

TECHNICAL GUIDANCE FOR THE ESTABLISHMENT OF SHORT ROTATION FORESTRY

1. Definition

A Short Rotation Forestry (SRF) crop is:

Single or multi-stemmed trees of fast growing species grown on a reduced rotation length primarily for the production of biomass.

2. Outline specification

- Planted with fast-growing, native or exotic species of conifer or broadleaf.
- Established stocking density for all species to be a minimum of 2,500 trees/ha.
- Rotation age will need to be a minimum of 15 years for all species, in order to be eligible for maintenance and farmland premium payments, if planted with grant aid under the Woodland Creation option in the SRDP. Farmland premium eligibility also requires afforested areas to be maintained as such for 20 or 30 years for conifers and broadleaf respectively i.e. restocking will be a condition of felling for all species that will not coppice.
- Initial crops will be single-stemmed trees. Subsequent crops may be single or multi-stemmed depending upon whether the crop is restocked by planting or coppice regeneration.

3. Technical considerations

Sites - the requirement for fast growth indicates that the most productive sites for SRF are likely to be lowland (<200m) and marginal agricultural (agricultural land classes 4 - 5). However, this does not preclude the planting of SRF at higher elevations, particularly with conifers, though it should be understood that biomass yields are likely to be lower and may require a longer rotation length to achieve.

Species - the best species for biomass production are those with high wood density as they have a higher calorific value per volume and, therefore, are more cost effective to harvest, transport and utilise. This drives species choice towards the use of fast-growing, productive broadleaves where possible. However, the use of lower density, fast-growing conifers should not be dismissed as their higher volume production can compensate for density, though handling costs increase.

The table below lists a selection of potentially worthwhile SRF tree genera and species, though their effective use will depend upon site suitability.

Common Name	Species
Broadleaf:	
Alder	<i>Alnus</i> sp
Ash	<i>Fraxinus excelsior</i>
Aspen	<i>Populus tremula</i>
Aspen, hybrid	<i>Populus tremula x tremuloides</i>
Birch, silver	<i>Betula pendula</i>
Eucalyptus	<i>Eucalyptus</i> sp
Lime	<i>Tilia</i> sp
Poplar	<i>Populus</i> sp
Rauli	<i>Nothofagus procera</i>
Sweet chestnut	<i>Castanea sativa</i>
Sycamore	<i>Acer psuedoplatanus</i>
Conifer:	
Douglas fir	<i>Pseudotsuga menziesii</i>
Grand fir	<i>Abies grandis</i>
Larch	<i>Larix</i> sp
Sitka spruce	<i>Picea sitchensis</i>
Western hemlock	<i>Tsuga heterophylla</i>
Western red cedar	<i>Thuja plicata</i>

Planting density - to 'capture' site biological potential (water, nutrients, light) more rapidly, higher than conventional tree density is advised. The optimal economic rotation length is reduced with closer spacing, bringing it nearer to the shorter biomass rotation length. Though it is not certain what the best SRF stocking rate is for most species, existing knowledge indicates that closer spacing, at least up to 5000 stems/ha, should increase biomass productivity overall.

Rotation age - this needs to be a compromise between maximising biomass yield (species choice, site, stocking density) and economics (investment, ease of harvesting/utilisation). Clearly, there is a need for a sustainable, annual SRF production, and it should be borne in mind that the longer the rotation, the more land needs to be locked up in an unproductive state. A rotation age of 15 years should allow SRF species to achieve a DBH of at least 15cm, giving a readily handle crop and a relatively rapid return on investment.

Thinning - the general presumption will be to not thin.

Multiple objectives - there is potential for a densely planted SRF crop to be partially harvested, selectively or not, for biomass, with the remaining trees being allowed to grow on for timber production. However, the decision to do this would depend upon developing market conditions and need not be the original objective.

This could be a particularly appropriate scenario for growing quality broadleaves. It would require more than a silvicultural thinning as the bulk of the crop would be harvested initially as SRF, leaving the better stems to grow on. An option then would be to underplant/coppice with another biomass crop.

Species mixtures - unless a species mixture is reliably co-dominant, there will be a loss of biomass production in the weaker species, likely to result in an overall yield reduction. Therefore, the presumption should be to plant single species blocks unless there are over-riding reasons not to do so e.g. biomass plus timber main crop, back-up species in case of failure (eucalypts + more frost hardy species).

Establishment - as the life-cycle of an SRF crop is truncated compared to conventional forestry, the establishment phase needs to be shorter, which is a factor facilitated by the denser planting. In line with this, beating-up is only likely to be appropriate to do once, at the end of the first year.