

Increased interest in biological control in forestry

Disease and pest management in forestry, and particularly in forestry nurseries, is generally reliant upon regular chemical application of fungicides and insecticides.

The global trend towards reducing chemical use and reliance is gradually being heeded by the forestry industry in South Africa and research into alternative control measures is stepping up.

The concept of integrated pest management (IPM), which incorporates biological, cultural and genetic control with selective use of chemicals, has been embraced by agriculture worldwide but the forestry industry has perhaps been slower to decrease reliance on chemical control measures because forestry is not food-related.

Concerns about the effects of fungicides and pesticides on health and the environment have led to an increasing interest in biological control methods to suppress the growth of pathogens and plant pests and to stimulate natural plant resistance.

Concerns over excessive synthetic chemical use have led to the deregistration of a number of effective chemicals in many countries and the South African authorities also recently announced that they are reviewing the Group I or most hazardous pesticides. Another issue around chemical control is the development of resistance by the target pest or pathogen to a particular product, which reduces the options available for control.

There is great potential for the use of biocontrol methods in forestry, particularly in nurseries, some of which are detailed below. An article in the New Zealand Journal of Forestry entitled "Biocontrol of forest nursery pathogens" indicates considerable overlap with the methods being researched and implemented in South Africa.



Insect-parasitic nematodes (EPNs) ooze out of the body of an insect larva that they have infested and killed

There are many beneficial and saprophytic micro-organisms in the forestry nursery which help suppress disease, but the most well documented and researched as a biocontrol agent is *Trichoderma spp.*

"*Trichoderma harzianum* is the ultimate good guy of all soil micro-organisms," says Dr Mike Morris, MD and Plant Pathologist at Plant Health Products in KwaZulu-Natal. "It is a naturally occurring soil fungus which grows vigorously around plant roots, protecting them from soilborne pathogens. It employs numerous modes of action including actively coiling around and destroying the fungal threads of various pathogens and producing substances which suppress their growth. Interestingly, the beneficial fungus also produces substances which enhance plant growth."

Numerous studies worldwide have shown that *Trichoderma* provides control of the fungi that cause damping-off of seedlings, including *Rhizoctonia*, *Pythium*, *Fusarium* and *Phytophthora*. *Trichoderma* works best as a preventative control measure so it is important that the biocontrol agent is applied at planting and again at transplanting so that it may colonise the roots before soil pathogens attack.

The graphs show the results of a study conducted at the University of KwaZulu-Natal, where Eco-T (product containing *Trichoderma* spores) controlled both *Pythium* and *Rhizoctonia* on eucalyptus seedlings.

These results give an indication of how Eco-T can help solve the disease problems associated with replanting into previously forested areas where there has been a build-up of root pathogens.



A white grub adult infected with the Beauveria bassiana fungus
Photo: JL Hatting, ARC – Small Grain Institute