

Scientists helping save citrus crop

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AFRICA'S most powerful microscopes are being used to boost the use of bio-pesticides in South Africa's citrus industry.

Nelson Mandela Metropolitan University master's student Patrick Mwanza, 26, is combining cutting-edge physics with real citrus farming practices. His aim is to encourage farmers to wage an environmentally friendly war against the false codling moth, one of the country's main citrus pests.

With the majority of South Africa's oranges exported to Europe, citrus farmers have to make sure their products are completely pest-free. To do this, some are reluctant to use anything but traditional chemical pesticides – but Mwanza is hoping his research will lead to greener farming.

Since 2004, the bio-pesticide Cryptogran – a product of River Bioscience, South Africa's leader in biological pest control – has been used effectively to control the false codling

moth. Cryptogran is essentially a concentrated form of a naturally occurring virus to which the moths are susceptible.

When it is sprayed on the oranges, newly hatched moth larvae ingest it and die.

Without pesticides, the larvae would burrow into the navel of the orange, ultimately causing "fruit drop", said Mwanza's supervisor, Dr Gill Dealtry, a senior lecturer in the biochemistry and microbiology department.

The challenge when it comes to Cryptogran is that sunlight diminishes the virus's effectiveness over time and, like most pesticides, it has to be reapplied every few months.

However, until now, there have been no hard and fast rules about how long the pesticide remains effective and how often it should be reapplied, with most farmers erring on the side of caution.

Using the university's new high resolution transmission electron microscope (HRTEM) – the most powerful in Africa – and special scan-

ning electron microscope (SEM) as well as a Raman spectroscope, Mwanza is able to examine the miniscule virus molecules to their very core – with the aim of making the application of Cryptogran an exact science.

This would lead to its optimal use and saving farmers money by preventing over and under-spraying.

It will also likely lead to the wider use of the bio-pesticide, which will have positive implications for the environment.

Using samples from trial sites in the Sundays River Valley and also under UV light in the lab, Mwanza has been able to determine that the virus's protective covering offers no protection from UV rays.

His next step is to examine the core of the molecule to determine how and when this internal structure changes.

He has presented his findings at major microscopy conferences in South Africa.

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CITRUS SOLUTION: Nelson Mandela Metropolitan University biochemistry master's student Patrick Mwanza conducts research on Cryptogran, a biological pest control for the false codling moth **PHOTOGRAPHS: NICKY WILLEMSE**



SAVING CITRUS: Mwanza and his supervisor, Dr Gill Dealtry, get to grips with a sample of baby oranges, which form part of Mwanza's research on the bio-pesticide used to control the false codling moth, one of the country's main citrus pests