Growing Broadleaves for Quality Timber

Establishment Practice

This Guidance Note is one of a series summarising information presented at a seminar on "Growing Broadleaves for Quality Timber", held in February 2010 as part of FC Scotland's Timber Development Programme. These notes provide information on all the main aspects of growing quality broadleaved timber, from choice of planting stock through to timber marketing, together with relevant references and links to more detailed information.

This presentation, which was delivered by Alan Harrison (Forest Research), is available for download through the seminar web page.

Introduction

Establishment practice comprises:

- Plants and stocking
- Protection
- Weed control

Plant types

Both bareroot and container grown planting stock are appropriate if well grown and planted correctly. Use of containerised stock generally allows more flexibility but can be subject to droughting if planting is followed by very dry weather. The root to shoot ratio of the plants should be "balanced", i.e. with the root accounting for between 30% and 50% of the plant by weight. The shoot diameter must be adequate to support the height of the plant, and plants taller than 50 -60 cm will require a stake. A good quality plant will always have a single leader with a live terminal bud.

Stocking

Stocking should aim for 5000 plants per hectare; stocking of 1100 stems per ha which became popular in native woodland and amenity schemes are wholly inappropriate. High stocking is required to encourage single (not forked) stems, straight, vertical growth and to provide greater potential for selection of good trees during thinning. It is also important to suppress side-branches and, in some species, epicormic shoots. Mixtures can be used e.g. oak in groups plus ash, birch or cherry. Recently the idea of growing high quality main crop trees in a matrix of shorter rotation biomass crop has been suggested and trials are underway.

Thinning

Thinning takes considerable skill and commitment. Thinning should be selective, with interventions during the first half of the rotation being "little and often", i.e. every 5 - 10 years, and thereafter every 10 - 15 years. The aim should be to remove 70% of the yield class volume in each thinning operation (e.g. for yield class 6 crop on a 5 year thinning cycle, the thinning volume should be 5 × 6 × 70% = 21 m^3/ha). Suggested final stocking levels and rotation lengths are shown in Table 1.

Table 1: Final stocking and rotation age by species

SPECIES	FINAL STOCKING (stems/ha)	TYPICAL ROTATION AGE (years)
Ash	120-150	70
Cherry	140-160	60
Oak	60-90	140
Sycamore	140-170	70

Protection

Broadleaves are very palatable to a wide range of birds, herbivores and insects, including deer, hares, rabbits, squirrels and voles. Methods of countering damage include:

- Barriers: e.g. fences, tree shelters, rabbit guards and vole guards.
- Biological control e.g. raptor posts.
- Direct action – e.g. shooting, poisoning or trapping.

Grey squirrel

Grey squirrels are a major pest of broadleaved trees (Figure 1). Grey squirrel will do some damage to most tree species, but sycamore and beech are particularly liable to damage. Damage levels are related to bark thickness and stem age, with trees between 10-40 years old being most vulnerable. Most damage occurs between April and July. The aim of control should be to reduce squirrel numbers to below 5 per hectare during this period. Control can be by trapping, poisoning or shooting. For more information see FC Practice Note 'Controlling Grey Squirrel Damage to Woodlands' (Mayle et al., 2007).

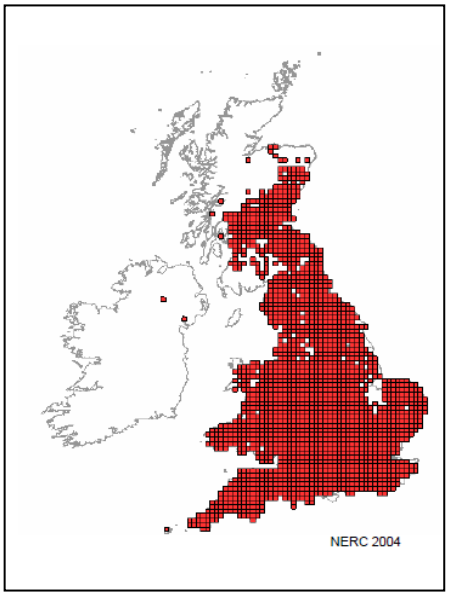

Figure 1: Distribution map of grey squirrel

Voles

Voles will attack most broadleaves with damage levels depending mainly on the vole population, which is determined by the surrounding food source and the level of cover. Swards of tall grass can harbour very high populations. Control measures can include vole guards (and possibly spiral guards), weeding and mowing to reduce cover and providing 'raptor posts' to encourage predators.

Weeding

Weeding is necessary to overcome competition for water, nutrients and light; and on some sites (e.g. with bracken) to reduce the risk of physical damage. The first stage is to identify the problem and then consider the control options, which include:

- Biological – sowing of less aggressive alternatives. e.g. clover or wild flower mixes on arable ground
- Barriers - mulches
- Mechanical – cultivation, mowing and flailing
- Herbicides.

