





Varietal evaluation of sweet pepper and tomato in St. Kitts under a protected agricultural structure

IDRC/McGill/UWI/CARDI Project

Presented by Pathleen Titus

CARDI Representative, St Kitts and Nevis







Protected Agriculture: Varietal Evaluation of sweet pepper and tomato in St. Kitts

Objectives

To assess the performance of selected tomato and sweet pepper varieties under two structurally different greenhouses and open field conditions.

The secondary objectives identify targeted components of performance, with the intention of developing student manageable projects







Expected Results

Suitable variety selected for production under protected ag structure

Best media for production under protected ag structure selected

Suitable variety selected for field production

Best conditions for field production identified

CARDI Protected Agriculture Structure at Estridge







Media treatments

Sharp sand

Top soil and manure (1:1volume)

Coconut coir (grow bags)







Varieties

Tomato varieties (Indeterminate)

Beverly

Striker

Caraibe

Sweet pepper varieties

Palladin,

Crusader,

Bipode

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Experimental design and nutrition

Eight replications of three varieties and three growing medium treatments in a completely randomised block design

Fertigation manually 3x/week

Nutrients used in the production system included starter (N:P:K 10:52:10), potassium nitrate (N:P:K 13.5:0:46.2), magnesium sulphate and tomato hydroponic fertilizer (N:P:K 4:18:37). Calcium supplied by using Calmax

Parameters measured

Plant height

Stem diameter

No of leaves

No of buds

No of flowers

50% flower set

50% fruit set

No of fruits

Analyses of the media and water done at the laboratories of Agro-services International, Inc., Florida .

Layout of tomato and sweet pepper in trial







Results

Water Sample Analysis

Cardi St. Kitts
P.O. Box 479
Basseterre

Date 07/24/12
Location: Cardi Field Station
Lab No: W7-W2-2
Representative:Pathleen Titus

pH	7.7
	ug/ml or mg/liter or ppm
Soluble Salts	110
Calcium	11.4
Magnesium	6.1
Potassium	2.5
Sodium	17.6
NH_4 Nitrogen	0
Phosphorus	0.3
SO_4 Sulfur	2.5
Boron	0.05
Copper	0.0
Iron	0.0
Manganese	0.0
Zinc	0.0
Chloride	50.2
NO_3 Nitrogen	
Sodium Absorption Ratio	1.5
	meq/liter or cmol/liter
Hydroxide(OH)	
Carbonate (CO_3)	
Bicarbonate (HCO_3)	1.5

Comments
Suitable for Irrigation.

Cardi St. Kitts

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Crop to Fert. Tomatoe Swt Pepper
Yield Goal
Last Crop
Approx. Yield
Lime Applied

Field or Sample No. Coconut Coir
Farm Location Cardi Field Stat
Date Sample Rec'd. 07-18-12
Date Processed 07-23-12

Act. C.E.C. 9.3 meq/100 cm3; Base Satn. 100 %; Acid. Satn 0 %; pH 5.8 ; O.M 0.4 %; Sol. Salts 630 ppm; Texture Code B2

ELEMENTS	SOIL ANALYSIS Lab No. B2 135 - 2			INTERPRETATION GUIDE (Below / Optimum / Above)	FERTILIZER SUGGESTIONS		
		meq/100cm3	lbs/acre			lbs/1000 sq. ft. or kg/230 m²	lbs/acre or X 1.12=kg/ha
Act. Acidity	A.A.	0.0		Critical Level			
Calcium	Ca	3.2	1152	Ca	Calcium	23.4	1020 *
Magnesium	Mg	3.63	790	Mg	Magnesium	0.0	0
Potassium	K	2.44	2054	K_2O K	Potash (K_2O)	.0	0
Sodium	Na						
Ca/Mg Ratio	Ca/Mg	.9		Ca/Mg	Dolomitic Lime	0	0
Mg/K Ratio	Mg/K	1.5		Mg/K	Calcitic Lime	46	2000
		ug/cm3					
Nitrogen	N	1	1	N	Nitrogen	3.5	155
Phosphorus	P	19	77	P_2O_5 P	Phosphate (P_2O_5)	4.0	175
Sulfur	S	21	38	S	Sulfur (as Sulfate)	1.0	45
Boron	B	0.90	1.6	B	Boron	.01	0.5
Copper	Cu	.7	1.3	Cu	Copper	0.2	9
Iron	Fe	2	3	Fe	Iron	1.0	45
Manganese	Mn	8.0	14.4	Mn	Manganese	0.3	11
Zinc	Zn	1.8	3.2	Zn	Zinc	0.2	6
Other							

