GOOD THINNING PRACTICE SHOWS INCREASED INCOME AND ENHANCES TIMBER QUALITY

Teagasc forestry researcher, Dr Niall Farrelly, indicates that the removal of poor quality trees at first and second thinning is essential to focus production on trees with potential to achieve construction grade timber. It also puts more money in your pocket.

INTRODUCTION:

Many farmers with older forestry plantations are at a crossroads as whether to consider thinning and whether the benefits accruing from thinning are worthwhile. Thinning presents an opportunity for growers to take control of the production process and influence and maximise the production of higher value material such as quality sawlogs, increasing the value of their enterprise.

In certain situations, a no thinning regime may be adopted by growers who have concerns about the stability of the crop and the risk of windblow or where poor access and/or tree health compromise thinning viability.

Restricted annual ring growth is evident where trees are under severe competition associated with no thinning

The removal of inferior quality trees allows production to focus on trees with superior form and with potential to reach high value construction grade timber.

The removal of smaller trees, pulpwood and bigger rougher trees should be prioritised for removal early in the rotation as these trees cannot accumulate significant value over the lifetime of the forest. To reduce competition for site resources and focus production on trees with superior form allows trees to develop into more valuable products is a key outcome of successful thinning operations.

TEAGASC RESEARCH INTO THINNING

To investigate the impact of thinning on crop development, timber quality and provide some information on the level of financial returns from thinning operations, Teagasc have established a number of permanent thinning trials across the country.

One such trial in a highly productive 15 year old Sitka spruce crop in Frenchpark, Co. Roscommon was established in 2010. The main objective was to observe the effect of different thinning intensities on volume production in the crop.

When the trial was established, the crop had a top height of 11 m, with a mean diameter at breast height (dbh) of 16.4 cm, and a volume of circa 200 m^3ha-1.

Thinning treatments (Fig. 1):

1. Control – leave crop unthinned.
2. Grade B – Light thinning - remove dying, suppressed, forked and subdominant trees.
3. Grade C – Medium thinning - as per grade B treatment but include some co-dominant trees.
4. Grade D – Heavy thinning - as per grade C treatment but more co-dominant and competing trees.

Fig. 1: View of unthinned (control) plot and plots representing three different thinning intensities (grades B to D) in Frenchpark, Co. Roscommmon.

FIRST THINNING

The first thinning commenced in 2010 and removed one line in seven with selective thinning between the lines.Thinning concentrated on removing dead, dying and inferior quality stems and improving the quality of the remaining crop. The volume removed varied from 23% to 35% of the standing volume with stocking after thinning varying from 1500 stems to 1000 stems per hectare across the different grades.

The thinnings were cut into pulpwood (smaller poor quality stems) and pallet wood (larger better quality stems for pallets) assortments depending on quality and length of trees.The tops of the trees and branches were left in the forest.

The standing sale of the thinnings returned a price of €6/m³ for pulpwood and a price of €18/m³ for pallet wood. No sawlog was produced in either thinning. At first thinning over 60% of volume removed was pulpwood with the proportion of pulpwood increasing with the intensity of thinning. There was no apparent difference in pallet wood production between thinning treatments.

Timber revenues from first thinning ranged from €475/ha for the grade B thinning, €564/ha for grade C thinning and €616/ha for grade D thinning (Table 1).

Table 1: Main crop details after first thinning with volume assortments and revenue generated.

Thinning type	Stems (Ha)	Vol. Remain (m3/ha)	Vol. Remove (m3/ha)	Net Vol. Pulp (m3/ha)	Net Vol. Pallet (m3/ha)	Revenue €/Ha
No thin	2133	211	0	0	0	0
Grade B	1500	168	51	28	17	475
Grade C	1230	148	62	34	20	564
Grade D	1015	134	73	44	19	616

SECOND THINNING

A second thinning took place in 2016 which focused on the removal of inferior quality removing between 220 to 330 stems per hectare, equivalent to 40 to 60 m3/ha. At second thinning, the yield of pallet wood increased with increasing thinning intensity, from 29% of total volume in the grade B thinning, to 65% in grade D thinning treatment.Timber revenues for second thinning ranged from €334/ha for the light thinning to €748/ha for the heavy thinning (Table 2).

Table 2: Main crop details after second thinning with volume assortments and revenue generated.

