

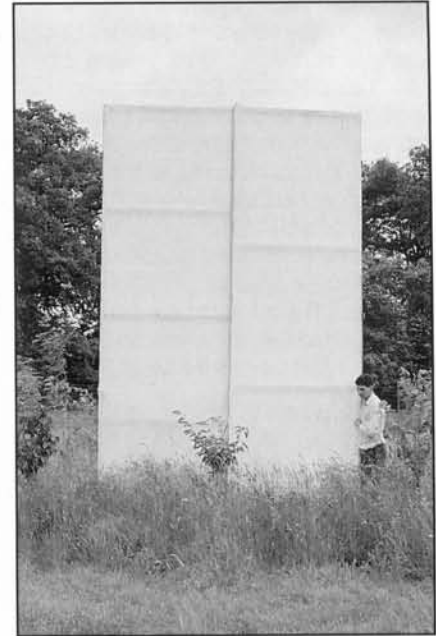
Weeding young trees - avoiding trouble

The use of herbicides is undoubtedly the most cost-effective method of weed control for young trees. Ian Willoughby clarifies the herbicide options and different application methods

Controlling weeds around trees can be a complex and costly business, so why bother? Might not a bit of vegetation actually help to protect trees from the sun and the wind? The simple answer is 'no'! Weed control in any new woodland planting is essential. Just as weeds reduce yields of agricultural crops, so they also adversely affect young trees' growth and survival, through competition for nutrients, light, and most importantly, moisture. The photographs opposite illustrate the effect that weed competition can have on tree growth. Often the effect will be even more dramatic, sometimes with weed-choked trees dying completely.

For the first few years after planting, trees are very vulnerable to damage from pests, diseases, drought etc, and if left unweeded, they can stay vulnerable for many more years, and the risk of failure becomes substantial. Put plainly, it is throwing money away to plant expensive trees, then fail to weed around them.

Some weeds are worse than others. For example, a vigorous or regularly cut grass sward can be extremely competitive. Weeds such as creeping



Good growth of wild cherry, after four years with total weed control through the use of herbicides (left). Poor growth of wild cherry, after four years with no weed control (right). (Photos: Forestry Commission)

thistle, spear thistle, ragwort and docks may be less harmful to trees, but can cause problems if they are allowed to spread to other parts of the farm.

Lowland ex-arable or improved grassland sites are likely to give extremely good tree growth, but also be subject to intensive weed competition.

Box A: Methods of weed control

Method	Approx cost for 5 yrs weed control @ 2,500 trees/ha		Notes
	Per tree	Per ha	
Mechanical (cutting, ploughing etc)	30p	£750	Can be difficult amongst planted trees, and rarely wholly effective - some weeds may be spread by ploughing, or vigour increased by cutting. Cutting weeds by itself is detrimental to tree growth.
Mulches (plastic)	38p	£950* ¹ (* ¹ = 1m diameter spot)	Effective in most situations, but costly, unsightly and not always durable. Organic mulches are much more expensive.
Alternative ground covers, eg kale, wild flower, clover low yielding grass	6p-40p	£150 - £1,000 (+)	Useful in between rows of weed-free strips with wide-spaced (3m x 3m) trees. Only for use in addition to, rather than instead of, other techniques.
Herbicides	14p-28p	£370* ² - £700* ³ (* ² = 1m band, * ³ = overall spraying using tractor)	Effective in all situations. Figures show an intensive regime on weedy site. Costs are likely to be lower in many cases. Care is needed to avoid harm to operators and environment. Safeguards for the environment and operators are provided by a rigorous approval system. <i>It is absolutely essential that users have received adequate training in the use of herbicides, and that they always read and follow the instructions on the product label.</i> Only products which are approved by the Pesticides Safety Directorate for use in forestry (listed on the product label) can be used.

Essential weed control

On fertile lowland sites cultivation will tend to encourage growth of annual weeds, so should be left undisturbed unless the soil structure is poor and will reduce tree growth. In dry years or on dry sites, weed growth may appear sparse or die back, but this does not mean it is safe to ignore your trees! On fertile sites, sparse weed growth probably indicates lack of moisture, so it is important to weed and to let the trees get what little moisture there is.

Box A summarises some of the alternative methods of weed control in new woodland plantings. The use of herbicides is without doubt the most cost-effective way of practising weed control. A typical weed control regime using herbicides on a lowland, fertile farm woodland site may be as follows:

1. Before planting, spray overall with a broad spectrum contact herbicide to control any established vegetation.
2. After tree planting, in March apply residual soil-acting herbicides to bare sites to control germinating weeds.
3. After the effects of the soil-acting herbicides wain, it may sometimes be necessary to apply contact herbicides to control established weeds. These may either be selective products, or directed sprays of broad spectrum herbicides.
4. At the end of the growing season, clean the site up with a broad spectrum herbicide, if there is a substantial covering of biannual or perennial weeds that will not be controlled by residual herbicides applied the following spring.

Repeat steps (2) to (4) as necessary until the trees are well established – usually three to five years after planting.

