



**Eamonn Wall amid mixed broadleaves after two growing seasons, planted as 60-90cm transplants, weeded each winter with kerb granules**

**W**eeds reduce both the survival and growth of trees by competing for light, nutrients and most important of all, for moisture – particularly in low rainfall areas.

Soil moisture deficits become greater under weeds than under bare soil because vegetation can lose moisture more rapidly and for a longer time before soil moisture potential limits transpiration. In comparison, relatively little moisture evaporates from bare soil before a layer of dry soil forms, restricting further moisture loss.

Weeds around trees also harbour small mammal pests such as mice and voles, and can induce mildew on some species. In some cases the physical weight of weeds can damage trees, particularly after heavy snowfall. For these reasons, effective weed control is vital to ensure good establishment of the young trees.

#### **What area do you weed?**

The majority of sites where trees are planted both in the uplands and in the lowlands benefit from weed control during the establishment phase. However, regularly cutting or mowing weeds, especially grass, is of no use since it increases their rate of water use by maintaining them in active growth, allowing them to compete more effectively and for longer during the growing season. The most cost-effective method of weed control is through the use of herbicides.

Control of weeds need not extend over the whole site in order to obtain improved survival and early growth of trees. Maintaining a weed-free area either as a 1m<sup>2</sup> spot around the base of each tree or as a 1m wide strip down the tree row will give the required results, but strip weeding allows mechanisation through the use of adapted agricultural spraying equipment.

#### **How long do you weed for?**

Weed control is only essential during the establishment phase, normally for the first three years after planting.

#### **Mechanisation of Operations**

The maintenance of a newly planted woodland can be expensive and even impractical unless mechanisation is possible. If mechanisation is planned it is important to allow sufficient space between the trees and sufficiently large headlands to allow tractors or other equipment (ie. farm bikes) to turn.

However, there can be conflict between

# Tackling WEEDS before they kill the TREES

**Attention to weed control and vegetation management is the key to successful tree establishment on ex-agricultural sites. Eamonn Wall discusses the various chemical herbicides used in woodland management**

planting to allow access to agricultural tractors and the production of quality timber which demands that the trees are planted at reasonably close spacing. If the primary objective is to produce high quality timber, then the options are either to plant trees at close spacing in the tree lines or to manage the inter-row vegetation by use of small horticultural machinery or the expanding range of equipment that is now available for use with four-wheel drive farm bikes.

#### **Types of herbicides**

Herbicides can be divided into three broad groups:

1. **Residual herbicides.** These products act via the soil where they are taken up through the roots of weeds. It is important that these herbicides are applied to damp soil and that rain allows application to move them into

the top 2-3cm of the soil. If these products are applied to dry soil and little or no rainfall follows application, weed control will be poor. Residual herbicides must be applied to a firm fine tilth; if large clods are present at the time of herbicide application these will weather and crumble, exposing untreated soil allowing prolific weed growth eg. Kerb, Flexadour.

2. **Foliar acting herbicides.** These are absorbed through the point of contact on the leaf and stem and are independent of the condition of the soil. The timing of application will be determined by the growth stage of the target weed. Foliar acting herbicides give best results when they are applied to actively growing weeds eg. Glyphosate.

3. **Residual and foliar acting herbicides.** These are herbicides which have a combination of the two modes of action listed here.

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## Where long-term weed control is required, residual

### Pre and post planting use

Herbicides can be used effectively before or after planting. There may be opportunities to control perennial weeds in the previous crop, eg. use of selective herbicides in pasture or the use of glyphosate pre-harvest in cereals and other arable crops. Such treatments can reduce the subsequent vigour of weeds such as creeping thistle or couch grass. Foliar-acting herbicides, can be used to clean up undisturbed stubbles before planting.

