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DATE: 20 January 2011
CLIENT: BOS
PROTOCOL NUMBER: BOSpotHERB
ASC REFERENCE: ASCBOSpotHERB

TITLE

Field study to evaluate the efficacy of Bio Terra 1, Bio Terra 2, Herbali and HpActive in controlling disease present on potato. Define commercial dosage rate. Compare to an untreated control and conventional treatments.

ABSTRACT

The efficacy and crop safety of Bio Terra 1, Bio Terra 2, Herbali and Hp Active in different combinations and at different dosage rates were compared to the conventional treatment and an untreated control in order to determine the effect in increasing the yield of potatoes and controlling disease. The combination of Bio Terra 1 at a dosage rate of 2 L product/ha, Bio Terra 2 at a dosage rate of 500 mL product/ha, Herbali at a dosage rate of 1 L product/ha, Hp Active at a dosage rate of 200 mL product/ha and 4 L molasses applied during plant and then a combination of Herbali at a dosage rate of 2 L product/ha and Hp Active at a dosage rate of 200 mL product/ha applied at the second week after emergence or the combination of Bio Terra 1 at a dosage rate of 4 L product/ha, Bio Terra 2 at a dosage rate of 1000 mL product/ha, Herbali at a dosage rate of 2 L product/ha, Hp Active at a dosage rate of 400 mL product/ha and 4 L molasses applied during plant and then a combination of Herbali at a dosage rate of 4 L product/ha and Hp Active at a dosage rate of 400 mL product/ha applied at the second week after emergence were found to be equally significantly effective to increase the yield of potato. No symptoms of phytotoxicity were visible on any of the potato plants treated during any given time of the trial.

INTRODUCTION

Fertlizers are substances supplying nutrients to plants or amending soil fertility. Using fertilizers is the most effective means to increase crop production and to improve the quality of food and fodder. The main use of fertilizers is to promote plant growth. Nutrients mainly present in fertilizers include nitrogen, phosphorous and potassium (the macronutrients) as well as some micronutrients added in smaller amounts. Fertilizers are usually applied directly to the soil, but can also be applied as foliar sprays.

OBJECTIVE

The aim of this study was to evaluate the efficacy of Bio Terra 1, Bio Terra 2, Herbali and Hp Active in controlling disease present on potato. Define commercial dosage rate. Compare to an untreated control and conventional treatments.

TRIAL DETAILS

Researcher: Jan van Schoor
Cell no: 082 940 5110
Co-operator: Wolwedans
Locality: Aurora, Western Cape
Type: Fertilizer
Crop: Potato
Cultivar/variety: BP1
Treatments: 6
Replicates: 6

Number of plots: 36
Experimental Design: Randomized complete block
Single plot size: 4 m X 10 m = 40 m^2 (120 plants per plot)
Total plot size of trial: 1440 m^2 (40 m^2 X 36)
Irrigation: Centre pivot sprayer

APPLICATION DETAILS

Growth stage of first application: Beginning of sprouting (BBCH 01) – During planting
Method of application: At plant: Drench
Treatments after emergence: Foliar
Total applications: 4 depending on treatment (see treatment program)
Nozzle type: Cone
Treatment volume: 1000 L/ha

Product list: herbali, HP Active, Bio terra 1, Bio Terra 2

Treatment program:

Treatment	Application 1 During plant		Application 2 Week 2 after emergence		Application 3 Week 5 after emergence		Application 4 Week 8 after emergence	
	Product code	Dose rate	Product code	Dose rate	Product code	Dose rate	Product code	Dose rate
1	Bio T 1	2 L/ha	Herbali	2 L/ha	-	-	-	-
	Bio T 2	500 mL/ha	HP Act	200 mL/ha	-	-	-	-
	Herbali	1 L/ha	-	-	-	-	-	-
	HP Act	200 mL/ha	-	-	-	-	-	-
	Molasses	4 L	-	-	-	-	-	-
2	Bio T 1	2 L/ha	-	-	-	-	-	-
	Bio T 2	500 mL/ha	-	-	-	-	-	-
	Molasses	2 L	-	-	-	-	-	-
3	Herbali	1 L/ha	Herbali	1 L/ha	-	-	-	-
	Molasses	4 L	HP Act	400 mL/ha	-	-	-	-
4	Bio T 1	4 L/ha	Herbali	4 L/ha	Herbali	1 L/ha	Herbali	1 L/ha
	Bio T 2	1000 mL/ha	HP Act	400 mL/ha	-	-	-	-
	Herbali	2 L/ha	-	-	-	-	-	-
	HP Act	400 mL/ha	-	-	-	-	-	-
	Molasses	4 L	-	-	-	-	-	-
5 Conventional	-	-	-	-	-	-	-	-
6 Untreated	-	-	-	-	-	-	-	-

Weather conditions: Climatic conditions were favorable for potato growth and favorable for disease increase on potato. Daily temperatures reached up to 38°C under field conditions, combined with medium to high humidity during the duration of the trial. Night temperatures varied between 6°C and 18°C.

Weather conditions at time of application:

APPLICATION INFORMATION	Application 1	Application 2	Application 3	Application 4
BBCH	01	19	35	60
Date	27-Jul-2010	08-Sep-2010	30-Sep-2010	20-Oct-2010
Time of application	16:00	10:30	10:30	09:00
Temperature (°C)	19	25	22	21
Windspeed (m/s)	1.5	0	0	1.4
Relative humidity (%)	60	42	49	62
Rain (mm)	0	0	0	0

ASSESSMENTS

Evaluation and data collection: Disease severity
Assessments on *Fusarium* spp., *Verticillium* spp., *Alternaria solani* and *Phythopthora infestans* were done prior to each application. Assessments were applied as preventative treatments. Assessments were done on 40 plants per plot by rating the damage of the plants according to a 5-point surface representation scale (0 = 0%, 1 = 1 – 5%, 2 = 6 – 25%, 3 = 26 – 50%, 4 = 51 – 75%, 5 = 76 – 100% surface damage representation). Percentage disease severity was calculated by allocating to each plant the upper percentage of the scale for the rating and calculating the mean percentage disease severity per experimental unit.