* If cost to apply rates of Ca or Mg in first year are too high then strive to apply within 3 years.

The annual amounts shown for fertilizer suggestions should be split into 2 or more applications.

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Crop to Fert. Tomatoe Swt Pepper
Yield Goal
Last Crop
Approx. Yield
Lime Applied

Field or Sample No. Soil & Manure
Farm Location Cardi Field Stat
Date Sample Rec'd. 07-18-12
Date Processed 07-23-12

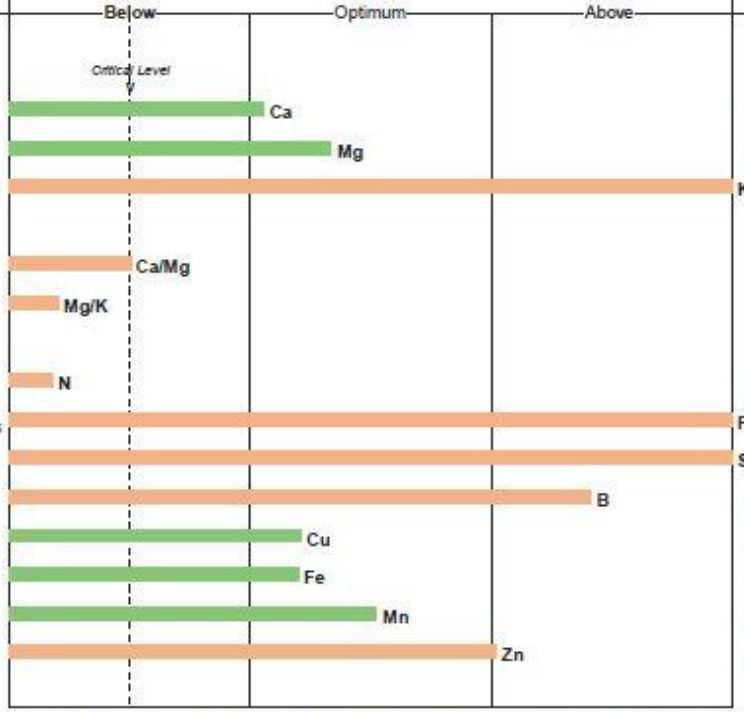
Act. C.E.C. 19.6 meq/100 cm3; Base Satn. 100 %; Acid. Satn 0 %; pH 8.1 ; O.M 1.1 %; Sol. Salts 4240 ppm; Texture Code B2

SOIL ANALYSIS

Lab No. B3 135 - 2

ELEMENTS		meq/100cm3	lbs/acre	
Act. Acidity	A.A.	0.0		
Calcium	Ca	5.1	1835	
Magnesium	Mg	5.35	1165	
Potassium	K	9.12	7679	K_2O
Sodium	Na			
Ca/Mg Ratio	Ca/Mg	1.0		
Mg/K Ratio	Mg/K	.6		
		ug/cm3		
Nitrogen	N	18	32	
Phosphorus	P	750	3074	P_2O_5
Sulfur	S	714	1285	
Boron	B	11.22	20.2	
Copper	Cu	7.6	13.7	
Iron	Fe	79	142	
Manganese	Mn	81.5	146.7	
Zinc	Zn	30.8	55.4	
Other				

