

FARMFUNGI

Production of edible fungi in the farm forest

PROJECT TEAM

Dr Tom Harrington, University of Limerick*
 Maria Cullen, University of Limerick
 John O'Connell, Private forest owner

* Email: thomas.harrington@ul.ie

COMPLETION DATE: December 2010

BACKGROUND

Oyster mushrooms (*Pleurotus ostreatus*) and shiitake mushrooms (*Lentinula edodes*) are produced on a commercial scale in a number of countries. Production by traditional methods (i.e. on logs) has the potential to be integrated into farm forest enterprises, and to contribute to the financial returns from these enterprises. This is because capitalisation costs are low and there is an availability of raw material for inoculation from thinnings. With careful management, logs may continue to produce crops for up to six years after inoculation, further reducing costs. The rationale behind this project is to assess the feasibility of this production method in a farm forest scenario in Ireland.

OBJECTIVES

- To determine whether inoculation of cut stumps and sawn logs and incubation in the forest will yield marketable quantities of oyster mushrooms and shiitake.
- To determine the influence of stump size and type, log type, size, and moisture content on mushroom yield.
- To develop a protocol for cultivation of mushrooms on logs derived from thinnings that will be applicable in farm forest enterprises.

- To determine whether a plantation of *Tuber aestivum*-inoculated host trees that will yield commercially viable quantities of truffles can be established on a previously unforested site in Ireland.

PROGRESS

A field trial, replicated in three different farm forests in Co Limerick, was set up in spring 2008 to assess production of oyster mushrooms (*Pleurotus ostreatus*) and shiitake (*Lentinula edodes*) on logs cut from forest thinnings. On each farm the trial comprised 720 logs (500 logs are considered the minimum that would give a commercial return). The trial tested one strain each of oyster mushroom and shiitake on 1 m logs of variable diameter of a range of hardwood timber types (Table 1). Ash, sycamore and beech are being assessed at all three farms, oak at two farms and alder at one farm. Inoculation of cut stumps of ash, sycamore and beech is being carried out at one farm.

Inoculated logs were arranged in four standing stacks, one stack for each timber type. There were 45 logs in each stack, comprising four diameter classes.

The logs are now being monitored on a monthly basis for moisture content, mycelium development, production of fruiting bodies, and contaminant fungi. Continuous environmental monitoring is also being carried out (air and soil temperatures, rainfall).

Moisture content remained between 25-35% just prior to (April) and after inoculation (Figure 1), which should have ensured adequate moisture for the colonization of logs.

The contaminant fungus *Trichoderma viride* spread extensively on most logs (except ash) in all the sites after inoculation. This was successfully countered by restacking and the onset of drier weather.

Table 1: Details of inoculations.

Plantation	Dates of inoculation	Type of timber inoculated with oyster and shiitake	Total number of logs inoculated	Total number of stumps inoculated
Blossomhill Kilcornan	27/05/08-20/06/08	Alder, ash, beech, oak and sycamore	850	180
Springfield Dromcolliher	09/06/08-23/06/08	Ash, beech, oak and sycamore	775	100
Askeaton	24/06/08-07/07/08	Alder, ash, and sycamore	540	27

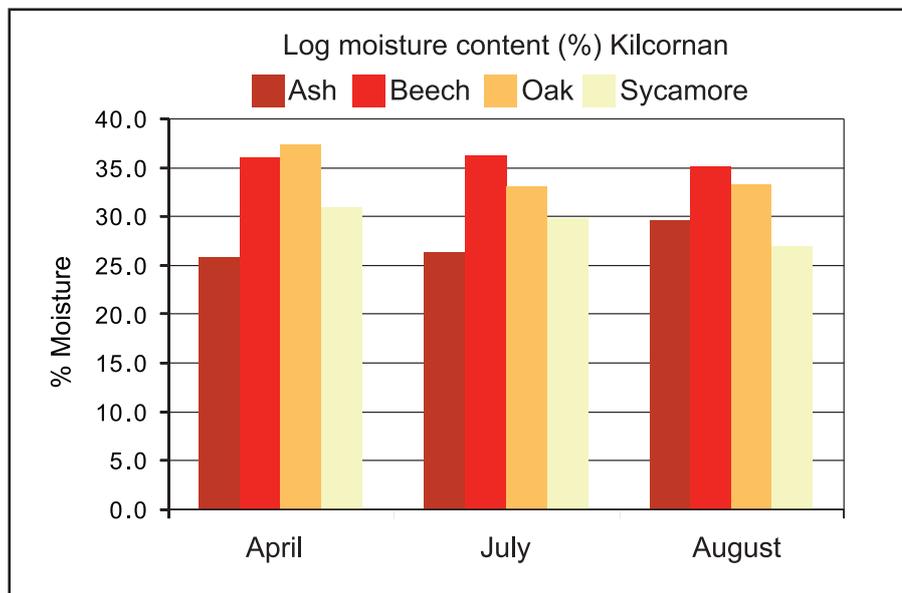


Figure 1: Moisture content in logs of different timber types inoculated with oyster mushroom.

Preliminary internal inspection of a number of logs indicated that the inoculae of oyster and shiitake are colonizing the timber. Fruiting bodies have appeared on a number of the smaller diameter beech logs and also on a number of stumps, a hopeful sign for the success of the inoculation.

Soil cores were collected from the oak and hazel truffle orchard and attempts were made to assess the density of *Tuber mycorrhizae* on roots of inoculated oak and hazel samplings. *Tuber mycorrhizae* appear to be present on roots of both species.

ACTIVITIES PLANNED

- Continuous monitoring of the weight and moisture content of the inoculated logs and fungal development on these logs.
- Monitoring environmental conditions in each plantation.
- Establishment of a second trial in spring 2009 to investigate variables such as different strains of oyster and shiitake mushrooms, the use of home-grown inoculum, suitability of conifer timber, and continuous (i.e. year-round) inoculation.
- Analysis of how variables (such as log type, log diameter, log moisture content) influence the yield of shiitake and oyster mushrooms.
- Analysis on the influence of stump size, type and location on yields of oyster mushrooms.

OUTPUTS

A short piece on the project was included in the *Ear to the Ground* television programme broadcast by RTÉ on 6 November 2008.