Evaluation and data collection: Tuber Weight
Assessments on weight of total amount of tubers were done at harvest. Thereafter weight of large, medium and small tubers, respectively, were done.

Statistical Analysis: The experimental design was a randomized complete block with 6 treatments replicated randomly in 6 blocks. Disease severity and plot severity were subjected to statistical analysis.

Phytotoxicity: Any signs of possible adverse effects on growth (e.g. yellowing/chlorosis, stunting, necrosis or node curl) were monitored for possible phytotoxic reactions to the applications.

Assessment dates: 27 July 2010 (0 Days After Application 1) (0DAA1), 8 September 2010 (0 Days After Application 2) (0DAA2), 30 September 2010 (0 Days After Application 3) (0DAA3), 20 October 2010 (0 Days After Application 4) and 17 January 2010 (89 Days After Application 4) (89DAA4) (harvest).

Weather conditions at time of assessments:

ASSESSMENT INFORMATION	Assessment 1	Assessment 2	Assessment 3	Assessment 4	Assessment 5
Date	27-Jul-2010	08-Sep-2010	30-Sep-2010	20-Oct-2010	17-Jan-2011
Time of assessment	16:00	10:30	10:30	09:00	13:00
Temperature (°C)	19	25	22	21	30
Windspeed (m/s)	1.5	0	0	1.4	0
Relative humidity (%)	60	42	49	62	56
Rain (mm)	0	0	0	0	0

RESULTS

Disease severity
Fusarium spp., *Verticillium* spp., *Alternaria solani* and *Phythopthora infestans* were successfully controlled by fungicides applied in the existing spray program, as no symptoms were visible during the trial.

Tuber weight

Results of weight of total amount of tubers are presented in Table 1 and Figure 1. Results of weight of large, medium and small tubers are presented in Table 1 and Figures 2, 3 and 4, respectively. Figures 5 – 9 illustrate the difference between each treatment respectively and the control.

Table 1. The effect of treatments on mean weight of total amount of tubers and weight of large, medium and small tubers, respectively.

Rating Date					17-Jan-2011		17-Jan-2011		17-Jan-2011		17-Jan-2011	
Part rated					Tuber - total		Tuber - large		Tuber - medium		Tuber - small	
Rating Type					Weight		Weight		Weight		Weight	
Trt no.	**Treatment name**	**Rate**	**Rate unit**	**Appl. code**								
1	Bio Terra 1 Bio Terra 2 Herbali Hp Active Molasses (4 L)	2 500 1 200	l/ha ml/ha l/ha ml/ha	A A AB AB A	78.12	a	18.83	ab	48.54	a	10.76	c

2	Bio Terra 1 Bio Terra 2 Molasses (2 L)	2 500	l/ha ml/ha	A A A	51.51	b	25.05	a	18.48	d	7.98	d
3	Herbali Molasses (4 L) Hp Active	1 400	l/ha ml/ha	ABCD A B	56.44	b	11.22	c	30.05	bc	15.17	b
4	Bio Terra 1 Bio Terra 2 Herbali Hp Active Molasses (4 L)	4 1000 2 400	l/ha ml/ha l/ha ml/ha	A A AB AB A	76.16	a	21.00	ab	32.69	b	21.72	a
5	Standard/Untreated Check	-	-	-	45.80	b	16.26	bc	23.28	cd	6.26	d
6	Untreated Check	-	-	-	49.35	b	15.14	bc	20.84	cd	16.38	b
LSD (P=.05)					14.429		5.518		7.664		2.424	
Standard Deviation					12.132		4.639		6.444		2.038	
CV					20.37		25.9		22.24		15.63	
Bartlett's X2					3.597		10.817		9.363		1.941	
P(Bartlett's X2)					0.609		0.055		0.095		0.857	
Replicate F					0.176		0.672		0.901		2.819	
Replicate Prob(F)					0.9693		0.6484		0.4960		0.0375	
Treatment F					8.056		6.497		17.530		48.495	
Treatment Prob(F)					0.0001		0.0005		0.0001		0.0001	

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when Analysis of Variance (AOV) Treatment Prob (F) is significant at mean comparison observed significance level (OSL).

- = significant at P = 0.0

Figure 1. The effect of treatments on mean weight of total amount of tubers.

