Pests in the press

Plant parasitic nematodes plague sports grounds

Amidst the talk of starting line-ups and defensive tactics, plant parasitic nematodes (PPN) have been a surprisingly hot topic at the Six Nations Rugby Tournament. Graduate researcher Stephanie Bryan at the Centre for Global Eco-Innovation, explains the global significance of these tiny pests which threaten sporting events, environmental conservation, global economies and food security. Plant parasitic nematodes cause an estimated 11% loss in life sustaining crops worldwide.

> *Arcis Biotechnology is a research and development led company with expertise in the development and commercialization of a wide range of innovative, effective application technologies. Based at Sci-tech Daresbury, where they have fully equipped laboratory facilities, the Group has already developed a number of patented compounds and technologies that have been enthusiastically received in the commercial marketplace via licensing partners.*
>
> ARCIS BIOTECHNOLOGY GROUP

Crops affected include soybean, wheat, sugarcane and potatoes, along with several other economically important crops. These soil-borne microscopic roundworms feed on plant cells predominantly from the root section. In addition to direct injury to the plant, nematode infestations are often associated with secondary infections of other pathogens that are able to invade a weakened plant. PPN impose huge loss of profits worldwide in agriculture, forestry and horticulture, through yield reductions and cost of control.

The parasites have recently become of interest to more than crop growers and scientists as there have been several fresh infestations at sports grounds. Sporting events such as the Six Nations Rugby Tournament, Premier League football and horse racing, have all faced disruptions as high PPN numbers in the turf grass root zones leads to weak, yellowing patchy turf that is soon reduced to a muddy field under studded boots and horse hooves.

There are various methods that have been used in attempts to control PPN numbers. Biological controls like natural predators and physical controls such as solarisation can prove effective in some circumstances, but the success is often dependent on a range of factors including climate, soil type and nematode species present. Subsequently, growers have traditionally relied on chemical nematicides to treat the infected soils.

EUROPEAN UNION
Investing in Your Future
European Regional Development Fund 2007-13

Organophosphates and carbamates are commonly used but face increasing restrictions on applications due to the hazards they present to both growers and the surrounding environments. There is therefore a great need to find a safer, effective and economical nematicide.

"Plant parasitic nematodes cause an estimated 11% loss in life sustaining crops worldwide."

Dr Rogers of Arcis Biotechnology explained, "Before a new product can be widely distributed and licensed, there is a need to gain further understanding to optimise applications and to explore the ecological implications of its use. In a three-year PhD research project, funded by the centre, Stephanie has been addressing a number of important questions for us about the potential use of our new product, which containing a novel combination of biocides and surfactants that target PPNs.

"This information will be used to decide how the product may best be used for maximum effect on target PPNs whilst minimising the impact on soil health and ultimately the sustainable intensification of agriculture."

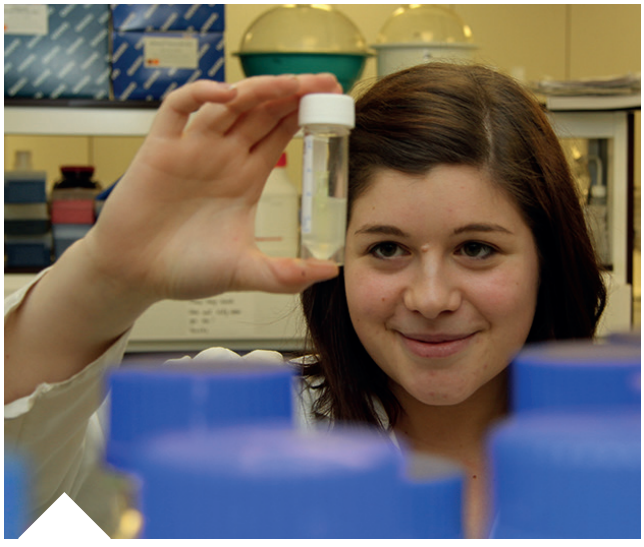
"Thanks to the Centre for Global Eco-Innovation we've been able to use facilities at the Lancaster Environment Centre to conduct glasshouse trials to examine the effect of the product on plant growth and soil moisture. Early results have shown no phytotoxic effects on the product on wheat plants when applied to the soil. There has been some evidence to suggest that the surfactants in the product increase moisture retention within the soil which may be advantageous to plant growth."

"There is a great need to find a safer, effective and economical nematacide."

Small scale commercial field trials have been carried out on a range of arable fields in the midlands and south east of England to further establish the effects of the product. Alongside the trials, Stephanie has taken soil samples to observe the effect of the product on the soil microbial diversity. Using a modern molecular technique, real-time quantitative polymerase chain reaction, it is possible to create a genetic profile of the DNA present in the soil in a method similar to those used in forensic science. This allows for the sensitive detection of changes in the soil biodiversity occurring due to nematicide application and crop growth.

"The Centre of Global Eco-Innovation has facilitated a partnership between Arcis Biotechnology and the Environment Centre at Lancaster University to help develop a new and environmentally friendly solution."

Dr Jan Rogers I Arcis Biotechnology Ltd



Stephanie Bryan I Graduate researcher