

Reforestation following Clearfell



Reforestation

Reforestation challenges

The challenges to replant a forest are similar, whether the reforestation is due to premature clearfell or is at the end of a crop's rotation. These challenges are:

- To decide when to replant, immediately or within one year of the felling licence expiring,
- To provide an ideal planting environment,
- To encourage strong growth of a fully stocked crop at the initial reforestation stage,
- To minimise losses or delays due to vegetation competition, livestock or insect damage.

Reforestation activities

Activities associated with reforestation include:

- Windrowing (brush, lop and top piled in rows typically 10-12m apart)
- Mounding
- Dipped trees (pre-treated in insecticide)
- Planting and filling in (replacement of dead plants)
- Fertiliser
- Vegetation control
- Fencing (if needed)
- Control of subsequent outbreaks of pine weevil post planting

Timeline	Activities
Year 1	Ground preparation- Windrow Mounding
	Plants dipped for weevil
	Planting
	Fertiliser
	Fencing
Year 2	1 st filling-in @ 500 stems/ha
	Spray for weevil
	Vegetation control
Year 3	2 nd filling-in if necessary
	Spot spray / manual clean



Windrowed and re-mounded site.



Replanted site.

Table 1: Reforestation activities and timescale

Ground Preparation

The successful reforestation of a clearfelled site begins at the ground preparation stage. The type of ground preparation will be dependent on a range of site factors including:

- soil type
- slope
- drainage status

Brash mats and other post-clearfell branching are normally arranged into windrows. This work is usually carried out by tracked excavator. Additional drainage or ground preparation such as mounding between the rows may be required.



Brash mats post-clearfell



Other branches post-clearfell

The bundling and removal of brash should only be considered on better sites and is dependent on a number of factors such as satisfactory nutrition levels and suitable ground conditions.

While brash bundling operations may be cost-neutral, the main benefit is lower site preparation costs because of the tidier nature of the reforestation area.



Brash bundling



Stacked brash bundles

Plant Quality

Trees should only be bought from a recognised forest nursery and should be ordered, where possible well in advance of planting. The trees should have a strong fibrous root and a straight stem. While more expensive and of limited availability, genetically improved planting stock have been proven to enhance growth, stem form and wood properties.



Poor (left) and good (right) quality broadleaf plants

Species	Number of trees required per hectare	Plant spacing (metres)	Number of trees required per 8 metre circular plot
Lodgepole pine (pure)	3,100	1.8 x 1.8	62
All other conifers	2,500	2.0 x 2.0	50
Alder	2,500	2.0 x 2.0	50
Sycamore, other broadleaves	3,300	2.0 x 1.5	66
Oak, Beech pure	3,300	2.0 x 1.5	66
Oak, Beech with nurse mix	3,300	2.0 x 1.5	66

Table 2: Tree spacing and stocking (Forest Service, 2011)

Replanting

Planting and subsequent filling-in should take place between November and March dependent on tree species and site type. The planting season may be extended by using either cold stored or containerised plants.

The correct number of trees per hectare (or stocking density) can be assessed using circular plots. Count the number of live trees within an 8 metre radius circle (see Table 2).



Stocking density being measured in an 8m circular plot.

Fertiliser, Fencing & Vegetation Control

Fertiliser

Phosphorus is the most commonly applied fertiliser on newly planted trees to promote early tree growth, usually in the form of Ground Rock Phosphate (GRP). Fertiliser must be applied between the months of April and August. This is to maximise fertiliser uptake and minimise the risk of environmental damage. It is highly unlikely that an application of nitrogen will be needed on a site that formerly grew a successful timber crop.

Fencing

It is important to regularly check the fence lines to prevent browsing animals such as sheep, cattle, deer, goats, hares or rabbits from entering the reforested plantation. Trees may be killed or severely damaged by bark stripping, eating of shoots, trampling on tree roots, etc. Animals may cause drains to collapse initiating water logging. This may result in an increased windthrow risk.



Sheep trespass on reforestation site



Deer fencing

Vegetation Control

Vegetation control is crucial on most sites. Vegetation such as briar, willow, gorse and willowherb can quickly colonise clearfelled sites and timely control of vegetation is critical to successful re-forestation. Control can be either manual or by chemical control.