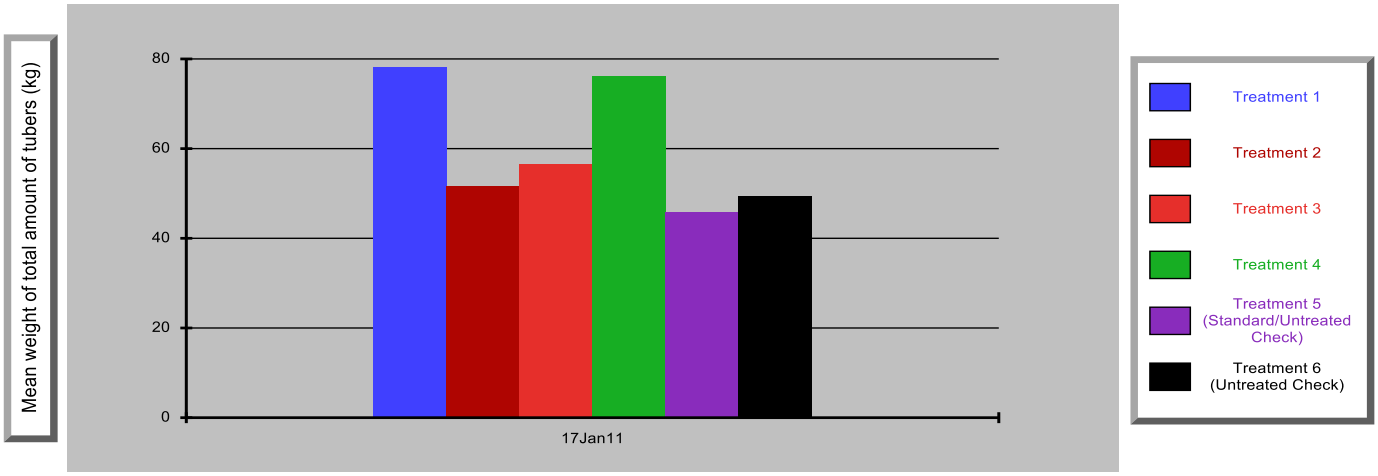

Figure 2. The effect of treatments on mean weight of large tubers.

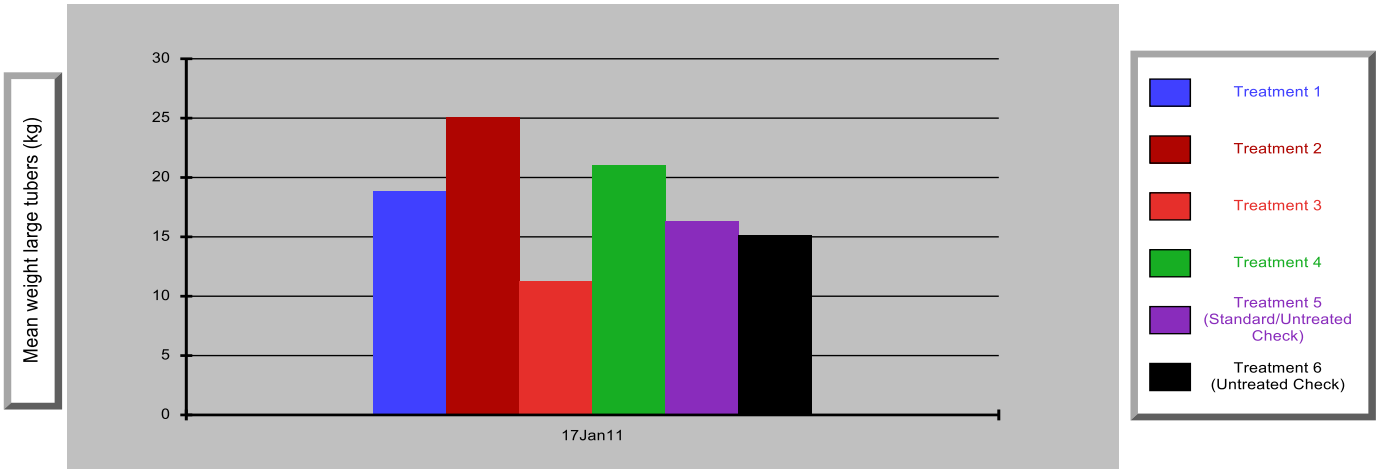

Figure 3. The effect of treatments on mean weight of medium tubers.

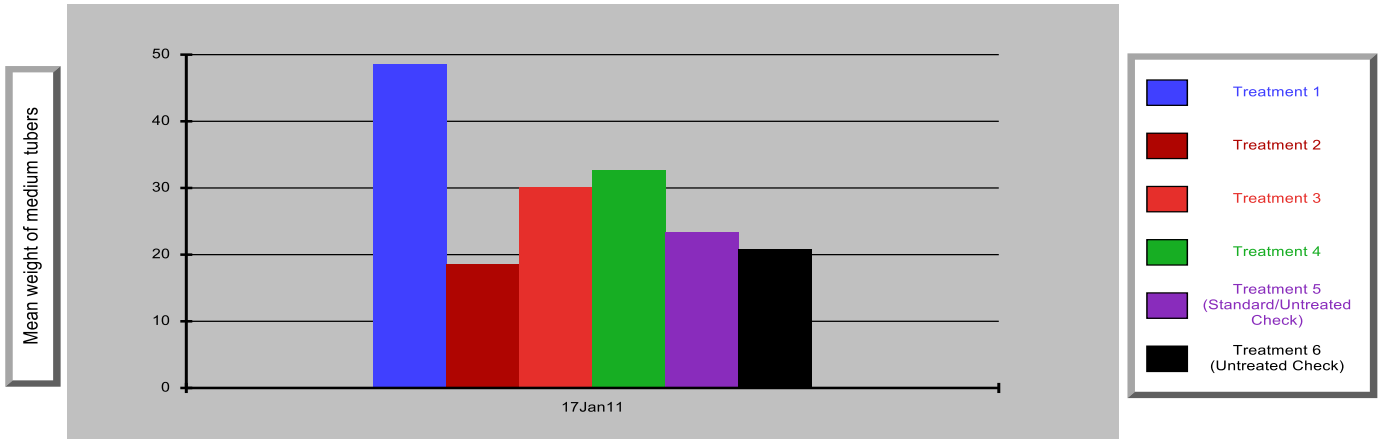

Figure 4. The effect of treatments on mean weight of small tubers.

