FARMFUNGI

Production of edible fungi in the farm forest

PROJECT TEAM

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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 capitalization costs are low and there is an availability of raw material for inoculation from thinnings With careful management, inoculated logs may continue to produce crops for up to six years after treatment, 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 *T. aestivum*-inoculated host trees that will yield commercially viable quantities of truffles can be established on a previously unforested site in Ireland.

PROGRESS

Monitoring of the 2008 trials

Oyster mushroom/shiitake trials

Moisture contents of inoculated logs: Monitoring of the 2008 trials in Askeaton, Blossomhill and Springfield continued. Moisture contents of the logs declined somewhat in the early part of 2009 (Figure 1) at all sites. A new irrigation regime installed at Blossomhill and Springfield in March 2009 arrested and reversed this

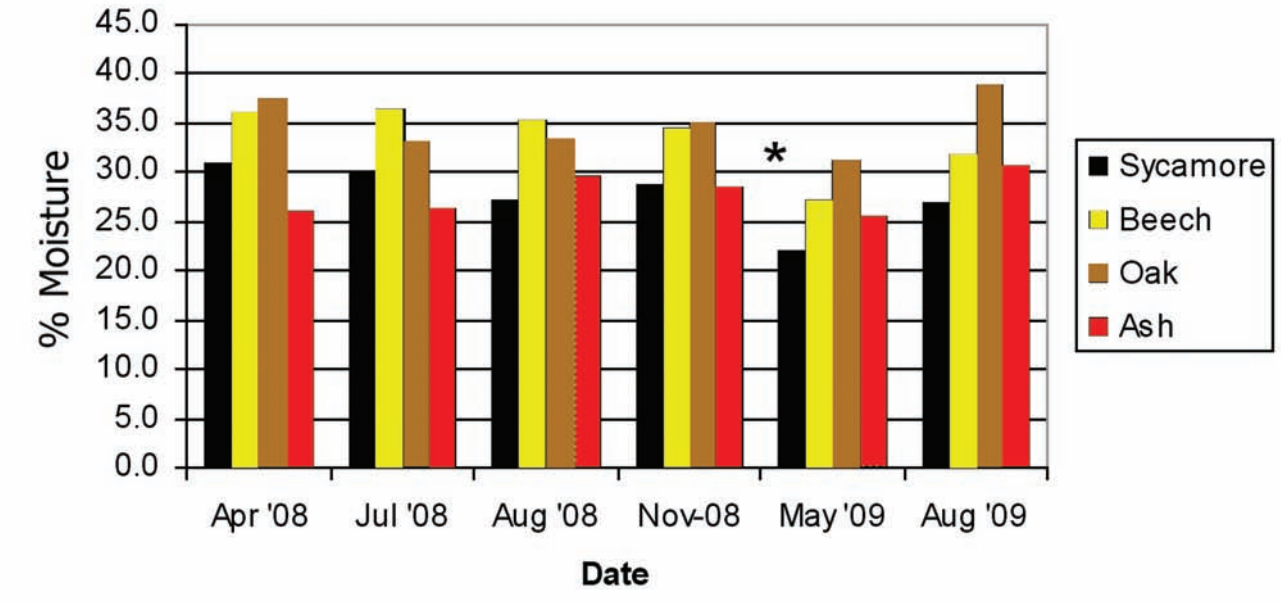

Figure 1: Average moisture content (%) of logs of different timber types at Blossomhill farm forest. Logs cut in April 2008. Irrigation installed in March 2009 (marked *).

decline (the abnormally wet summer of 2009 also helped). It was not possible to install a similar regime in the Askeaton site; this site will act as a benchmark for assessing the impact of irrigation.

Production of oyster and shiitake mushrooms

Oyster fruit bodies began appearing as early as January 2009 on sycamore stumps. Almost 50% of sycamore stumps have produced on average, 2.3 fruit bodies per stump, over the period January–August 2009. Other stump types have produced very little yet.

Logs had not produced as much as stumps up to September 2009. The main expected production period for logs would be autumn: late August –December. Expected yield would be about 2-3 kg per log. Production on logs started in September as expected, and although results have not been collated yet, production appeared to have been better than on stumps but not as good as expected. The shiitake logs have produced very little, even though induced by dipping in water. Oyster fruit bodies have appeared sporadically on all timber types, and while it is not statistically possible to say yet which timber type is most productive, it appears that sycamore is the most, and ash the least productive. The severe cold snap that started in mid-December ended all fruiting in 2009. It is expected that production on these logs will continue into 2010.

The 2009 trials

A further set of trials was set up in spring 2009. The aims of these trials were to investigate variables such as different strains of *Pleurotus* and shiitake, the use of 'home-grown' inoculum, suitability of conifer timber, influence of different inoculation rates, and continuous (i.e. year-round) inoculation. Some of the logs inoculated with a native strain of *Pleurotus ostreatus* have already produced some fruit bodies, but the main production period will be next autumn. The same irrigation regime has been applied for these and monitoring of moisture content is continuing.

The truffle orchard trial

The oak and hazel truffle orchards are being maintained manually weed-free and progress of the trees is being monitored. It is likely that excavation of the entire roots system of selected whole plants will have to be carried out in spring 2010.

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.
- 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.
- Final analysis of data and economic evaluation of in-forest fungal inoculation/production.

OUTPUTS

An interim report on the FARMFUNGI project, entitled *Fungi in farm forests*, was delivered by Tom Harrington, at the Forest Fungi in Ireland Seminar at Avondale House, Co Wicklow on 28 August 2009.