

Mulch mats a novel way for trees to outgrow weeds

An important part of successfully establishing forests is the suppression of competing weeds: clearly the more vigorous the weed growth is, the more young crops experience competition for light, water and nutrients. Even in the Irish climate, competition between weeds and young, newly planted trees for moisture can be particularly severe, and can significantly reduce early growth, particularly in broadleaves.

Much research in forest vegetation management has been devoted to testing and developing herbicides. While herbicide application is a cost-effective solution, environmental awareness and forest certification processes have led to a reappraisal of herbicide use. Given these developments it is important to examine potential alternatives to herbicides for use in Irish forestry.

A research team based at Waterford Institute of Technology, led by Dr Nick McCarthy, has pioneered work in seeking workable alternatives to herbicides. COFORD has funded the team to evaluate the effectiveness of mulch mats placed around the trees at planting for weed suppression. Mulching is a weed control technique used in agriculture and forestry throughout the world. The primary objective of the work was to investigate the use of a range of mulch mats as an alternative to herbicide use to control weed vegetation to establish forest and other tree crops on both afforestation and reforestation sites.

Eight different photodegradable plastic mulch mats were tested in four plantation types: a Nordmann fir (*Abies nordmanniana*) Christmas tree plantation at Clonroche, Co Wexford, a eucalyptus (*Eucalyptus parvifolia*) foliage plantation at Tralee, Co Kerry, and a reforestation site planted with ash (*Fraxinus excelsior*) and Sitka spruce (*Picea sitchensis*), respectively at New Ross, Co Wexford.

Rainfall and air temperature were measured at the three sites. The rainfall-sealing effect of the mulches and their effect on soil surface temperatures under each mulch mat treatment were quantified using temperature probes and tensiometers linked to pressure transducers. Other studies have shown that temperatures can increase under plastic mulch to the extent that the soil dries out. This study, however, found no differences in soil temperature under the mats compared with the control. This concurs with other findings that indicate that black films have the least modifying effect on soil energy budgets



Christmas tree (Nordmann fir) experimental site showing mulch mats used in the trial.

and conserve soil moisture well.

In terms of the overall effectiveness of the mulch mats the results have shown that:

- Mulch mats are at least as good as conventional herbicide in controlling weeds, and their use allows trees to get well established, on a range of sites.
- All the mats used in these trials were photodegradable, but in the interim biodegradable mulch mats have come on the market, which are more environmentally friendly.
- Policy developments are likely to further reduce the range and use of herbicides for weed control – thus it is prudent to continue investigating and testing alternatives.

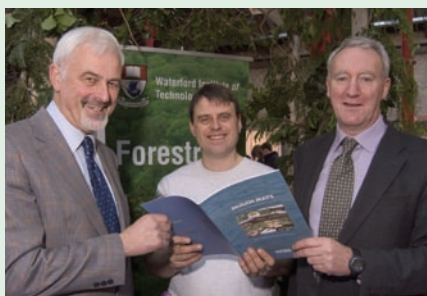
Although the use of mulch mats is, at the moment, prohibitively expensive for large scale tree planting, they have a use in amenity tree planting and are worth considering in establishing shorter-lived tree crops such as Christmas trees and species grown for decorative foliage. As far as large scale

planting for conventional forestry is concerned, technology may develop to the extent that mats can compete with herbicides and eventually partially or fully take their place. One way or another, investment in new approaches to vegetation control is needed, as forest establishment by planting is likely to predominate for the foreseeable future.

The team's work is summarised in a COFORD report: *Mulch mats and their role in establishing forest and other tree crops* by Nick Mc Carthy, Claire Mc Carthy and Milo O Rathaille. This line of research is continuing under a new round of COFORD funding, with the objective of coming up with workable, cost effective alternatives to current herbicides.

To order a copy of the report please contact COFORD: phone 01-2130725 or email info@coford.ie.

For further information on experimental methods of vegetation control contact Dr Nick Mc Carthy, Waterford Institute of Technology (nmccarthy@wit.ie)



Alistair Pfeifer (COFORD Research Programme Manager), Dr Nick Mc Carthy (WIT) and Dr Eugene Hendrick (COFORD Director) at the launch of the report "*Mulch mats and their role in establishing forest and other tree crops*" by Dr Nick Mc Carthy, Claire Mc Carthy and Milo O Rathaille.