

Fertiliser application

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Even on poor shallow unenclosed upland sites, forest can produce excellent yield with minimal fertiliser application. Once established, trees source all the essential minerals even from poor soils.

Trees make fewer soil nutrient demands than other crops. Forests require little or no fertilisation throughout crop rotations even on land sub-marginal to agriculture. Up until the early 1990s, when afforestation was carried out on very poor land such as peatlands, upland old red sandstone and acidic podzol-type soils, many new planting sites required at least one fertiliser application.

Today, better quality land – although still marginal to agriculture – is being made available for planting. Most of this is on enclosed mineral ground and was farmed at some stage. These sites are unlikely to need fertilisation while unenclosed sites, which are unlikely to ever have been cultivated, will require one or two fertiliser applications. Once established, trees can source all the essential minerals even from poor soils. Over the years they recycle nutrients from decaying leaves and lop and top to enrich the soil.

Where phosphorous are required in forestry sites, Phosphorous is usually top of the list. Some sites may require potassium and Nitrogen while Copper deficiencies – although rare – have also been recorded in a few peat sites

Depending on the soils and the species planted, Nitrogen may also be required. Poorer sites may also need a second application of rock Phosphate.

Foresters and growers should regularly check their plantations for nutrient deficiency. Poor growth rates and foliage discolouration are the obvious signs of nutrient deficiency. Foliar analysis is recommended before applying fertilisers to check what nutrients may be lacking. For example, cut over midland peats can be deficient in potassium and Copper while deep peats are usually deficient in Nitrogen.

Phosphorus is not only an essential element for grass and other plants in agricultural production, it is also a vital nutrient in tree growth. Better quality mineral soils now being made available for forestry will perform adequately without fertilisers but some may require at most, a once off application of 250 kg/ha of rock Phosphate.

Crops respond well to Phosphate even on peatlands – both blanket and raised bogs – old red sandstone and poor podzol soils and poor peaty and mineral gley soils. These required 350 kg/ha at establishment and at least one further application later of 250 kg/ha.

Most Phosphate application recommendations are for Sitka spruce but these can also be applied to other conifers such as Norway spruce (Table 1).

Table 1. Recommended Application Of Phosphorous For Sitka Spruce*

Site type	Rate of Application of granulated rock Phosphate (kg/ha). Fertiliser contains 11 to 16% P.
Enclosed/improved fields recently farmed	None
Former agricultural land not recently farmed.	250
Unenclosed land	350 On very poor sites, two applications may be necessary – 350 kg/ha. at establishment and 250 kg/ha as required.

*Rates may also apply to other conifers including Norway spruce, Douglas fir and pines.

Source: Forest Service, 2000.

Potassium deficiency can occur in midland fen peats and in West of Ireland sites which may require muriate of potash (50% K) at 250 kg per ha.

Nitrogen has been an issue in the past especially on peat where heather competition is prevalent leading to 'heather check'. These sites require one or more applications of Nitrogen in the form of urea as well as herbicide application to kill of heather competition.

Before applying fertilisers, foresters and forest owners should familiarise themselves with the Forest Service 'Forestry and Water Quality Guidelines'. For example, fertilisers should ideally be applied in later spring and early summer, between April and August and should not be applied during or immediately after periods of heavy rainfall. Fertiliser should not be applied in waterlogged soils.

Greatest care should be taken when applying fertiliser close to rivers, lakes and streams. The *Code of Best Forest Practice* recommends that fertilisers should be applied manually in the 20-50m area adjacent to aquatic zones. Fertiliser should not be applied within 20 m of an aquatic zone.

In plantations established on difficult terrain or when crops reach the thicket stage (close of canopy) aerial fertilisation can be carried out efficiently and safely if guidelines are observed so as leaving a 50 m wide corridor on aquatic zones unfertilised.

Plantations where trees are showing signs of nutrient deficiency should not be submitted to the Forest Service for second instalment payment. In such cases a foliar analysis should be undertaken to determine the fertiliser type and rate to be applied. The site should then be fertilised accordingly and following a successful response to the application of fertiliser the site should be submitted for second instalment payment.