

COST E42 Growing Valuable Broadleaves Silviculture Matrix: An Irish example

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Introduction and Matrix -

The purpose of developing the silvicultural matrix in COST E 42 was to provide a vehicle whereby information on silviculture of valuable broadleaved species could be gathered from as many participating countries as possible. The aim of this matrix is to determine what are considered the optimum silvicultural treatments for each of our target species in countries across Europe. In many cases only one or two countries will have experience of a particular species. Also it must be realised that, for many of the larger countries in Europe, there are different climatic regimes and no single matrix can encapsulate the recommendations for that country. In this case a number of climatic regional matrices would be preferable. For this reason, not all countries felt in a position to contribute a matrix and preferred to provide a narrative discussion on various species.

As an illustration of how the matrix can provide a guideline for farmers wishing to plant, the example of ash (*Fraxinus excelsior* L.) in Ireland is taken. Based on the research we carried out, we developed a set of guidelines to assist farmers in making critical decisions. These guidelines now form the basis for government support to farmers.

Stocking density	Rate of height growth	Essential, Valuable, Useful or not needed?	Operation	Brief Description	Stand height	Number of stems operated on	Percentage of stems remaining after operation	Number of stems after operation	Which stems are treated
3300 stems per hectare - Operations up to 10 metres in height									
3300 (at 2.75m)	Essential	Formative Shaping	Treatment aimed at removing "non-permanent" defects i.e. those that can be removed with a secateurs such as turks and very large branches	1 to 4	800	25	3200 (some further losses)	3100	Shape stems of above average height and of good quality (Shape only stems with removable defects)
	Essential	Second formative shaping/pruning	Removing defects, which have occurred since previous shaping, from some of the stems which have already been shaped	4 to 6	500	62.5% of previously shaped stems	3100 (some further losses)	3100	Shape only the best of stems already shaped
	Essential	Mark Potential Crop Trees (PCT)	Mark vigorous, straight, disease and defect free stems using a permanent marking treatment as possible. Selected stems should be as evenly distributed in stand as possible.	6	350	19 to a 30% of shaped stems	3100	3100	Select best stems mostly from those which received a second shaping
	Essential	First stem removal (tending)	First major reduction in stem numbers. Basic stem performance in low vigour. Removal of stems whose crowns are competing with PCTs to provide more growing space. Removal of weak and diseased stems.	8	At least 1500	At least 30%	2150	2150	Remove poorly formed and diseased stems but concentrate on those interfering with crowns of 300 selected and shaped stems and also the certain number retained for early hurley butt removal
	Essential	Pruning	Removal of a large number of stems in standing will open canopy and may improve natural pruning. This operation removes lower branches, particularly codominants, which may cause problems	8	350	11% of all stems	3100	3100	Prune only selected PCT stems which need improvement. Removing large branches and codominants which interfere with stem form.

The COST E42 silviculture matrix

Irish silviculture of *Fraxinus excelsior* L. -

Ireland does not have a history of broadleaf forest management. Broadleaf forestry in Ireland is plantation-based. The majority of the broadleaf plantations have been planted by private owners during the last 15 years with government support. Ash is the predominant broadleaf species. One of the main reasons that ash is a popular choice of species, other than its' vigorous growth rates in Irish conditions, is that Ireland is in the enviable position of being able to realise early returns from a proportion of ash thinnings which can be used to produce hurley sticks for hurling, a very popular national sport.

Irish silvicultural recommendations for ash include:

Planting

- using 1u1 transplants from certified seed sources or known provenance
- plant 3,300 stems ha⁻¹, 2m x 1.5m spacing
- control weed competition, especially from grasses

Formative shaping

- formatively shape 800 – 1100 stems when 1 – 2.5m height
- only shape those stems greater than average height
- shape 700 – 800 stems when 2.5 – 4m height
- shape in early June and July

Tending

- when average height is 8m, select 350 Potential Crop Trees (PCTs) ha⁻¹
- permanently mark PCTs and potential hurley butts
- remove 2 stems per PCT and hurley butt that are competing in the crown
- remove diseased stems
- install extraction racks 1:7 – 1:10 lines in suitably large plantations
- extract by quad bike, tractor or forwarder, depending on size of plantation
- prune PCTs to 6m height

1st Thinning

- when average height is 12 – 15m, select 300 PCTs ha⁻¹
- remove 2 – 3 competitors per PCT



Ash hurley butts and a hurley (left), and hurling (right)

Extension activities -

Teagasc plays an active role in plantation silviculture research, education and advising Irish forest owners on the management of their plantations. Numerous demonstration days are held throughout the year on all aspects of plantation silviculture. Teagasc also has a network of 9 forestry advisors throughout the country that are freely available to owners for advice.

Because there has been little history of broadleaf forest management in Ireland, there is a perception by many owners that management of broadleaves is complicated and beyond their skills. However, the Tending demonstration days have proven to us that forest owners can become proficient in selecting Potential Crop Trees and their competitors after only a few minutes training. This bodes well for the future management of broadleaves in Ireland



Ian Short discussing the selection of PCTs with forest owners at a Tending demonstration