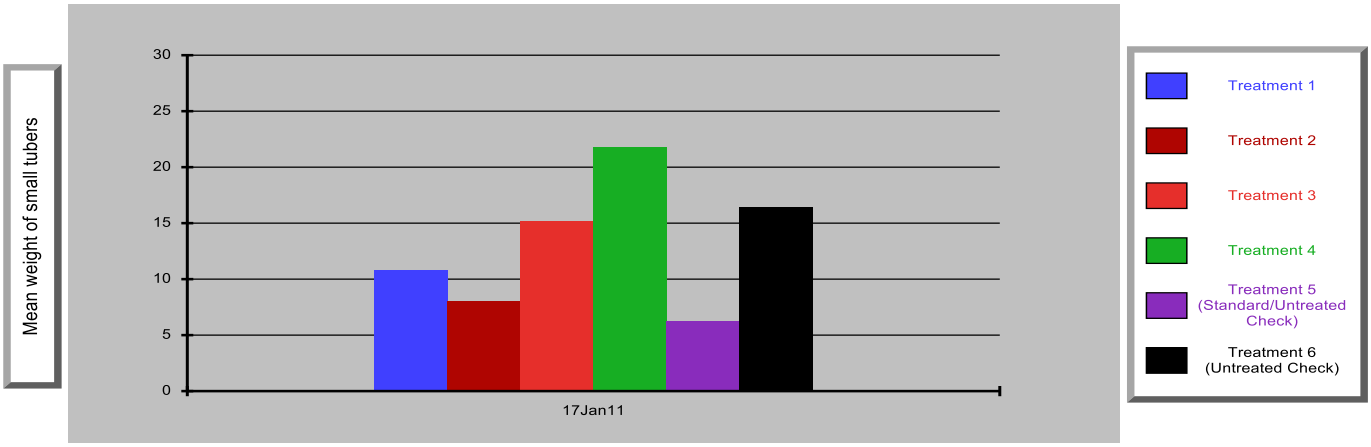

Figure 5. Comparison between tubers of treatment 1 compared to the untreated check (treatment 6).

Figure 6. Comparison between tubers of treatment 2 compared to the untreated check (treatment 6).

Figure 7. Comparison between tubers of treatment 3 compared to the untreated check (treatment 6).

Figure 8. Comparison between tubers of treatment 4 compared to the untreated check (treatment 6).

Figure 9. Comparison between tubers of treatment 5 compared to the untreated check (treatment 6).

CORRECTED LEVEL OF EFFECTIVENESS

Corrected level of effectiveness results on potato plants are presented in Table 2. The corrected level of effectiveness (% growth increase relative to the control) was calculated by expressing the mean weight of total, large, medium or small tubers in treated plots as a percentage of mean weight of total, large, medium or small tubers, respectively, in the control plots.

Table 2. The corrected level of effectiveness related to mean weight of total, large, medium and small tubers at harvest.

TREATMENT	CORRECTED LEVEL OF EFFECTIVENESS (%)			
	Total	Large	Medium	Small
1	58.30	24.37	132.92	-34.31
2	4.38	65.46	-11.32	-51.28
3	14.37	-25.89	44.19	-7.39
4	54.33	38.71	56.86	32.60
5	-7.19	7.40	11.71	-61.78
6 Untreated control	0.00	0.00	0.00	0.00

*DAA = days after application

PHYTOTOXICITY

Phytotoxicity: No phytotoxicity of any kind was observed.

DISCUSSION

1. Disease severity:
   Fusarium spp., *Verticillium* spp., *Alternaria solani* and *Phythopthora infestans* were successfully controlled by fungicides applied in the existing spray program, as no symptoms were visible during the trial.
2. Tuber weight: Total
   Significant differences from the untreated control were found with treatments 1 and 4 (Table 1, Figure 1). Treatments 1 and 4 differed significantly from the untreated control and from treatments 2, 3 and 5, but did not differ significantly from each other. Treatments 2, 3 and 5 did not differ significantly from the untreated control or from each other. A corrected level of effectiveness of 58.30% and 54.33% were found with treatment 1 and treatment 4, respectively, indicating an increase in yield of the respective percentages compared to the control (Table 2).
3. Tuber weight: Large
   Significant differences from the untreated control were only found with treatment 2 (Table 1, Figure 2). Treatment 2 was found to have a significantly higher mean weight of large tubers than treatments 3, 5 and 6, but did not differ significantly from treatments 1 and 4. Treatments 1 and 4 did not differ significantly from treatments 5 and 6. A corrected level of effectiveness of 65.46% was found with treatment 2 indicating an increase in yield of this percentage in mean weight of large tubers compared to the control (Table 2).
4. Tuber weight: Medium
   Significant differences from the untreated control were found with treatments 1 and 4 (Table 1, Figure 3). Treatment 1 differed significantly from all the other treatments, with the highest mean weight of medium tubers. Treatment 4 had the second highest mean weight of medium tubers, differing significantly from treatments 2, 5 and 6, but not from treatment 3. A corrected level of effectiveness of 132.92% was found with treatment 1 indicating an increase in yield of this percentage in mean weight of medium tubers compared to the control (Table 2).
5. Tuber weight: Small
   Treatment 4 was found to have significantly the highest mean weight of small tubers, differing significantly from all the other treatments (Table 1, Figure 4). Treatments 2 and 5 had significantly the lowest mean weight of small tubers, differing significantly form all the other treatments, but not differing significantly from each other. A corrected level of effectiveness of 32.60% was found with treatment 4, indicating an increase in yield of this percentage in mean weight of small tubers compared to the control (Table 2).
6. No symptoms of phytotoxicity were visible on any of the plant material treated during any given time of the trial.