The aim should always be to adopt the least environmentally harmful but effective option.

Mulches include both organic products such as bark, straw and spent compost and inorganic materials such as opaque plastic, felt and woven mats. All these options potentially give good localised control by smothering competing plants. They also have the additional benefits of increasing moisture retention and soil temperatures. However, they are expensive to use on a large scale (i.e. circa £900/ha) and some can have undesirable toxic, inhibitory or nutritional effects such as anaerobism. Mulches need to be either biodegradable or removed after use. A further drawback on some sites is that voles like to nest, run and feed under them, which can encourage damage to plants.

Herbicides

Herbicides provide the most effective and easily managed solution. They are long-lasting, relatively inexpensive and safe (provided that they are used according to the product label). The aim should be to predict problems before they manifest themselves and then to time the application to be most effective. It is important to choose the right chemical (see Tables 2 to 4 below) and the best timing and method of application. It should be noted that the range of approved chemicals is rapidly reducing due to increasing regulation. For further details see *"Reducing Pesticide Use in Forestry"* (Willoughby *et al.*, 2004) which can be downloaded from www.forestry.gov.uk/publications.

Table 2: Chemicals currently available for use on FSC certified estate (i.e. Forestry approval, and not on FSC 'highly hazardous' list, or if on list, derogation granted).

Active Ingredient	Product Name (s)	Typical Use	FSC 'Highly Hazardous'	Notes
Asulam	Asulox	Bracken	No	
Clopyralid	Dow Shield	Thistles	No	
Cycloxidim	Laser Stratos	Grasses	No	
Dichlobenil	Casoron G	Broad spectrum	No	Approvals revoked March 2010.
Glufosinate ammonium	Challenge Harvest	Broad spectrum	No	
Glyphosate	Round Up etc..	Broad spectrum	No	
Metamitron	Goltix	Mixed residual	No	Mainly of use only for farm woodlands.
Metazachlor	Butisan S Sultan 50	Mixed residual	No	Mainly of use only for farm woodlands.
Napropamide	Devrinol	Mixed residual	No	Mainly of use only for farm woodlands. Approval revoked May 7th 2010
Triclopyr	Garlon 4 Timbrel	Woody	No	

Table 3: Chemical is legal and safe if used according to the product label, but cannot be used on FSC certified estates (i.e. Forestry or farm forestry approval).

Active Ingredient	Product Name	Typical Use	FSC 'Highly Hazardous'	Notes
Amitrole	Weedazol	SRC Broad spectrum	Yes	No derogation applied for
2,4-D	Broadsword Broadshot Greengard	Herbaceous	Yes	No derogation applied for
Dicamba	Broadsword Broadshot Greengard	Herbaceous	Yes	No derogation applied for
Fluazifop	Fusilade Max	Grasses	Yes	
Isoxaben	Flexidor 125 Gallery	Herbaceous residual	Yes	No derogation applied for
Pendimethalin	Stomp 400SC	Mixed residual	Yes	No derogation applied for
Propaquizafop	Falcon	Grasses	Yes	No derogation applied for
Propyzamide	Kerb	Foliar and residual grasses	Yes	Application for FSC derogation rejected, Appeal in Progress

Table 4: Chemical is no longer legal to use in forest or farm forestry crops

Active Ingredient	Notes
Ammonium sulphamate	Approvals revoked, May 2008.
Atrazine	
Cyanazine	
Diquat	
Diuron	Approvals revoked, August 2008
Imazapyr	
Paraquat	Approvals revoked, July 2008.
Simazine	

Herbicide Advisor

This a web-based, expert system developed to advise on the relative efficacy of different herbicides for scenarios with a mix of weed and crop species, at varying times of the year. The system requires the user to carry out weed identification, impact assessment and prediction. Herbicide Advisor then produces a suitability index for each herbicide as well as further details on crop sensitivity to overall sprays and secondary weed susceptibility. It can be accessed on the Forest Research internet site: http://www.forestry.gov.uk/fr/ggae-5jqkfd.

Conclusions

Establishing and growing quality broadleaves is perfectly possible in Scotland, but it does require a long-term commitment to management.

References

Mayle, B., Ferryman, M., Pepper, H. (2007). Controlling Grey Squirrel Damage to Woodlands. Forestry Commission Practice Note 4 (Revised). Forestry Commission, Edinburgh.

Willoughby, I., Evans, H., Gibbs, J., Pepper, H., Gregory, S., Dewar, J., Pratt, J., McKay, H. (2004). Reducing pesticide use in forestry. Forestry Commission Practice Guide, Forestry Commission, Edinburgh, 140pp.