Fungus that boosts potatoes, maize

Postgraduate student and farmer **Nick Snaith** applied the *Trichoderma* product Eco-T to seed potatoes and maize, boosting yield, uniformity and health for a small cash outlay, writes **Robyn Joubert**.

IN TRIALS WITH SEED POTATOES AND seed maize, the beneficial fungus, *Trichoderma harzianum* boosted emergence, uniformity and yield.

"Biocontrol agents offer farmers a softer alternative to hard chemicals," says Nick Snaith, the postgraduate student and farmer who conducted the trials. He works part-time under Prof Mark Laing, chair of plant pathology at the University of KZN.

'At R200/ha, Eco-T net an outrageous R9 800 return.'

Biocontrol agents are common strategy in biological farming, which combines nature and modern science to build a vibrant, healthier soil.

Such soil will produce a healthier plant and a crop needing less fungicide and insecticide, improving profitability. It's achieved using crop rotation, best tillage methods, and green and animal manure, and by building populations of beneficial microorganisms like *Trichoderma*.

In the trials, live *Trichoderma* was introduced to the seed in applications of Eco-T, a product developed and produced by Plant Health Products in Nottingham Road, KZN.

Nick conducted the trials on his farm using conventional farming methods, to ensure his results could be replicated by large-scale growers. Eco-T was mixed according to manufacturer's recommendations and sprayed on potato tubers using a knapsack sprayer. The tubers were planted with a conventional mechanical planter. Some blocks were also treated with a root drench in the field.

Faster emergence

"It's desirable for seedlings to emerge evenly and rapidly," says Nick. "This allows better weed and insect control and provides uniformity."

Modern agriculture depends on chemical weed control with pre- and post-emergence herbicides.

"These chemicals are only effective for a limited time," explains Nick. "Within that window, the crop must emerge and be able to compete effectively for light, water, fertility and space.

"The same principle applies for insect control at the vulnerable stage of emergence. Once the seedling has emerged without insect damage, it must grow vigorously all the way to maturity to ensure an even harvest with most of the crop at a desired size. For seed production, uniformity is paramount."

Trial crops

Nick monitored the trial crop of seed potatoes to see if treated seed emerged more quickly and uniformly than untreated seed.

"In the untreated control, only 48% of the seedlings had emerged by the time the seed-dressed potatoes were at 54% emergence," he reports. "When the seed-dressed potatoes were at 100% emergence, the control was only just over 90% emerged.

"Treated potatoes emerged about five days earlier which tells me *Trichoderma* enhances plant vigour. If you're marketing baby potatoes, or your marketing plan is to enter the market early, you'd gain at least a week. "*Trichoderma* also keeps the seed potatoes cleaner." He adds that treated tubers weren't necessarily bigger, but were more uniform in size. With a more uniform crop farmers can meet client specifications.

Similar results were obtained with maize, where seeds were also easily

LEFT: Farmer and postgraduate researcher Nick Snaith.
Robyn Joubert

RIGHT: *Trichoderma*-treated potato plants (left) show more root development than untreated ones (right).
Plant Health Products

A commercial maize trial conducted in 2008. The maize plant on the left is typical of those treated with *Trichoderma*, showing an enlarged root system with more fine roots and root hairs than the typical control plant to the right.

GEORGE ALLISON

treated before planting. "Again, the treated seedlings emerged a few days earlier than the untreated control," says Nick. "Uniformity was excellent, which is even more important to maize farmers. The plants came out like a row of soldiers."

Cashing in

Nick found that *Trichoderma* significantly increased profitability. "Maize yields were 800kg/ha higher, at a cost of only R25/ha to apply Eco-T at the recommended rate of 1g/kg seed.

"Seed potatoes, with just the tuber treatment of 250g/ha Eco-T, yielded 5t/ha more than the untreated control. At the commercial potato price of about R2 000/t, 5t is equivalent to R10 000. Eco-T cost R200/ha, netting an outrageous R9 800 return on a very small outlay."

The product was far more effective when applied as a dressing prior to planting the tubers than as a drench in the field.

However, there was no significant difference in insect populations.

The root of the matter

Nick attributes the impressive trial results to *Trichoderma's* ability to improve and protect the plant's root system.

"We're going for an integrated approach," he explains. "Developing the root system ensures a healthier plant. In the trials, it helped reduce leaf and root disease."

Working with *Trichoderma*

The beneficial effects of *Trichoderma* were first documented as far back as 1934.

- ***Trichoderma* is a living organism and needs to be treated as such.**
- **Products containing live *Trichoderma* have a shelf-life of about six months when kept below 25°C.**
- **The product should not be left in a hot car – keep it in an insulated container, out of the sun.**
- **Seeds and tubers can't be treated and stored for a long period, but should be treated just before planting.**
- **As *Trichoderma* is a fungus, avoid simultaneously applying certain broad-spectrum fungicides.**

Applied to the roots, *Trichoderma* together with other beneficial microorganisms, triggers the plant's immune system, a response known as induced systemic resistance. "*Trichoderma* also actively controls soil pathogens," Nick explains.

A bigger root system enables better and faster nutrient uptake for a healthier plant. Crops are then less prone to general growing stresses like drought, heat and cold stress and disease. Reducing disease and stress pressure, even a little, should improve yields and save on the cost of the overall spray programme. "You should have a healthier crop which costs less," says Nick.

- *Contact Nick Snaith on 082 654 0364 or e-mail eco@potato.co.za.*
- *Contact Plant Health Products on (033) 266 6130.* **|fw**

Quest for a stoneless plum

STONE FRUIT TREES PRODUCE a seed encapsulated in a hard stone (endocarp) made up of lignin. The fleshy part (mesocarp) around the stone develops as the fruit grows. Consumers will find a stoneless stone fruit, preferably without the seed, an ideal food.

Seedless watermelons and papaya bred through modern conventional techniques are already popular.

Conventional breeding has produced plums with smaller stones and more flesh, but only recently did stoneless ones appear on the horizon. The search for them actually

'Consumers will find a stoneless stone fruit, preferably without the seed, an ideal food.'

started about 100 years ago, when the famous US plant breeder Luther Burbank crossed a near-stoneless wild plum relative with a French prune. The selections he derived have a seed, but almost no stone.

Scientists have discovered a set of genes that turns on specifically for lignin production in the stone tissue, and then shuts down as soon as the stone hardens. They hope to suppress these genes so no lignin is produced. The other step was going back to germ plasm selections in their gene banks, where they discovered a few remaining Burbank stoneless varieties.

They then genetically engineered the variety with an early flowering trait so that it produced fruit within six months, speeding up the conventional breeding process.

Several promising lines are being tested. If successful, this technique can be extended to cherries, peaches, nectarines and apricots. – *Wynand van der Walt (wynandjvdw@telkomsa.net).*

- *Source:* ARC News, *April 2009.*