Sharl Mintoff, David Lovelock, Nadine Kurz and Lucy Tran-Nguyen

DEPARTMENT OF PRIMARY INDUSTRY AND FISHERIES, PO Box 3000, Darwin NT 0800
Sharl.Mintoff@nt.gov.au

The viability of CGMMV in Northern Territory soils

Introduction

Cucumber green mottle mosaic virus (CGMMV) is a tobamovirus that infects cucurbit crops, as well as a variety of weed species, and was first detected in the Northern Territory in late 2014(1). Very little is known concerning how long the virus is able to survive in soil across the NT. Work is currently being undertaken to test the longevity of CGMMV in soil against soil type and temperature.

Soil has been collected from properties across the Darwin, Katherine and Alice Springs regions to determine how long the virus remains viable in the absence of host plants. Currently a CGMMV trial is being undertaken on Berrimah Farm, to determine if the level of CGMMV in the soil can be altered via the presence of non-host plants versus non-irrigated bare and covered ground.

Methods

Field trials and soil sampling

Eighty soil samples were collected from each of the four infested properties (1 Darwin, 2 Katherine and 1 Ti Tree) at 0, 3 and 6 months. Soil probes were installed to measure the soil temperatures and 80 healthy cucurbit hosts were planted to determine the presence of the CGMMV.

Biocontrol pot trial

The soil collected from the field trials were placed into pots and healthy cucurbits planted in each pot. Positive and negative control pots were filled with clean potting mix, plants in the positive control group were inoculated with CGMMV. The presence of the virus was tested 6 weeks later from leaf samples via PCR.

Non-host field trial

The field site was split into six quadrants containing positive and negative controls, two non-irrigated bare and covered ground and two non-host plant quadrants. Non-host plants include capsicum, sweet corn and spring onion.

Discussion

It is evident from the field and pot trials that CGMMV is still present within the soil of formerly quarantined properties despite the absence of host plant for up to 12 months. Results from the 3 and 6 month pot trials will provide a much clearer indication if the difference in soil temperatures and types from different properties and regions can effect the viability and degradation of the virus.

The non-host field trial is ongoing and it is hoped that a difference in the level of CGMMV can be detected between treatments, which will potentially provide us with information on how to better manage the virus on contaminated land.

Results

Figure 1: CGMMV soil field trial sites with cucumber and watermelon at the 3 month time point, on properties in **A)** Darwin, **B)** Katherine and **C)** Ti Tree. **D)** Pot trial experiment conducted in the Biocontrol shade house at BRF.

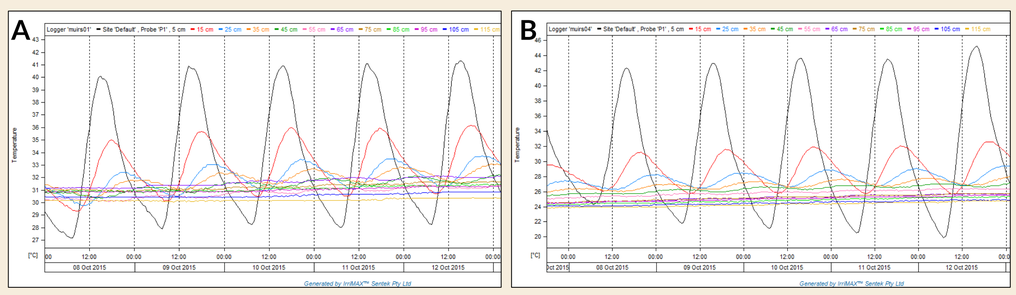

Figure 2: Raw data of soil temperature at various depths from field sites. Data presented shows the differences in soil temperatures of properties in **A**) Darwin and **B**) Ti Tree.

Location	Field Trial	Pot Trial
IP1	-	+
IP2	+	+
IP3	+	-
IP4	-	-

Table 1: Preliminary results of CGMMV presence in soil. Samples taken from the initial field trials shows the presence of CGMMV in planted cucurbits. Pot trial of soil collected from field sites at month 0 shows the presence of CGMMV in the soil before host cucurbits were planted.

Figure 3: Site for the non-host and non-irrigated covered and bare ground field trial at Berrimah farm. This field trial is examining the effect of different field preparations on a CGMMV infested site and includes a negative control, **A**) positive control with host plants, **B**) Non-host plants that include sweet corn, capsicum and spring onion, **C**) non-irrigated covered and bare ground.

Acknowledgements
This project has been funded by Horticulture Innovation Australia Limited using the vegetable levy and funds from the Australian Government.
We would also like to acknowledge NT growers, for their co-operation and participation during this research project.

Reference
1. Tesoriero LA, Chambers G, Srivastava M, Smith S, Conde B, Tran-Nguyen LTT: **First report of cucumber green mottle mosaic virus in Australia**. *Australasian Plant Disease Notes* 2015, **11**:1-3.