RECOMMENDATION

A combination of Bio Terra 1, Bio Terra 2, Herbali, Hp Active and molasses was found to be the most effective for increase in potato yield. Minimum dosage rates of the combination of Bio Terra 1 at a dosage rate of 2 L product/ha, Bio Terra 2 at a dosage rate of 500 mL product/ha, Herbali at a dosage rate of 1 L product/ha, Hp Active at a dosage

rate of 200 mL product/ha and 4 L molasses applied during plant and then a combination of Herbali at a dosage rate of 2 L product/ha and Hp Active at a dosage rate of 200 mL product/ha applied at the second week after emergence could be applied effectively to increase the yield of potatoes.

CONCLUSION

Significant increase in yield of potato was found with some of the treatments tested in the Aurora area. The combination of Bio Terra 1 at a dosage rate of 2 L product/ha, Bio Terra 2 at a dosage rate of 500 mL product/ha, Herbali at a dosage rate of 1 L product/ha, Hp Active at a dosage rate of 200 mL product/ha and 4 L molasses applied during plant and then a combination of Herbali at a dosage rate of 2 L product/ha and Hp Active at a dosage rate of 200 mL product/ha applied at the second week after emergence or the combination of Bio Terra 1 at a dosage rate of 4 L product/ha, Bio Terra 2 at a dosage rate of 1000 mL product/ha, Herbali at a dosage rate of 2 L product/ha, Hp Active at a dosage rate of 400 mL product/ha and 4 L molasses applied during plant and then a combination of Herbali at a dosage rate of 4 L product/ha and Hp Active at a dosage rate of 400 mL product/ha applied at the second week after emergence were found to be equally significantly effective to increase the yield of potato. No symptoms of phytotoxicity were visible on any of the potato plants treated during any given time of the trial.

COMPILED BY:

Jan van Schoor Pr. Sci. Nat (Reg. no 400278/05)
Agricultural Product Development Consultant

APPENDIX A

AGRICULTURAL SCIENCE CONSULTANTS CC

Field study to evaluate the efficacy of Bio Terra 1, Bio Terra 2, Herbalie and HpActive in controlling disease present on potato. Define commercial dosage rate. Compare to an untreated control and conventional treatments.

Trial ID: BOSpotHERB Protocol ID: BOSpotHERB
Location: Aurora Study Director: Andre Pretorius
Project ID: Investigator: JAN VAN SCHOOR
Sponsor Contact:

Trt No.	Type	Treatment Name	Description	Rate	Rate Unit	Appl Code
1	VAR	Bio Terra 1	not treated	2	l/ha	A
	VAR	Bio Terra 2		500	ml/ha	A
	VAR	Herbalie		1	l/ha	AB
	VAR	Hp Active		200	ml/ha	AB
	VAR	Molasses (4 L)				A
2	VAR	Bio Terra 1		2	l/ha	A
	VAR	Bio Terra 2		500	ml/ha	A
	VAR	Molasses (2 L)				A
3	VAR	Herbalie		1	l/ha	ABCD
	VAR	Molasses (4 L)				A
	VAR	Hp Active		400	ml/ha	B
4	VAR	Bio Terra 1		4	l/ha	A
	VAR	Bio Terra 2		1000	ml/ha	A
	VAR	Herbalie		2	l/ha	AB
	VAR	Hp Active		400	ml/ha	AB
	VAR	Molasses (4 L)				A
5	CHK	Standard/Untreated Check	not treated			
6	CHK	Untreated Check	not treated			

Replications: 6, Untreated treatments: 1, Design: Randomized Complete Block (RCB), Treatment units: Treated 'Plot' size, Dry Form. Unit: g/kg, Treated 'Plot' size Width: 4 meters, Treated 'Plot' size Length: 10 meters, Application volume: 1000 L/ha, Mix size: 25 liters, Format definitions: G-All7.def, G-All7.frm

Product quantities required for listed treatments and applications of trials included in this table:

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code

* 'Per area' calculations based on spray volume= 1000 L/ha, mix size= 25 liters (mix size basis).
* Adjusted for multiple applications in treatment list.

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Trial ID: BOSpotHERB Protocol ID: BOSpotHERB
Location: Aurora Study Director: Andre Pretorius
Project ID: Investigator: JAN VAN SCHOOR
Sponsor Contact:

Crop Code			SOLTU	SOLTU	SOLTU	SOLTU	SOLTU
BBCH Scale			BPOT	BPOT	BPOT	BPOT	BPOT
Crop Scientific Name			Solanum tubero>	Solanum tubero>	Solanum tubero>	Solanum tubero>	Solanum tubero>
Crop Name			Potato	Potato	Potato	Potato	Potato
Crop Variety			BP1	BP1	BP1	BP1	BP1
Part Rated			TUBTOT C	TUBLAR C	TUBMED C	TUBSMA C	PLANT C
Rating Date			17Jan11	17Jan11	17Jan11	17Jan11	8Sep10
Rating Type			WEIGHT	WEIGHT	WEIGHT	WEIGHT	PHYGEN
Rating Unit			kg	kg	kg	kg	%
Sample Size, Unit			120 PLANT	120 PLANT	120 PLANT	120 PLANT	1 PLOT
Collection Basis, Unit			- PLOT	- PLOT	- PLOT	- PLOT	
Number of Subsamples			1	1	1	1	1
Crop Stage Scale			BBCH	BBCH	BBCH	BBCH	BBCH
Crop Density, Unit			120 PLOT	120 PLOT	120 PLOT	120 PLOT	120 PLOT
Assessed By			Jan van Sch	Jan van Sch	Jan van Sch	Jan van Sch	Jan van Sch
Days After First/Last Applic.			174 89	174 89	174 89	174 89	43 43
Trt-Eval Interval			89 DA-D	89 DA-D	89 DA-D	89 DA-D	0 DA-B
ARM Action Codes			K05	K05	K05	K05	K05
Number of Decimals			2	2	2	2	2
Trt No.	Treatment Name	Rate	Rate Unit / Appl Code	1	2	3	4	5
1	Bio Terra 1	2	l/ha A	78.12 a	18.83 ab	48.54 a	10.76 c	0.00 a
	Bio Terra 2	500	ml/ha A					
	Herbali	1	l/ha AB					
	Hp Active	200	ml/ha AB					
	Molasses (4 L)		A					
2	Bio Terra 1	2	l/ha A	51.51 b	25.05 a	18.48 d	7.98 d	0.00 a
	Bio Terra 2	500	ml/ha A					
	Molasses (2 L)		A					
3	Herbali	1	l/ha ABCD	56.44 b	11.22 c	30.05 bc	15.17 b	0.00 a
	Molasses (4 L)		A					
	Hp Active	400	ml/ha B					
4	Bio Terra 1	4	l/ha A	76.16 a	21.00 ab	32.69 b	21.72 a	0.00 a
	Bio Terra 2	1000	ml/ha A					
	Herbali	2	l/ha AB					
	Hp Active	400	ml/ha AB					
	Molasses (4 L)		A					
5	Standard/Untreated Check			45.80 b	16.26 bc	23.28 cd	6.26 d	0.00 a
6	Untreated Check			49.35 b	15.14 bc	20.84 cd	16.38 b	0.00 a
LSD (P=.05)				14.429	5.518	7.664	2.424	0.000
Standard Deviation				12.132	4.639	6.444	2.038	0.000
CV				20.37	25.9	22.24	15.63	0.0
Bartlett's X2				3.597	10.817	9.363	1.941	0.0
P(Bartlett's X2)				0.609	0.055	0.095	0.857	.
Replicate F				0.176	0.672	0.901	2.819	0.000
Replicate Prob(F)				0.9693	0.6484	0.4960	0.0375	1.0000
Treatment F				8.056	6.497	17.530	48.495	0.000
Treatment Prob(F)				0.0001	0.0005	0.0001	0.0001	1.0000

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

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Location: Aurora Study Director: Andre Pretorius
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Sponsor Contact:

Crop Code					SOLTU	SOLTU	SOLTU
BBCH Scale					BPOT	BPOT	BPOT
Crop Scientific Name					Solanum tubero>	Solanum tubero>	Solanum tubero>
Crop Name					Potato	Potato	Potato
Crop Variety					BP1	BP1	BP1
Part Rated					PLANT C	PLANT C	PLANT C
Rating Date					30Sep10	20Oct10	17Jan11
Rating Type					PHYGEN	PHYGEN	PHYGEN
Rating Unit					%	%	%
Sample Size, Unit					1 PLOT	1 PLOT	1 PLOT
Collection Basis, Unit							
Number of Subsamples					1	1	1
Crop Stage Scale					BBCH	BBCH	BBCH
Crop Density, Unit					120 PLOT	120 PLOT	120 PLOT
Assessed By					Jan van Sch	Jan van Sch	Jan van Sch
Days After First/Last Applic.					65 22	85 20	174 89
Trt-Eval Interval					0 DA-C	0 DA-D	89 DA-D
ARM Action Codes					K05	K05	K05
Number of Decimals					2	2	2
Trt No.	Treatment Name	Rate	Unit	Appl Code	6	7	8
1	Bio Terra 1	2	l/ha	A	0.00 a	0.00 a	0.00 a
	Bio Terra 2	500	ml/ha	A			
	Herbalie	1	l/ha	AB			
	Hp Active	200	ml/ha	AB			
	Molasses (4 L)			A			
2	Bio Terra 1	2	l/ha	A	0.00 a	0.00 a	0.00 a
	Bio Terra 2	500	ml/ha	A			
	Molasses (2 L)			A			
3	Herbalie	1	l/ha	ABCD	0.00 a	0.00 a	0.00 a
	Molasses (4 L)			A			
	Hp Active	400	ml/ha	B			
4	Bio Terra 1	4	l/ha	A	0.00 a	0.00 a	0.00 a
	Bio Terra 2	1000	ml/ha	A			
	Herbalie	2	l/ha	AB			
	Hp Active	400	ml/ha	AB			
	Molasses (4 L)			A			
5	Standard/Untreated Check				0.00 a	0.00 a	0.00 a
6	Untreated Check				0.00 a	0.00 a	0.00 a
LSD (P=.05)					0.000	0.000	0.000
Standard Deviation					0.000	0.000	0.000
CV					0.0	0.0	0.0
Bartlett's X2					0.0	0.0	0.0
P(Bartlett's X2)					.	.	.
Replicate F					0.000	0.000	0.000
Replicate Prob(F)					1.0000	1.0000	1.0000
Treatment F					0.000	0.000	0.000
Treatment Prob(F)					1.0000	1.0000	1.0000

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Field study to evaluate the efficacy of Bio Terra 1, Bio Terra 2, Herbalie and HpActive in controlling disease present on potato. Define commercial dosage rate. Compare to an untreated control and conventional treatments.

