



Investigating the longevity and host range of CGMMV in Northern Territory Soils



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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 (NT) in late 2014(1). A total of 27 properties from Darwin, Katherine and Ti-Tree were found to be CGMMV positive between September 2014 and April 2016. Soil collected from four infested properties (IP) have been tested for the presence and viability of CGMMV in the field and in bioassays. Potential non-host plants have been tested for their susceptibility to CGMMV in field and pot trials.

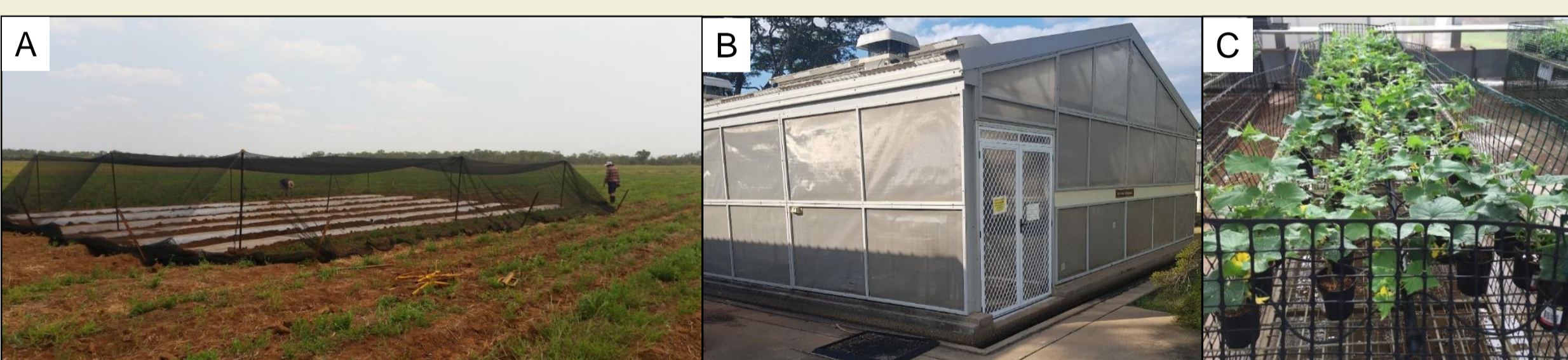
Methods

Field and Biocontrol Trials

Eighty soil samples were collected from each of the four IP's from Darwin, Katherine and Ti-Tree at 12, 15 & 18 months during quarantine. At 12 months during quarantine, eighty healthy cucurbit hosts were planted at the sampling site to determine if CGMMV was still viable in the field (Fig. 1A).

The soil collected from each field site at were taken back to Berrimah Research Farm (BRF) (Fig. 1B) and placed into individual pots with a healthy cucurbit plant (Fig 1C). Clean potting mix was used for both positive and negative controls, with plants in the positive control manually inoculated with CGMMV. The presence of the virus was tested 8 weeks later from leaf samples via PCR.