INTERPRETATION GUIDE



FERTILIZER SUGGESTIONS

	lbs/1000 sq. ft. or kg/230 m^2	lbs/acre or X 1.12=kg/ha
Calcium	0.0	0
Magnesium	0.0	0
K Potash (K_2O)	.0	0
Dolomitic Lime	0	0
Calcitic Lime	0	0
Nitrogen	3.5	155
P Phosphate (P_2O_5)	0.0	0
S Sulfur (as Sulfate)	0.0	0
Boron	.00	0.0
Copper	0.0	0
Iron	0.0	0
Manganese	0.0	0
Zinc	0.0	0

This report is accepted by the client under the condition that Agro Services International, Inc. is responsible only for the accuracy of the analysis of the sample as received, such liability limited to the cost of the analysis. No other warranties, expressed or implied, are given. Comments: The suggested nitrogen rates are general for the crop. If better local information is available then use that. Recently applied organic material is not indicated by the analysis. Adjust fertilizer rates accordingly.

The annual amounts shown for fertilizer suggestions should be split into 2 or more applications.

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Crop to Fert. Tomatoe Swt Pepper
Yield Goal
Last Crop
Approx. Yield
Lime Applied

Field or Sample No. Gravel
Farm Location Cardi Field Stat
Date Sample Rec'd. 07-18-12
Date Processed 07-23-12

Act. C.E.C. 6.7 meq/100 cm3; Base Satn. 100 %; Acid. Satn 0 %; pH 7.6 ; O.M 0.3 %; Sol. Salts 180 ppm; Texture Code B2

ELEMENTS	SOIL ANALYSIS Lab No. B1 135 - 2				INTERPRETATION GUIDE (Below / Optimum / Above)	FERTILIZER SUGGESTIONS		
		meq/100cm3	lbs/acre				lbs/1000 sq. ft. or kg/230 m 2	lbs/acre or X 1.12=kg/ha
Act. Acidity	A.A.	0.0			Critical Level			
Calcium	Ca	4.8	1728		Ca	Calcium	0.0	0
Magnesium	Mg	1.51	328		Mg	Magnesium	2.5	110
Potassium	K	0.39	328	K_2O	K	Potash (K_2O)	3.1	135
Sodium	Na							
Ca/Mg Ratio	Ca/Mg	3.2			Ca/Mg	Dolomitic Lime	0	0
Mg/K Ratio	Mg/K	3.9			Mg/K	Calcitic Lime	0	0
		ug/cm3						
Nitrogen	N	1	1		N	Nitrogen	3.5	155
Phosphorus	P	22	90	P_2O_5	P	Phosphate (P_2O_5)	4.0	175
Sulfur	S	22	40		S	Sulfur (as Sulfate)	1.0	45
Boron	B	0.38	0.7		B	Boron	.04	1.8
Copper	Cu	1.8	3.2		Cu	Copper	0.2	7
Iron	Fe	19	34		Fe	Iron	0.5	22
Manganese	Mn	7.2	13.0		Mn	Manganese	0.4	15.5
Zinc	Zn	1.9	3.4		Zn	Zinc	0.2	6
Other								

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The annual amounts shown for fertilizer suggestions should be split into 2 or more applications.

Results

- Coir best medium
- Tomato variety Striker and the sweet pepper variety Crusader gave the highest yields
- All varieties had their best yields in the coir medium and worst in the soil and manure mixture
- Soil and manure mixture had higher pH, EC, TDS, salts and temperature than the other two media.

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Variety/media interaction as seen in tomato grown under a protected structure at the CARDI Field Station

	Medium	Tomato variety		
		Striker	Beverly	Caraibe
	Coir	0.22	0.18	0.09
	Soil and Manure	0.05	0.05	0.06
	Sharp Sand	0.20	0.10	0.06
	LSD	0.06		

Tomato growing in different media in CARDI Protected Ag Structure

Sweet pepper growing in different media at CARDI Protected Ag structure







Conclusion

This trial will be repeated eliminating the soil and manure mix. The high pH, TDS, salts and temperature of this medium makes it unsuitable for use as a medium for tomato and sweet pepper production.

THANK YOU

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