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Location: Aurora Study Director: Andre Pretorius
Project ID: Investigator: JAN VAN SCHOOR
Sponsor Contact:

Crop Code
SOLTU, BPOT, Solanum tuberosum, = US
Part Rated
TUBTOT = tuber - total
TUBLAR = tuber - large
TUBMED = tuber - medium
TUBSMA = tuber - small
PLANT = plant
C = Crop is Part Rated
Rating Type
WEIGHT = weight
PHYGEN = phytotoxicity - general / injury
Rating Unit
kg = kilogram
% = percent

PLANT = plant/plant biomass/shrub
PLOT = total plot

PLOT = total plot
Crop Stage Scale
BBCH = BBCH uniform plant stages

PLOT = per plot
ARM Action Codes
K05 = Perform 5% Tukey's HSD mean separation on Standardized Summary

AGRICULTURAL SCIENCE CONSULTANTS CC

Field study to evaluate the efficacy of Bio Terra 1, Bio Terra 2, Herbalie and HpActive in controlling disease present on potato. Define commercial dosage rate. Compare to an untreated control and conventional treatments.

Trial ID: BOSpotHERB Protocol ID: BOSpotHERB
Location: Aurora Study Director: Andre Pretorius
Project ID: Investigator: JAN VAN SCHOOR
Sponsor Contact:

Crop Code					SOLTU	SOLTU	SOLTU	SOLTU
BBCH Scale					BPOT	BPOT	BPOT	BPOT
Crop Scientific Name					Solanum tubero>	Solanum tubero>	Solanum tubero>	Solanum tubero>
Crop Name					Potato	Potato	Potato	Potato
Crop Variety					BP1	BP1	BP1	BP1
Part Rated					TUBTOT C	TUBLAR C	TUBMED C	TUBSMA C
Rating Date					17Jan11	17Jan11	17Jan11	17Jan11
Rating Type					WEIGHT	WEIGHT	WEIGHT	WEIGHT
Rating Unit					kg	kg	kg	kg
Sample Size, Unit					120 PLANT	120 PLANT	120 PLANT	120 PLANT
Collection Basis, Unit					- PLOT	- PLOT	- PLOT	- PLOT
Number of Subsamples					1	1	1	1
Crop Stage Scale					BBCH	BBCH	BBCH	BBCH
Crop Density, Unit					120 PLOT	120 PLOT	120 PLOT	120 PLOT
Assessed By					Jan van Sch	Jan van Sch	Jan van Sch	Jan van Sch
Days After First/Last Applic.					174 89	174 89	174 89	174 89
Trt-Eval Interval					89 DA-D	89 DA-D	89 DA-D	89 DA-D
ARM Action Codes					K05	K05	K05	K05
Number of Decimals					2	2	2	2
Trt No.	Treatment Name	Rate	Unit	Appl Code	Plot	1	2	3	4
1	Bio Terra 1	2	l/ha	A	105	80.10	25.35	39.72	12.30
	Bio Terra 2	500	ml/ha	A	206	74.40	15.75	47.10	7.14
	Herbalie	1	l/ha	AB	301	90.00	14.10	61.80	9.39
	Hp Active	200	ml/ha	AB	402	67.98	20.10	45.54	14.19
	Molasses (4 L)			A	501	81.00	21.36	52.05	12.36
					601	75.24	16.29	45.03	9.15
					Mean =	78.12	18.83	48.54	10.76
2	Bio Terra 1	2	l/ha	A	102	54.30	16.68	20.10	7.20
	Bio Terra 2	500	ml/ha	A	203	79.20	21.51	17.94	5.94
	Molasses (2 L)			A	304	37.50	38.10	14.28	9.63
					401	35.04	23.91	21.60	9.15
					502	52.05	27.60	21.63	10.20
					602	50.97	22.50	15.33	5.76
					Mean =	51.51	25.05	18.48	7.98
3	Herbalie	1	l/ha	ABCD	104	61.20	12.75	37.20	19.02
	Molasses (4 L)			A	201	42.90	9.45	29.61	11.40
	Hp Active	400	ml/ha	B	303	55.20	10.80	25.20	14.88
					406	66.45	11.88	28.20	15.36
					503	60.36	12.36	34.35	18.09
					603	52.52	10.08	25.76	12.24
					Mean =	56.44	11.22	30.05	15.17
4	Bio Terra 1	4	l/ha	A	103	67.29	20.91	28.68	19.35
	Bio Terra 2	1000	ml/ha	A	204	83.40	22.20	37.50	24.60
	Herbalie	2	l/ha	AB	305	64.80	16.35	36.51	21.36
	Hp Active	400	ml/ha	AB	404	89.13	24.54	28.05	21.57
	Molasses (4 L)			A	504	70.50	25.05	36.30	22.62
					604	81.81	16.95	29.07	20.82
					Mean =	76.16	21.00	32.69	21.72
5	Standard/Untreated Check				106	37.95	18.72	18.75	6.30
					205	51.90	21.90	25.20	4.35
					302	64.20	11.01	18.69	9.36
					405	29.13	13.41	30.48	5.01
					505	51.60	19.20	24.96	8.10
					605	39.99	13.32	21.60	4.41
					Mean =	45.80	16.26	23.28	6.26
6	Untreated Check				101	47.13	16.26	18.72	14.61
					202	42.96	11.61	40.50	18.60
					306	37.20	8.61	12.36	14.58
					403	70.11	17.40	11.76	17.73
					506	54.36	17.28	17.61	18.90
					606	44.34	19.66	24.06	13.86
					Mean =	49.35	15.14	20.84	16.38

AGRICULTURAL SCIENCE CONSULTANTS CC

Field study to evaluate the efficacy of Bio Terra 1, Bio Terra 2, Herbalie and HpActive in controlling disease present on potato. Define commercial dosage rate. Compare to an untreated control and conventional treatments.