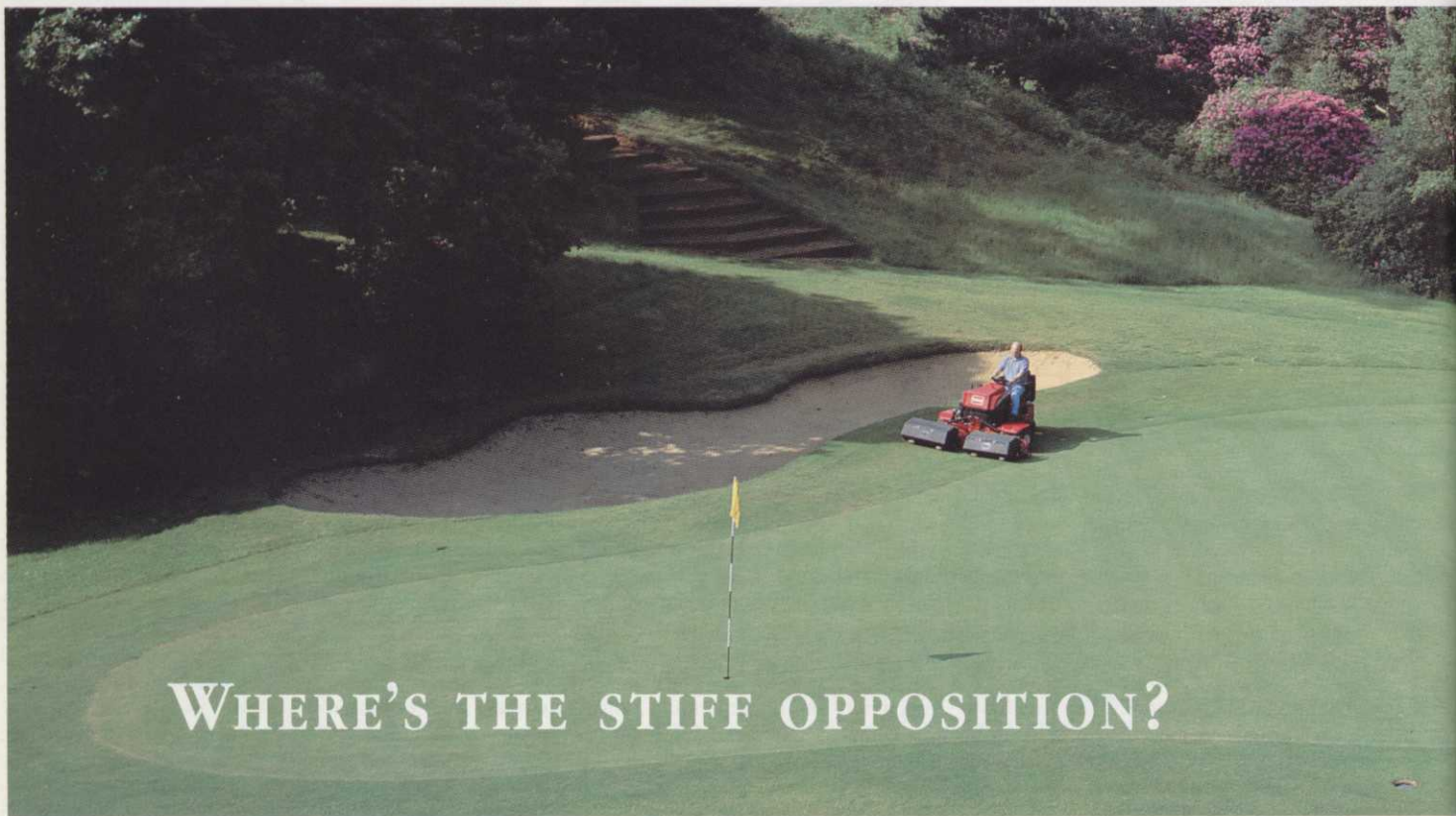
Where long-term weed control is required after planting the use of residual herbicides is the best option. It is vital to match the weed control spectrum of the herbicide to that of the weed species on the site. Many residual herbicides generally only control weeds pre-emergence and must therefore be applied to bare earth. If bare soil is to be maintained all year round, treatment may be repeated in the autumn and the spring. However, in practice, weeds resistant to the residual herbicides (sometimes applied as a tank mixture) is needed. As an alternative to a year-round bare-soil system, some vegetation cover may be allowed to develop in the autumn and win-

ter when it is not competitive and then be killed by a spring applied foliar-acting herbicide. A spring applied residual treatment will then delay reinvasion.

### Characteristics of the most commonly used chemicals

■ **Propyzamide (Kerb granules/liquid):** This is a soil acting herbicide which slowly volatilises in cold soil and is taken up by germinating weeds and through the roots of existing weeds, especially grasses. A limited range of herbaceous broadleaved weeds are also susceptible from germination to the true leaf stages particularly grasses. Such weeds which emerge late in the season, however, will only be partially controlled.

Propyzamide slowly breaks down in the soil, lasting for 3-6 months. All commonly planted forest trees are tolerant. Application via granules (using pepperpots) and liquids (using knapsack sprayer, spot gun, etc.) can take place anytime between October 1 to January 31 north of a line from Aberystwyth to London and to December 31 south of this line. In practice it appears that few extra weeks



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# herbicides are best option



Trees protected from rabbit browsing by the use of 60cm plastic spiral guard with bamboo for support. These trees were weeded via a winter application of kerb granules

make little odds, presumably depending on season.

Propyzamide concentrate can be harmful to fish and, as with all chemicals, ponds, waterways and ditches should not be contaminated or used as a dumping ground for empty containers.

