Thinning for profit

New TEAGASC research suggests that forest thinning should focus on increased removal of inferior quality trees earlier in the forest life cycle, to focus on trees with greater potential to reach construction grade timber.

Background

While trees are initially planted in forests at approximately 2,500 stems per hectare, competition and natural selection reduces the number of trees over time. Taller, vigorous trees are better at competing for light, moisture and nutrients, while the smaller, weaker trees eventually die. Thinning is the practice of artificially removing inferior quality trees to concentrate timber production on trees with superior form for the achievement of high-value construction-grade timber. As many farmers have planted forest crops, thinning represents an opportunity to increase the production of more valuable timber products. Current research in Teagasc investigates the impact of thinning on crop development, timber quality and profitability, which aims to support best practice development in the sector. The research suggests that intensifying thinning practice will ensure increased mobilisation of value-added timber products from the sector.

An assessment of log straightness of the remaining crop was also carried out to determine if thinning improved the quality of the remaining trees.

Experimental study

A thinning trial in a highly productive Sitka spruce crop in Frenchpark, Co. Roscommon, was monitored over two thinning cycles, which took place over a six-year period from 2010 to 2016. Four different thinning treatments were assigned: no thinning (control); light (retain 80% of the control); medium (retain 68% of the control); and, heavy thinning (retain 62% of the control). The first thinning operation emphasised the removal of dead, dying and inferior quality stems with the objective of improving the quality of the remaining crop. The second thinning operation was focused on the removal of inferior quality competing stems. The gross volume removed increased with the intensity of thinning, with 91m^3/ha being removed in the light thinning, 123m^3/ha in the medium thinning, and 135m^3/ha in the heavy thinning over the two thinning operations. A proportion of gross volume from thinning is composed of stumps and tree tops, and the net volume is available for cutting into wood products. Removed trees were cut into pulpwood (smaller, poor quality stems) and pallet wood (larger, better quality stems for pallets) depending on quality and length of trees. Based on the sale of timber, pulpwood commanded a price of €6/m^3 and pallet wood a price of €18/m^3 in the forest; no sawlog was produced in either thinning. An assessment of log straightness of the remaining crop was also carried out to determine if thinning improved the quality of the remaining trees.

Results

At first thinning, over 60% of volume removed was pulpwood, with increases in pulpwood production with greater intensity of thinning; little difference between pallet wood was apparent between treatments. Timber revenues from first thinning ranged from €475/ha for the light thinning, to €564/ha for the medium thinning and €616/ha for the heavy thinning. At second thinning, the amount of pallet wood removed

Table 1: Details of volume, timber assortments and revenue generated after two thinning cycles in the Frenchpark thinning trial.

Treatment	Age (yrs)	Stems (ha)	Total vol. (m^3/ha)	Standing vol. (m^3/ha)	Thinned vol. (m^3/ha)	Pulp (m^3/ha)	Pallet (m^3/ha)	Combined revenue (€/ha)
Unthinned	21	1,990	452	452	0	0	0	0
Grade B	21	1,163	477	386	91	53	27	809
Grade C	21	938	461	338	123	56	51	1,255
Grade D	21	791	446	311	135	63	55	1,364

FIGURE 1: Increased growing space following thinning facilitates increased growth.

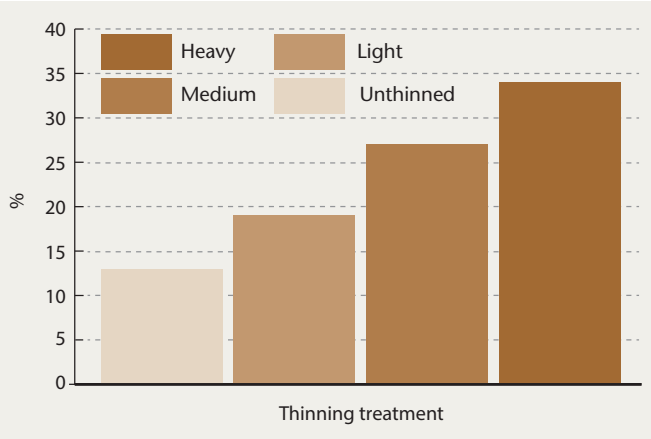

FIGURE 2: Volume of straight logs (>5m) according to thinning treatment.

increased with thinning intensity, with yield increasing from 29% of total volume in the light thinning, to 59% in the medium thinning, and 65% in the heavy thinning treatment. Timber revenues for second thinning ranged from €334/ha for the light thinning, to €691/ha for the medium thinning and €748/ha for the heavy thinning. Total revenue generated from the two thinning operations was greatest in the heavy thinning at €1,364/ha, with €1,255/ha for medium and €809/ha for the light thinning. No revenue was generated for the unthinned control plots (**Table 1**). There is no indication that heavy thinning is negatively impacting on volume production of the crop, with only a modest decrease (1% difference) between the control and the heavy thinning. Thinning has facilitated the development of larger trees as a result of increased growing space, with the average trees in the heavy thinning nearly twice the volume (0.4m^3) of the trees in the control treatment (0.23m^3) (**Figure 1**). Thinning has greatly enhanced the quality of the remaining trees, with the greatest amount of straight logs apparent in the heavy thinning treatment (**Figure 2**).

Conclusion

Where possible, thinning should be considered earlier in the life cycle of a forest and the adoption of robust thinning practice with increased removal of inferior quality trees offers the best results. Options to increase the intensity of thinning may provide for increased revenues at first and second thinning, especially when compared to a no thinning regime. Timber quality can be significantly enhanced with a greater removal of inferior trees, with an increase in the yield of straight logs. The potential to reduce rotation times exists, as trees have increased growing space to reach merchantable size quicker. Further research will evaluate the impact of thinning on the structural properties of timber.

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