Trial ID: BOSpotHERB Protocol ID: BOSpotHERB
Location: Aurora Study Director: Andre Pretorius
Project ID: Investigator: JAN VAN SCHOOR
Sponsor Contact:

Crop Code				SOLTU	SOLTU	SOLTU	SOLTU
BBCH Scale				BPOT	BPOT	BPOT	BPOT
Crop Scientific Name				Solanum tubero>	Solanum tubero>	Solanum tubero>	Solanum tubero>
Crop Name				Potato	Potato	Potato	Potato
Crop Variety				BP1	BP1	BP1	BP1
Part Rated				PLANT C	PLANT C	PLANT C	PLANT C
Rating Date				8Sep10	30Sep10	20Oct10	17Jan11
Rating Type				PHYGEN	PHYGEN	PHYGEN	PHYGEN
Rating Unit				%	%	%	%
Sample Size, Unit				1 PLOT	1 PLOT	1 PLOT	1 PLOT
Collection Basis, Unit							
Number of Subsamples				1	1	1	1
Crop Stage Scale				BBCH	BBCH	BBCH	BBCH
Crop Density, Unit				120 PLOT	120 PLOT	120 PLOT	120 PLOT
Assessed By				Jan van Sch	Jan van Sch	Jan van Sch	Jan van Sch
Days After First/Last Applic.				43 43	65 22	85 20	174 89
Trt-Eval Interval				0 DA-B	0 DA-C	0 DA-D	89 DA-D
ARM Action Codes				K05	K05	K05	K05
Number of Decimals				2	2	2	2
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	5	6	7	8
1	Bio Terra 1	2	l/ha	A	105	0.00	0.00	0.00	0.00
	Bio Terra 2	500	ml/ha	A	206	0.00	0.00	0.00	0.00
	Herbalie	1	l/ha	AB	301	0.00	0.00	0.00	0.00
	Hp Active	200	ml/ha	AB	402	0.00	0.00	0.00	0.00
	Molasses (4 L)			A	501	0.00	0.00	0.00	0.00
					601	0.00	0.00	0.00	0.00
					Mean =	0.00	0.00	0.00	0.00
2	Bio Terra 1	2	l/ha	A	102	0.00	0.00	0.00	0.00
	Bio Terra 2	500	ml/ha	A	203	0.00	0.00	0.00	0.00
	Molasses (2 L)			A	304	0.00	0.00	0.00	0.00
					401	0.00	0.00	0.00	0.00
					502	0.00	0.00	0.00	0.00
					602	0.00	0.00	0.00	0.00
					Mean =	0.00	0.00	0.00	0.00
3	Herbalie	1	l/ha	ABCD	104	0.00	0.00	0.00	0.00
	Molasses (4 L)			A	201	0.00	0.00	0.00	0.00
	Hp Active	400	ml/ha	B	303	0.00	0.00	0.00	0.00
					406	0.00	0.00	0.00	0.00
					503	0.00	0.00	0.00	0.00
					603	0.00	0.00	0.00	0.00
					Mean =	0.00	0.00	0.00	0.00
4	Bio Terra 1	4	l/ha	A	103	0.00	0.00	0.00	0.00
	Bio Terra 2	1000	ml/ha	A	204	0.00	0.00	0.00	0.00
	Herbalie	2	l/ha	AB	305	0.00	0.00	0.00	0.00
	Hp Active	400	ml/ha	AB	404	0.00	0.00	0.00	0.00
	Molasses (4 L)			A	504	0.00	0.00	0.00	0.00
					604	0.00	0.00	0.00	0.00
					Mean =	0.00	0.00	0.00	0.00
5	Standard/Untreated Check				106	0.00	0.00	0.00	0.00
					205	0.00	0.00	0.00	0.00
					302	0.00	0.00	0.00	0.00
					405	0.00	0.00	0.00	0.00
					505	0.00	0.00	0.00	0.00
					605	0.00	0.00	0.00	0.00
					Mean =	0.00	0.00	0.00	0.00
6	Untreated Check				101	0.00	0.00	0.00	0.00
					202	0.00	0.00	0.00	0.00
					306	0.00	0.00	0.00	0.00
					403	0.00	0.00	0.00	0.00
					506	0.00	0.00	0.00	0.00
					606	0.00	0.00	0.00	0.00
					Mean =	0.00	0.00	0.00	0.00

AGRICULTURAL SCIENCE CONSULTANTS CC

Field study to evaluate the efficacy of Bio Terra 1, Bio Terra 2, Herbalie and HpActive in controlling disease present on potato. Define commercial dosage rate. Compare to an untreated control and conventional treatments.

Trial ID: BOSpotHERB Protocol ID: BOSpotHERB
Location: Aurora Study Director: Andre Pretorius
Project ID: Investigator: JAN VAN SCHOOR
Sponsor Contact:

Crop Code
SOLTU, BPOT, Solanum tuberosum, = US
Part Rated
TUBTOT = tuber - total
TUBLAR = tuber - large
TUBMED = tuber - medium
TUBSMA = tuber - small
PLANT = plant
C = Crop is Part Rated
Rating Type
WEIGHT = weight
PHYGEN = phytotoxicity - general / injury
Rating Unit
kg = kilogram
% = percent

PLANT = plant/plant biomass/shrub
PLOT = total plot

PLOT = total plot
Crop Stage Scale
BBCH = BBCH uniform plant stages

PLOT = per plot
ARM Action Codes
K05 = Perform 5% Tukey's HSD mean separation on Standardized Summary