words got a bit garbled, because her advice (200-400) applied only to ex-farm sites and the figures would be lower for less fertile sites (say, 150-300), even allowing for the lower suppression-induced mortality that occurs in such sites. This detail has been lost. Many stands exist where the pruned stocking is unsustainably high, and far higher than the optimum for maximising clearwood recovery, given that no production thinning is envisaged.

So how do you choose an exact stocking within the acceptable range? Well that depends on your choice of discount rate and therefore rotation age. If you have a high discount rate (8-9%) you will get the same results as using Internal Rate of Return (typically 8-9%): upfront costs are vital and the size of the harvest pay-back is of lower priority. You will opt to go for short rotations, and low stockings . Why low stockings? Low stockings are cheaper (fewer trees per hectare to prune) and essential for a reasonable piece size given the short rotation. It is ironic that many large companies choose an incompatible combination of direct clearwood regimes, high discount rate, low rotation ages and high stockings. I suggest they haven't analysed their regimes sufficiently well or else don't believe in their own calculations.

I wonder how many corporates really understand the theory of DCF analysis and can argue intelligently for the high discount rates they have adopted. If you have a more realistic view of the world and believe that a relatively risk-free and inflation-adjusted return of 6% or less, when compounded over several decades, is sufficiently acceptable for any prudent investor, then you will choose long rotations (35 years or more) and high stockings. Choose the highest stocking that will ensure that the vast majority of harvested trees are alive and within the specifications for good pruned logs.

As your fairy godmother would say, pick the wrong stocking and your forestry investment will turn into a pumpkin.



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