Organic soil decreases the activity of propyzamide and treatment of soils with depth of peat greater than 10cm is not recommended. Pre- and post-planting applications are possible, however pre-planting applications can cause problems and have resulted in tree mortality, so is best kept for post-planting applications.

■ **Isoxaben (Flexidor 125 or Gallery 125):** This is a pre-emergent liquid herbicide sprayed on bare soil to control broadleaved weeds. It is useful when applied mixed with kerb flo (ie. liquid) when treating dense grass as the kerb kills the existing invading grass for 3-6 months and the Isoxaben prevents colonisation of the broadleaved weeds. Their action in the tank-mix is complementary leading to effective control of grasses and broadleaved weeds. Expensive, though Flexidor is much cheaper than Gallery.

■ **Glyphosate (Roundup):** This is a translocated herbicide taken up by the foliage and conveyed to the roots. It causes chlorosis and eventual death of leaves and then kills roots and shoots. It controls a wide range of weeds including: grasses, herbaceous broadleaved weeds, bracken, heather and woody weeds. When applied late in the growing season, the main effect is obtained in the following year. On contact with the soil is inactivated and quickly broken down.

It can be applied at any time of the year when vegetation is actively growing but is most effective on broadleaved weeds when they are close to flowering but before senescence.

Certain conifers will tolerate overall glyphosate sprays provided leader growth has hardened. Hardening can occur as early as the

end of July or may be delayed until the end of October in some locations.

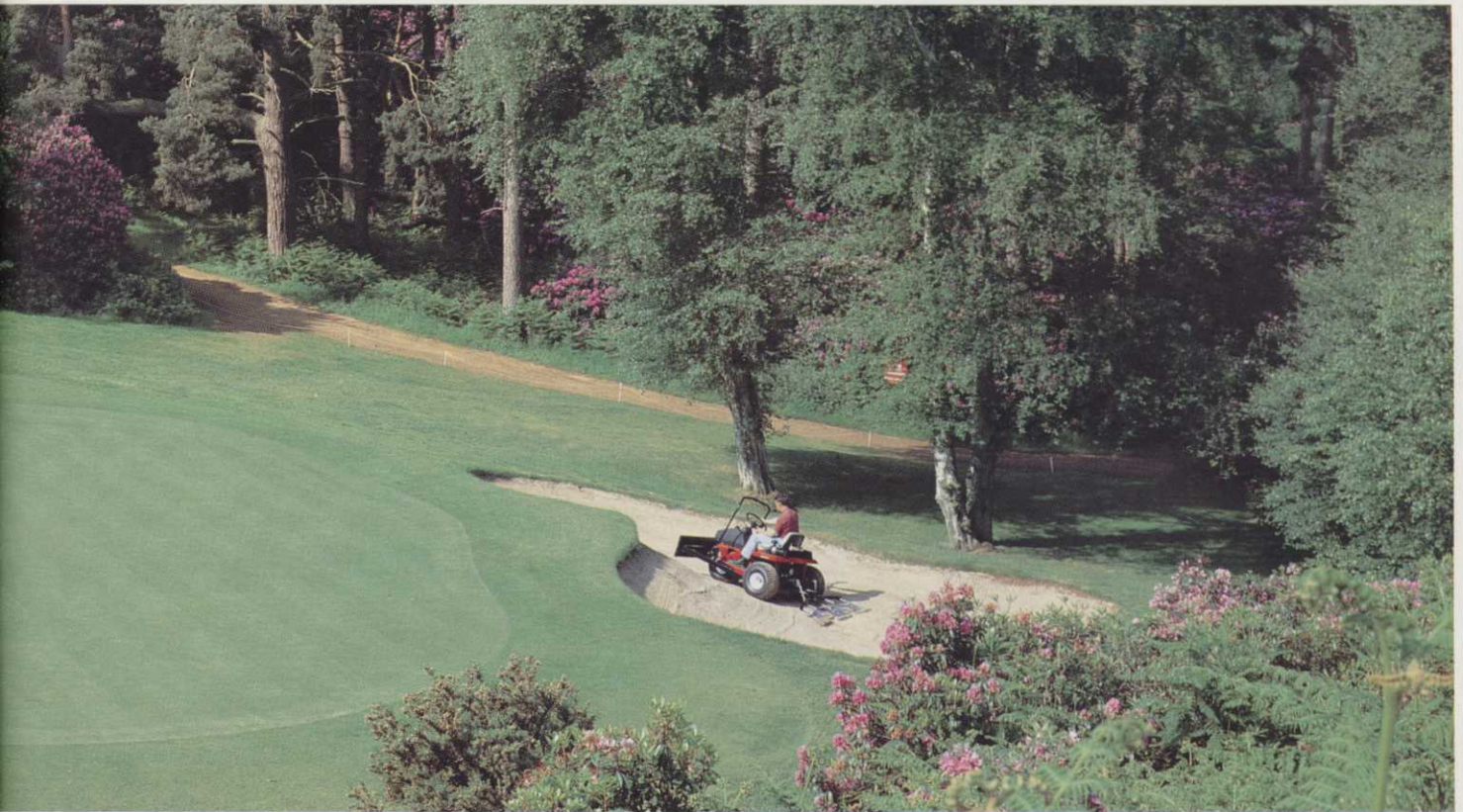
Broadleaves, larch and other conifers will not tolerate overall applications; always use a guard, a weedwiper or a directed spray to avoid contact with the foliage and immature bark of crop trees.

