BROADFORM

Silviculture of new broadleaved plantations: shaping and thinning

PROJECT TEAM
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OBJECTIVES
To develop treatment protocols for the early management of broadleaved species to include:

- shaping methods to improve stem form up to 3 m;
- development of tending practice to favour the best quality stems.

PROGRESS
The final report was submitted to COFORD in November 2007. As a result of the BROADFORM project, the following shaping protocols have been produced:

Ash, sycamore and beech shaping protocols

- Shape when most stems are within the 1 – 2.5 m height range.
- If possible, shape again when the taller stems are 2.5 – 4 m in height.
- Shape only those stems above average height.
- Shape only potentially good quality trees.
- Shape approximately 30 – 35% of stems (800 – 1100/ha) during the first operation as required.
- During the second operation shape 700 – 800/ha of the stems already shaped as required.
- Shape from the leader downwards.
- Concentrate on removing branches derived from nodes and whorls.
- Remove incipient forks.
- Remove co-dominant branches if competing with the leading shoot.
- Remove disproportionately large branches.
- Half of the foliage can be removed without affecting growth.
- 80% of foliage can be removed from potentially good trees or those occupying canopy gaps.
- Shape in early June and July by preference, or else during the winter, i.e. November or December.

Oak shaping protocol
Oak is a difficult tree to shape due to the frequency of disproportionately large branches, forks, death of the leading shoot, and the development of a multiplicity of twiggy shoots with no discernible leader. Because some young oak retain their leaves during the dormant season, care should be taken in examining the stem for branches that may be concealed by the leaves.

- Shape at least 50% of stems on first shaping as required.
- Avoid shaping stems of very poor quality.
- For forked stems with a distinct leader, favour the side of the fork with the leading shoot.
- Pay particular attention to the removal of disproportionately large branches from the lower stem.
- Where the stem has lost its leading shoot and has developed a multiplicity of green shoots, there is little advantage in shaping.
- Where the shoots have lignified it is worthwhile to select the strongest and remove the rest.
- Shape any time except February and March.

The results from the project suggest that shaping should be carried out frequently, possibly biennially, to ensure that defects formed on latter years' growth do not reduce stem quality.

Ash pre-commercial thinning protocol
A pre-commercial thinning protocol for ash has been produced as a result of a literature search,

discussions held during COFORD field tours, and previous BROADFORM results. The precursor to this protocol was developed by BROADFORM staff during the Teagasc in-service training workshop, held in Donegal, November 2006.

- Select, and permanently mark, 300 – 400 Potential Crop Trees (PCT) per ha (12 – 16 stems in a 20 x 20 m plot)
- PCTs should be selected on the basis of:
  - Disease-free: no canker present.
  - Stem form: aim for 6 m of straight defect-free stem, then 5 m, then 4 m, etc.; no forks, no large branches.
  - Vigour: favour the more vigorous trees.
  - Distribution: aim to select at least one (preferably 2 or more) PCTs in each 10 x 10 m area.
- Retention of possible hurley butts may be considered.
- Select 1 – 2 stems per PCT to be removed.
- Select on the basis of: diseased; competing in the canopy with a PCT.
- Occasionally a stem selected as a PCT may need to be selected for removal due to competition with a more favourable neighbouring PCT stem.
- Wolves can be removed assuming that no more than 800 stems/ha in total are removed.
- Prune selected PCTs as required.

The removal of the stems selected for thinning will result in the greatest benefit to the potential crop trees. It should also be noted that the protocol does not include the introduction of extraction racks (racks 1:7 lines would remove approximately 500 additional stems/ha), although the protocol can be easily modified to take this into account. Extraction racks were not included in the protocol because the thinning is to be carried out manually and extracted with a quad or other suitable small-scale method. The majority of ash sites have insufficient numbers of quality sawlog PCTs to enable extraction racks to be installed at this stage. It is envisaged that extraction racks may be installed during the second thinning operation when it will be clearer which trees are likely to be final crop trees.

Discussion on thinning of ash.

ACTIVITIES PLANNED

- Conduct extension/outreach activities and ancillary activities related to the COFORD broadleaf forestry programme;
- Monitor the BROADFORM thinning sites and additional sites as applicable;
- Carry out final measurements of the poplar clonal trials;
- Initiate a thinning trial/demonstration in the Arklow Millennium woodland;
- Establish a pilot field study on the silvicultural management options for poor quality broadleaf plantations;
- Networking and fact-finding missions regarding state-of-the-art of broadleaf spacing trials, establishment of broadleaf mixtures, broadleaf thinning, agroforestry, shaping and pruning of broadleaves, and management of poor quality broadleaf stands.

OUTPUTS

Participation in the review of *Growing Broadleaves.*
Presentation at the Wood Energy 2007 demonstration at Stradbally, 20 June.
Presentation of the ash thinning demonstration, organised by ITGA, COFORD, FDA, SIF and Teagasc thinning, at Kilmeague, Co Kildare, 6 July.
Final report submitted to COFORD.
Dr Ian Short participates in COST Action E42: Growing Valuable Broadleaved Tree Species.