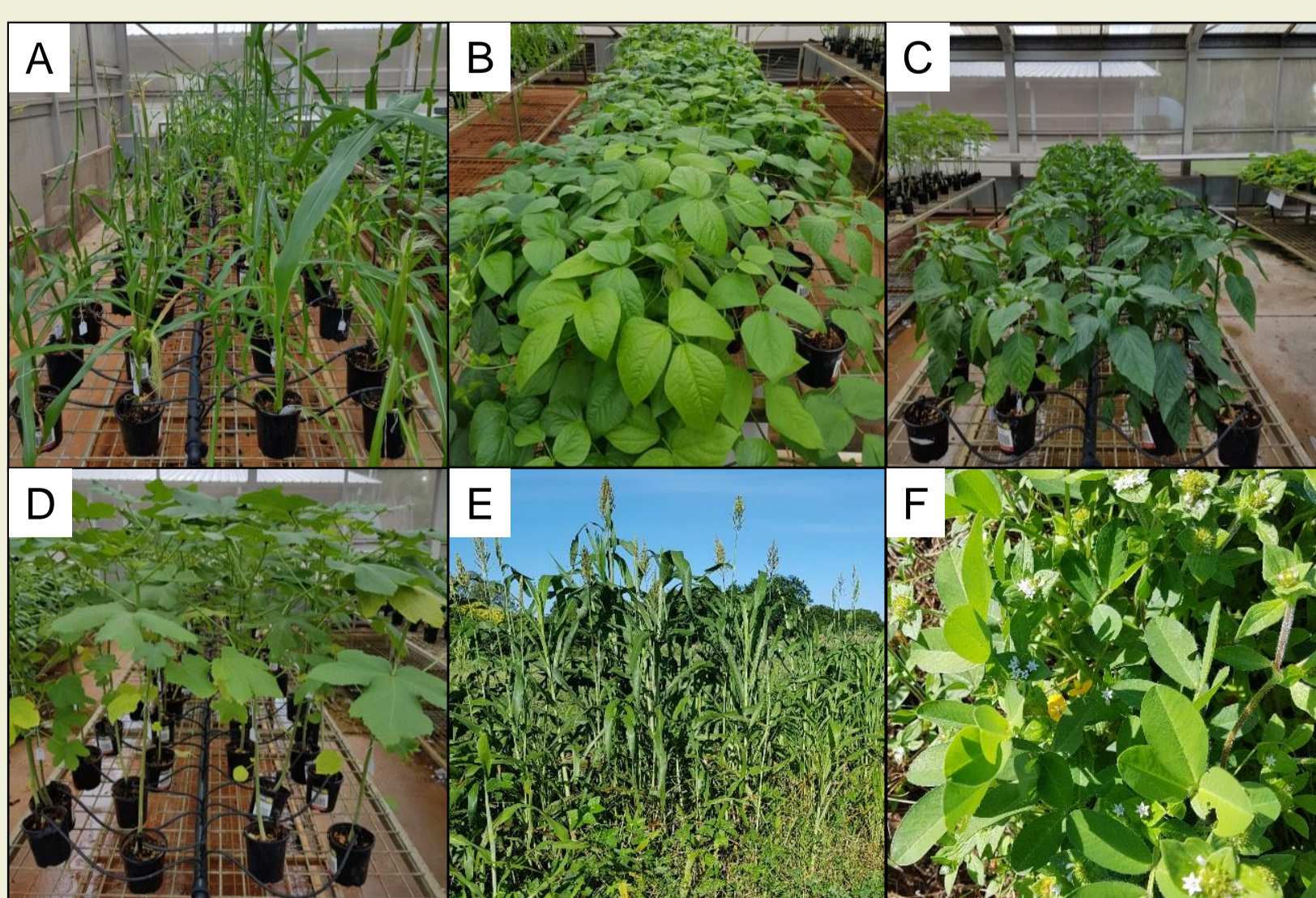
Figure 1: Field trial set-up (A) for CGMMV detection, insect proof screenhouse (B) at BRF where bioassays (C) were conducted to determine if CGMMV was still viable.



Non-host trial

Field and pot trials were set up using economically important crops to the NT. Both dry and wet season crops were tested against CGMMV. The crops included Okra, Sweetcorn, Capsicum, Snakebean, Peanut and Sorghum (Fig. 2). Plants were left to grow for 8 weeks post inoculation.

Figure 2: Non-host plants Sweetcorn (A), Snakebean (B), Capsicum (C), Okra (D), Sorghum (E) and Peanuts (F) tested for their susceptibility to CGMMV in field and/or pot or trials.



Discussion

The field and bioassays from collected soils at 12, 15 and 18 months during quarantine suggest that CGMMV is still viable in soils that have been host free for a minimum of 12 months. Susceptible weed hosts are currently being tested for their ability to harbor and spread the virus via seed.

Initial testing suggests the selected non-host crops of sweetcorn, snake bean, capsicum, okra, sorghum and peanuts are not susceptible to CGMMV. This could potentially provide a revenue for farmers in the NT and around Australia that are affected by the virus. Further non-host crops may be investigated including; tomato, beans, carrots and broccoli.

Results

Table 1: Results of the viability of CGMMV in soil at the 4 IP's in the 12 month during quarantine field trial and 12, 15 and 18 month during quarantine bioassays at BRF.

Location	12 month Field Trial	12 month Bioassay	15 month Bioassay	18 month Bioassay
IP1	-	+	+	
IP2	+	-	+	
IP3	-	+	+	-
IP4	-	-	+	+

Table 2: Non-host susceptibility to CGMMV in field and pot trials conducted at BRF.

Plant	Season	Field Trial	Pot Trial
Sweetcorn	Dry	-	-
Snake bean	Dry		-
Capsicum	Dry	-	-
Okra	Wet		-
Sorghum	Wet	-	TBC
Peanut	Wet	-	TBC

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.