Glyphosate applied later than June will be too late to lessen the effect of weed competition in the current season. It is most effective on moist vegetation and when relative humidity is high and air warm. Heavy rainfall within 24 hours of application may reduce the herbicide's effectiveness by preventing sufficient foliar absorption.

## Grass

Grasses especially can compete vigorously for light, nutrients and in the lowlands and drier uplands, for water; effective control is therefore usually essential for successful tree establishment and growth.

Perennial rhizomatous grasses are the most difficult to control and require the use of residual herbicides (Kerb) or frequent application of contact herbicides (glyphosate). Kerb



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will have some effect on herbaceous broadleaved weeds but wherever they constitute a significant part of the weed population, glyphosate is more likely to give good results. Isoxaben will also keep out the broadleaved weeds.

As glyphosate is a contact herbicide, it should be noted that grasses treated in early April will invade and re-establish themselves by May/June if it is a warm moist spring. If this occurs, a second application will be required.

A winter application of Kerb followed by a glyphosate application during the summer to treat subsequent broadleaved weed invasions is a useful programme to consider for broadleaved/conifer planting schemes.

A pre-planting application of glyphosate in strips can speed up planting by reducing subsequent screening time and also by providing the tree planters with pre-determined lines.

## Broadleaved weeds

Land managed for agricultural production usually has an enormous number of weed seeds in the soil. These are generally not apparent because, under pressure, grass prevents most weed species becoming established and under arable crops, weeds are controlled initially by herbicides and later by the smothering effect of the crop. Whether agricultural soils are left unmanaged or efforts are made to maintain bare ground, a succession of weed

species takes place, although not disturbing a cereal stubble may delay and reduce this influx to some extent. This process starts with a rapid invasion of volunteers from the previous crop and annual arable weeds. Gradually these annual weeds are replaced by perennials, many of which are deep rooting and difficult to remove selectively using herbicides between broadleaved trees and some conifers. Examples of such weeds are dandelion, docks, creeping thistle, perennial nettle and bramble. The best way to remove these weeds is by repeated application of foliar-acting herbicides, applied in ways which avoid contact with the user.



The survival of large trees is not as good as that of small trees. Watering trees in Bexley during the recent drought summers was necessary

## Chemical update

Tree planting on golf courses is similar to planting elsewhere and only a small proportion of the UK forest area is treated with herbicides each year (<1%). During a recent five-year period, Forestry Commission use of herbicide products declined by one third, although the area treated remained constant. The most commonly used herbicide is glyphosate, which was applied to over 70% of the area treated in 1991. A reduction in amounts of herbicide applied per unit area reflects the use of both directed spot applications and products which require lower doses of active ingredient for forestry application, whilst others (eg. some triazine products) have been discontinued for commercial reasons. Withdrawal has occurred particularly where further information was required for label registration by the Pesticides Safety Directorate.

## Approval status of forest herbicides

Under the Control of Pesticides Regulations (1986) only those products approved for use as forest herbicides can lawfully be used to control weed species.

There are two types of product approval which users of pesticides must be aware of:

1. Label approval (full approval): The approved product label, found on the herbicide container, states the conditions for the use of the product. These represent the only uses for which the product was developed.
2. Off-label approval: Some products may have local importance or a minor use for which no full label approval exists. In these circumstances, off-label approval may be granted after application to the Pesticides Safety Directorate. For these products a copy of the off-label approval should be obtained by the user. Often a leaflet or other source of information may give further information on the conditions of use.

It is the product and not the active ingredient which has label approval. Therefore it is not permissible to apply an alternative product with the same active ingredient as an approved product, unless the alternative product also has approval for forestry use.

## Conclusion

Successful tree establishment depends on the correct species choice, followed by good planning, planting, weeding and maintenance.

Chemical herbicides are a great aid to the woodland manager and their correct use is both an economical and effective means of ensuring that the trees we plant today will be the quality woods of tomorrow.

Happy weeding!

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