Encroaching vegetation on replanted site

When: April – June

Why: to reduce competition for light, water and nutrients between trees and weeds

Control: Manual or chemical control

Manual cleaning may involve either trampling or cutting of the competing vegetation.

Chemical control involves the use of an appropriate herbicide which should be carefully applied:

- The choice of herbicide depends on the type of weeds, the tree species, site type and the time of year.
- Broadleaves are more susceptible than conifers to damage from herbicide drift, so careful application is essential. Use a cowl or guard.
- Chemical control can lead to a boost in tree growth, especially for species such as oak and sycamore.

Vegetation	Herbicide	Timing of application
Grasses, Rush & Bracken	Glyphosate	May – Oct
Gorse	Triclopyr	Aug – Dec
Woody scrub	Triclopyr	Aug – Nov
Rhododendron	Triclopyr	June – Sep

Table 3: Types of vegetation and herbicides

To be most effective in terms of effort and cost, vegetation control should be carried out at the start of the growing season.

Weevil Risk

Felling a coniferous crop increases potential breeding material for the large pine weevil (*Hylobius abietis*). Young trees used for restocking are liable to be heavily attacked by adult pine weevils. Weevils feed on the stems from the root collar upwards, possibly girdling the stem and resulting in plant death.



Plant damage due to weevil

Young tree losses due to pine weevil damage may substantially increase the re-establishment costs through the cost of insecticide application, replacing plants and additional weeding. Adult pine weevil may live for up to four years and may attack at any time of year when it is warm enough for insect activity.

There is a tendency for two peaks of damage to occur, one in spring before egg laying and the other in late summer before the adults hibernate underground.

Method of predicting a weevil outbreak

Stump hacking

Clear the soil away from a quarter of a stump, at least 40 cm out and 30 cm down from soil level (include at least one major root and two root-stump junctions). Remove bark from the cleared area using a spade. Count the number of weevil larvae and pupae. Weevil larvae are not segmented or ridged and tend to form a C shape.

Sample at least five stumps. If the average count per stump on a site felled more than 12 months is

- **1 or less** spraying may not be necessary
- **1 – 5** check site again during weevil feeding periods (April and August).
This method should be viewed as an indicator and is not 100% accurate.
- **5 or more** spraying will be necessary.



Removal of bark from stump



Close up of pine weevil larva

Weevil control

No successful non-chemical means of controlling the weevil population in the stumps is currently available. It may be necessary to dip and/or spray the young trees with an appropriate insecticide such as cypermethrin.

Please note: The insecticide application is only effective for approx. six weeks so predicting the optimum time of application is critical.

Read the label and follow the guidelines when applying chemicals. As per the Sustainable Use Directive, only a registered professional user or a person operating under the direct supervision of a registered professional user can apply pesticides authorised for professional use.

Work is on-going to develop non-insecticide control alternatives as part of an Integrated Pest Management (IPM) approach.

Replant is a time to Re-assess

Reforestation allows forest owners to pause and to consider their options before choosing the next rotation's path. The owners' objectives may change to reflect the multi- functional nature of forestry.

Research in terms of improved species, species mixes and management techniques is on-going. Teagasc's Forestry Development Department is available to assist owners to access the latest advice and knowledge, in order to maximise the forest resource.

Teagasc's Forestry Services



Research

Teagasc's forestry research focuses on supporting the developing farm forestry sector.



Advice

Your local Forestry Adviser provides private landowners with independent and objective advice.



Training

Teagasc's Forestry Development Department provides FETAC-certified, forestry-related courses.

Further information:

- Contact your local Forestry Adviser
- www.teagasc.ie/forestry provides up to date info on forestry grants, upcoming events, technical advice, forestry research, staff contact details and much more
- Subscribe for Teagasc Forestry e-News: forestry news emailed directly to you
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This leaflet can be read in conjunction with:

- Teagasc Farm Forestry Series No. 8: Grey Squirrel Damage of Broadleaves
- Teagasc Farm Forestry Series No. 9: Deer Damage in Farm Forestry
- Teagasc Farm Forestry Series No. 14: Nutrient Deficiencies in Forest Crops
- Teagasc Farm Forestry Series No. 16: Management of Young Forests
- Teagasc Farm Forestry Series No. 19: Continuous Cover Forest Management

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