All trees would benefit from 100% weed control throughout the establishment phase, but this may appear unsightly, provides no cover for wildlife, and is expensive and undesirable due to the amount of herbicide required. As an absolute minimum, a one metre diameter spot, or a one metre wide band around each tree should be kept weed-free from April to July, until trees are well established.

Selecting herbicides

Table 1 summarises some of the herbicides that may be of particular use in farm woodland establishment. It is essential that you obtain further advice or guidance before using them. Refer to Box D for further information, contact a professional adviser and, in any event, always read the product label.

Box B: Hand-held herbicide applicators



Knapsack sprayer (left)
Versatile sprayer, variety of designs. Typically a 15 litre reservoir carried on operators back. Photo shows sprayer with guard.

Uses: Pedestrian application of all liquid herbicides, as bands, spots, overall etc.



Forestry spot gun (right)
Adapted drenchgun with a lighter 5 litre knapsack, delivering a 5 ml measured dose.

Uses: Pedestrian application of liquid herbicides, spot application only. Calibration easier than standard knapsack sprayer.



Pepper pot (left)
Beaker-type plastic pot.

Uses: Pedestrian application of granular herbicides. Supplied free with propyzamide granules.

Weed wiper (right)
Pole with rope-wick.

Uses: Direct application to weeds where careful placement of herbicides is required.



Table 1: Herbicide options

Example product	Active ingredient	Manu- facturer	Crop Tolerance				Uses				Rate litre/ ha	Weeds controlled	Approx cost/ha [Herbicide only]
			Pre-flushing trees dormant		Post-flushing		Pre- plant	Residual pre-emer- gence	Post emer- gence	End of season clean up			
			Conifers	B'lves	Conifers	B'lves							
Unicrop Flowable Atrazine	500 g/l atrazine	Unicrop 01628 526083	✓ ¹	✓ ¹	✓ ¹	X	X	✓	X	X	5	Some established grasses, pre-emergent grasses and some herbaceous weeds	£15
Dow Shield	200 g/l clopyralid	Dow Elanco 01462 457272	✓	✓	✓	✓	✓	X	✓	✓ ³	0.5-1.0	Established thistles, and some other herbaceous weeds	£33-65
Fortrol	500 g/l cyanazine	Cyanamid 01329 224000	✓	✓	✓	XD	X	✓	X	X	4 ¹	Some established grasses, pre-emergent grasses and some herbaceous weeds	£65
Fusilade	250 g/l fluoazifop-p- butyl	Zeneca 01428 656564	✓	✓	✓	✓	✓	X	✓	✓ ³	1.5	Some established grasses	£38-114
Challenge	150 g/l glufosinate ammonium	AgrEvo 01533 841581	X	✓	XD	XD	✓	X	✓	✓	3-5	Most established weeds. Deeply rooted species require repeat applications	£33-55
Roundup Pro Biactive	360 g/l glyphosate	Monsanto 0116 2620864	✓ ²	XD	XD	XD	✓	X	✓	✓	1.5-5	Most established weeds	£10.50-35
Flexidor	125 g/l isoxaben	Dow Elanco 01462 457272	✓	✓	✓	✓	X	✓	X	X	2	Some herbaceous weeds pre-emergence	£102
Butisan	500 g/l metazachlor	BASF 0161 4856222	✓	✓	✓	✓	X	✓	X	X	2.5	Some grasses and herbaceous weeds pre-emergence	£75
Stomp	400 g/l pendimethalin	Cyanamid 01329 224000	✓	✓	✓	✓	X	✓	X	X	5.0	Some grasses and herbaceous weeds pre-emergence	£45
Falcon	100 g/l propaquizafop	Cyanamid 01329 224000	✓	✓	✓	✓	✓	X	✓	✓ ³	0.7-1.5	Some established grasses	£34-72
Kerb Flowable	400 g/l propyzamide	PBI 01992 623691	✓	✓	✓ ⁴	✓ ⁴	✓	✓	X	✓	3.75	Most grasses, pre- emergence and established, some herbaceous weeds pre-emergence	£90

Notes

Refer to product labels and Forestry Commission Field Books 8 and 14 for more information, specifically on species controlled and operator and environmental protection.

1. Use a mixture of 5 l/ha atrazine with 4 l/ha cyanazine.
 2. Most fully dormant conifers (not Douglas fir) will tolerate sprays at 1.5 l/ha.
 3. Weeds may have grown beyond their susceptible stage to this product, by the end of the growing season.
 4. It is usually too late to achieve effective weed control with propyzamide by the time trees have flushed.
- XD. Use only as a directed spray – avoid all contact with trees.

This table does not provide an exhaustive list of all approved products.

