



RESPONSE OF *Solanum lycopersicum* L. (Tomato) TO *Tuta absoluta* AND *Glomus clarum* USING SIMPLE SEQUENCE REPEAT (SSR) MARKER

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INTRODUCTION

Tomato (*Solanum lycopersicum* L.) belongs to the family Solanaceae and the order Solanales (Singh *et al.*, 2016).

It is sensitive to a number of diseases and attacked by devastating pests of which *Tuta absoluta* is one of them (Chhetri, 2018).

Several approaches have been employed in the management of *Tuta absoluta* but there are limited information on the use of AMF (*Glomus clarum*) and identification of molecular markers associated with resistance of tomato to *Tuta absoluta*.

This study aimed at investigating the response of tomato to *Tuta absoluta* and *Glomus clarum* using morphological and molecular techniques

MATERIALS AND METHODS

Eight tomato varieties were collected from TechnoServe, NACGRAB and Ojor Market, Nigeria.

Complete Randomized Design was used with three replicates and three treatments (*Glomus clarum* + *Tuta absoluta*, *Tuta absoluta* alone and Control).

A screen house experiment was conducted involving 72 polypots where five (5) grams of *G. clarum* was inoculated to the varieties and *Tuta absoluta* was infested on the plants 1 week after.

Growth, agronomic, and yield characters were determined while percentage incidence was calculated according to the method described by Rasheed *et al.* (2018) and severity of infestation was assessed using the visual rating scale described by Anjorin *et al.* (2013).

Amplification of DNA and detection of polymorphisms from young apical leaves were carried out using SSR primers: LEGA003, LECA001, LEAAT005 and LETAA001in

RESULTS AND DISCUSSION

There was significant difference between *Glomus clarum* and *Tuta absoluta* treated plants across growth, agronomic and yield characters.

Plants treated with *G. clarum* showed reduced percentage incidence (13%) and severity of infestation (27%) compared to *T. absoluta* alone (19% and 40%) and control (23% and 35%) as seen in figures 1 and 2 respectively. This could be due to *G. clarum* which induced activation of tomato defense mechanism, optimum nutrient uptake and damage compensation in accordance with the reports of Olawuyi *et al.* (2014) and Olowe *et al.* (2018).

Primer LEAAT005 had the highest allele number (4), gene diversity (0.73), and polymorphic information content (0.67) while the highest major allele frequency of 0.67 was observed in LEGA003.

CONCLUSION AND RECOMMENDATION

Plants treated with *Glomus clarum* reduced the infestation of *Tuta absoluta*.

Primers LEAAT005 and LECA001 detected the highest genetic polymorphism and could be used in marker assisted breeding of tomato and other *Solanum* spp.

The tomato varieties; NGB00717, NGB00725 (NACGRAB) and Dan Eka Jibia (Technoserve), were tolerant to *Tuta absoluta* and could be recommended for breeding of tomato against *Tuta absoluta*.

RESULTS

Table 1: Growth, agronomic and yield characters of Tomato as affected by *Glomus clarum* and *Tuta absoluta*

Treatments	Plant height (cm)	Leaf length (cm)	Number of leaves	Stem girth (cm)	Leaf width (cm)	Presence of flowers	Number of flowers	Number of dead flowers	Presence of fruits	Number of fruits	Fruit fresh weight (g)
<i>Glomus clarum</i> + <i>Tuta absoluta</i>	95.07 ^a	5.55 ^b	11.97 ^a	0.58 ^a	2.59 ^a	3.64 ^a	3.78 ^a	1.31 ^a	1.76 ^a	1.18 ^a	1.75 ^a
<i>Tuta absoluta</i> alone	85.68 ^b	5.06 ^c	11.60 ^a	0.53 ^a	2.46 ^b	2.97 ^b	3.27 ^b	1.27 ^a	1.26 ^b	0.45 ^b	1.13 ^b
Control	89.25 ^b	5.23 ^b	11.64 ^a	0.56 ^b	2.44 ^b	3.46 ^a	3.25 ^b	1.13 ^a	1.56 ^a	0.28 ^b	0.97 ^b

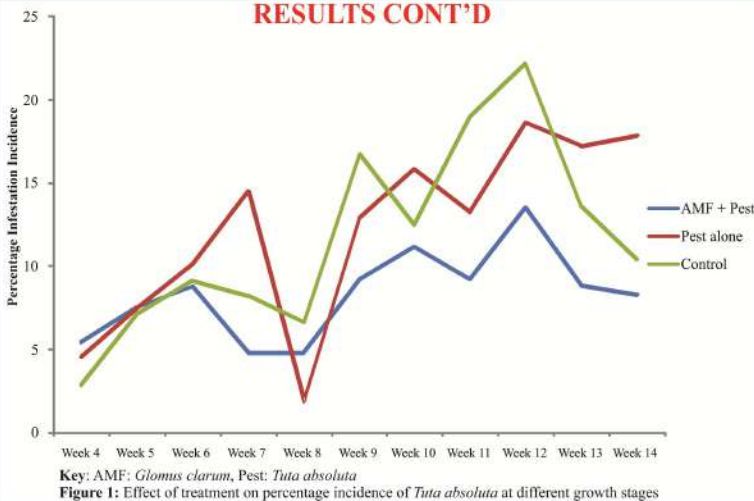
Means with different letters in the same column are significantly different at P < 0.05 according to Duncan Multiple Range Test (DMRT).

RESULTS CONT'D

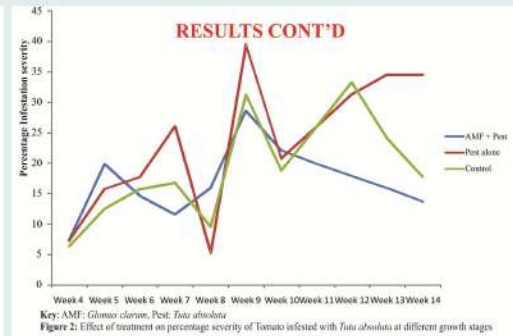
Table 2: Gene diversity, Allele number, and Polymorphic information content of SSR primers

Molecular Markers	Major Allele Frequency	Sample Size	Allele No.	Gene Diversity	Polymorphic Information Content
LEGA003	0.67	24	3	0.50	0.44
LECAA001	0.46	24	3	0.64	0.57
LEAAT005	0.33	24	4	0.73	0.67
LETAA001	0.63	24	3	0.50	0.41
Mean	0.52	24	3.25	0.59	0.52

RESULTS CONT'D



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Plate 1: Photograph showing *Tuta absoluta* larvae



Plate 2: Photograph showing tomato with complete silver off leaves as a result of *Tuta absoluta* attack



Plate 3: Photograph of damaged tomato fruits caused by *Tuta absoluta*

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