Thinning type	Stems (Ha)	Vol. Remain (m3/ha)	Vol. Remove (m3/ha)	Net Vol. Pulp (m3/ha)	Net Vol. Pallet (m3/ha)	Revenue €/Ha
No thin	1990	452	0	0	0	0
Grade B	1163	386	40	25	10	334
Grade C	938	338	61	22	31	691
Grade D	791	311	62	19	35	748

COMBINING RESULTS FROM 1ST AND 2ND THINNING

Total revenue generated from the two thinning operations was highest in the heavy thinning at €1364/ha, €1255/ha for medium and €809/ha for the light thinning (Table 3).

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. No revenue was generated for the unthinned control plots.

Table 3: Details of total volume production, yield of pulp and pallet and revenue generated after two thinning cycles.

Thinning type	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	1990	452	452	0	0	0	**0**
Grade B	21	1163	477	386	91	53	27	**809**
Grade C	21	938	461	338	123	56	51	**1255**
Grade D	21	791	446	311	135	63	55	**1364**

IMPACT OF THINNING ON TREE SIZE AND STEM QUALITY

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 (0.4 m³) of the trees in the control treatment (0.23 m³).

An assessment of log straightness of the remaining crop was also carried out to determine whether each tree was capable of producing a straight 5m log for higher value saw log production. This was used to determine if thinning improved the quality of the remaining trees.

Results indicated that thinning has greatly enhanced the quality of the remaining trees, with the greatest amount of straight logs apparent in the heavy thinning treatment (Fig. 2).

Removal of poor quality trees in favour of the retention of the best quality trees is the key to good thinning practice and optimising returns

"Increasing the intensity of thinning may provide for increased revenues at first and second thinning especially when compared to a no thinning regime"

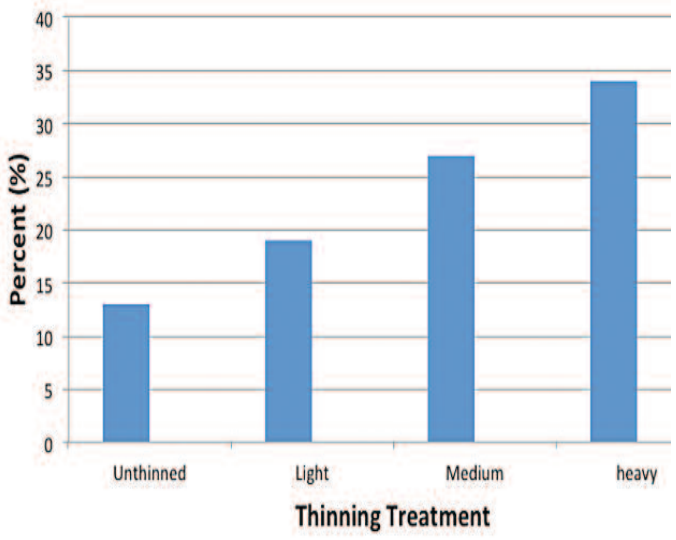

Fig. 2: Volume of straight logs (>5 m) according to thinning treatment.

SUMMARY

- An analysis after two thinnings shows that thinning more heavily resulted in the production of a larger volume of commercial pallet wood.
- The heaviest (Grade D) thinning has produced more than twice the volume of Pallet wood compared to the light (Grade B) thinning.
- Income from timber sales in the heaviest thinning (Grade D) was almost 60% higher than for the light thinning (Grade B).
- Timber quality measured by the volume of 5 metre+ straight logs was greatly enhanced by thinning with the greatest proportion of straight trees (by volume) in the heaviest (Grade D) thinning.
- The heaviest (Grade D) thinning produced larger trees, a higher proportion of trees with straighter stems and the largest volume of commercial Pallet wood and offers the potential for earlier saw log timber production. On this basis heavier (Grade D) thinning is likely to be the most financially attractive thinning/ harvesting management option.

CONCLUSIONS

Increasing the intensity of thinning may provide for increased revenues at first and second thinning especially when compared to a no thinning regime. In addition timber quality can be significantly enhanced with an increased focus on the early removal of inferior trees with an increase in the yield of straight commercial logs.

The choice of thinning intensity or grade may ultimately depend on local site and crop conditions and/or personal choice but results from the research presented here clearly indicate the benefit of thinning on crop development.

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.

It is likely that increased thinning intensity may have the potential to reduce rotation times as trees have increased growing space to reach merchantable size more quickly. Thinning trials such as those in Frenchpark are an important research resource source to provide foresters, growers and the wider industry with up to date advice and guidance based on Irish growing conditions. Further Teagasc forest research will evaluate the impact of thinning on the structural properties of timber.

For more information on Teagasc forest research please see: https://www.teagasc.ie/crops/forestry/research/