Plantation design

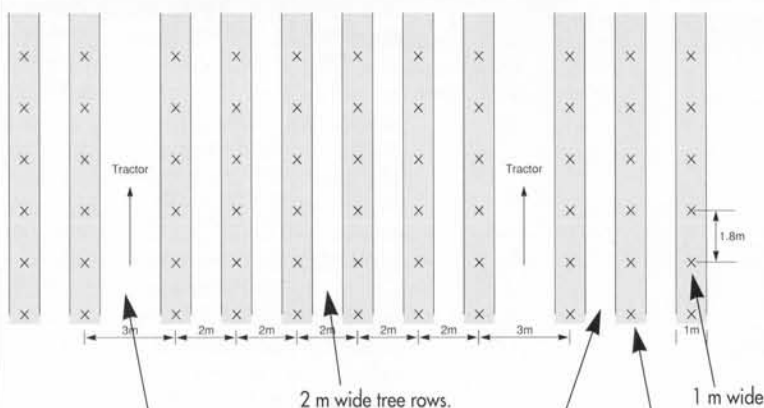
Whatever your objectives – be they to improve the look of a farm, to create a conservation habitat, or timber production – the aim should be to create a woodland environment rapidly. The best way to achieve this is to plant trees at no more than 2m x 2m spacing (ie no fewer than 2,500

stems/ha). Such a design helps to minimise the vulnerable stage of woodland establishment by encouraging rapid 'capture' of the site, and reduces the impact of the occasional dead tree. It is better to work towards a vigorous healthy woodland with planned open space, rather than a weed covered field with a few very widely spaced sickly trees, that may

take many years to form a true woodland. Mechanised access is possible with close spacings by using 'tram-lines' as illustrated in Figure 1.

If one metre wide weed-free bands are maintained rather than 100% weed control across the entire site, it may be necessary to manage the areas between the tree rows. For example, a grass cover can be sown before tree

Figure 1: Example of a close-spaced planting design that allows mechanised access



3m wide row between trees to allow tractor access. A 17m boom could then treat 3 rows either side of tractor.

The combination of 6 rows of 2m spacing, followed by 1 row at 3m spacing, with trees at 1.8m spacing between rows achieves 2500 stems/ha whilst allowing mechanised access.

Inter-row area – sow grass cover pre-planting to prevent influx of noxious weeds.

weed-free band around trees

Tractor mounted boom sprayers are a cheap method of applying broad spectrum herbicides pre-planting, or more selective products post-planting. (Photo: Forestry Commission)



planting to stop the influx of thistles, ragwort etc between weed-free bands. For wider spaced plantings (3m x 3m) inter-row vegetation management, in addition to weed-free zones around trees, becomes essential.

Crop tolerance

Table 1 indicates the crop tolerance of the selected products. Trees protected by treeshelters allow the use of more broad spectrum products, without the need to direct sprays away from the base of trees, but may be too expensive to use in closely spaced plantations of less than about one hectare in area.

Which applicator?

If the plantation design is right and the appropriate products selected, agricultural mechanised boom sprayers may

be the cheapest and easiest method of application. There are also many pedestrian hand-held applicators (see Box B p28) that can be used to apply broad spectrum products as directed sprays, or where mechanised access is not possible.

Avoid future problems

It is usually easier to anticipate a weed problem and act pre-emptively, than to be faced with a jungle of weeds later in the season. Use past experience of a site, and look at what is growing now and likely to be a problem in the future, then prevent a big problem arising later in the season by applying soil-acting herbicides to a clean site.

Planning a weed control strategy even before the first tree is planted, may not be simple but it is essential. □

Box C: Summary weed control recommendations

- Weed control is essential.
- Maintain a **minimum** of a one metre wide band, or one metre diameter spot, weed free around each tree, from April to July for three to five years after planting.
- Check the approval status of herbicides before you use them.
- Take professional advice and/or carry out further reading.
- Always read the product label.

Ian Willoughby is a silviculturist at the Forestry Commission Research Division, Alice Holt Lodge, Wrecclesham, Farnham, Surrey, GU10 4LH. Tel 01420 22255.

Box D: Further information

- Willoughby, I and Dewar, J (1995), *The use of herbicides in the forest*, Forestry Commission Field Book 8, HMSO.
 - Willoughby, I and Clay D. (1996), *Herbicides for farm woodlands and short rotation coppice*, Forestry Commission Field Book 14, HMSO.
- Both of the above are available direct from HMSO on tel 0171 873 9090, but Field Book 14 should be regarded as a supplement to, rather than an alternative for, Field Book 8.
- Willoughby, I and Moffat, A (1996), *Cultivation of lowland sites for new woodland establishment*, Forestry Commission Research Information Note 288. Available from: Research publications officers, Forestry Commission Research Division, Alice Holt Lodge, Wrecclesham, Farnham, Surrey, GU10 4LH; tel 01420 22255.
 - Alternatively, contact a professional forestry adviser. For example, **The Institute of Chartered Foresters** holds a register of members in consultancy practice. Contact: 7A St Colme Street, Edinburgh, EH3 6AA; tel 0131 225 2705.
 - Further information on safe use of pesticides is available from: **The Pesticides Safety Directorate**, Mallard House, Kingspool, 3 Peasholme Green, York YO1 2PX; tel 01904 640500.
 - Information on training in the use of pesticides is available from: **The Forestry and Arboriculture Safety and Training Council**, c/o Forestry Commission, 231 Corstorphine Road, Edinburgh, EH12 7AT; tel 0131 334 8083.