



## **S205 FUNGHI**

### *UNEARTHING THE WOODWIDE WEB*

Narrator

Luxurious timber in the luxurious Rain Forest. Economics inextricably bound with ecology. Now biologists are unearthing a new set of relationships fundamental to the forest.

Lessons from nature could help with man-made problems. And literally turn our understanding of forests upside down.

The first clue can be found almost anywhere there are trees. Even in a wet Yorkshire wood.

Funghi seem unlikely candidates to start a revolution.

But most of the action goes on beneath the soil. This fungus is digesting a dead piece of wood. Wood decomposers are the forest's recycling service. Nothing breaks down branches better. Look carefully in the leaf litter and there are tell tale signs of other decomposers. Skeleton leaves are caused by Funghi. Other leaves are bleached when Funghi attack.

Prof Ian Alexander, University of Aberdeen

Funghi are important components of the decomposive system in any eco system. And particularly so in forests. They're one of the major agents by which the leaves and twigs which fall to the forest floor, broken down and the nutrients within them are released for re-absorption by the plants.

Narrator

In the heat and humidity of the Malaysian Rain Forest, this happens up to five times faster than in the British Oak Wood. Ian takes up the trail with forest pathologist Doctor Lee Su See. As in the British woodland, decomposers deal with death. The health of the forest depends on them. Branches and leaf litter are a treasure trove of nutrients. Funghi feed them back to living plants. Again, to get to the business end you have to get your hands dirty.

Prof Ian Alexander

Many of the Funghi that occupy this part of the forest eco system form these long fungal strands. So that the individual fungus can colonise quite a large area of the forest floor. And this serves as a sort of plumbing system for it to conduct carbohydrates and nutrients and water.

Narrator:

This is part of an extraordinary network. Not all Funghi get nutrients from breaking things down. Some of them form constructive partnerships with living trees. The budding mycologists are about to log onto a woodwide web.

Female:

Is this it?

Prof Ian Alexander

Yes. These are tree roots which are mycorrhizal. Some of these root tips will be infected by this fungus here.

Mycorrhizal means the tree roots have teamed up with the fungus. And the fungus is part of a hidden underground community.

Prof Ian Alexander

It's interesting the way that the mycorrhizae and the decomposers occupy the same bit of space don't they. And so they must be interacting quite significantly.

Dr Jonathan Leake, University of Sheffield

I think below ground, we have aspects of competition. But we also have a lot of interlinking between organisms. So the complexity of the below ground linkages is something which is quite unique and different to what we see above ground. Where we typically think much more about individual plants competing with each other. Or animals and plants interacting.

Narrator

These mycorrhizae have been cultivated for closer inspection. The fine threads are part of the fungus, collectively called 'the Mycelium'.

Dr Jonathan Leake, University of Sheffield

If you look here, you can see units that are much thicker, most robust. And these are joining together forming an inter connected web. Connected back to the plant, and then extending out into the soil. At the same time you can see there are finer mycelium extending off beyond the tips of these thicker structures.

Narrator

Plant and fungus connect in the bulbous tips. They become a single structure that looks different from either partner alone. Here, the hairs at the growing tip are replaced by mycorrhizas further up the root. It must be a mutually beneficial arrangement. In nature, most trees form fungal connections.