Aroostook Testing & Consulting Laboratory Inc.
ATC Labs Inc.
160 Airport Drive Skyway Industrial Park Presque Isle Maine 04769 207-762-5771

ARCLAY RESEARCH PROJECT
December 2006

Trial 3 and 4 - Grower who applied two applications

This was the only study conducted that got two treatments of Arclay during the growing season. The second application of the material occurred because during the growing season there was an observation of an infection of scab had developed and was growing. This prompted the second application.

SOIL ANALYSIS

Soil Analysis
Arclay Trials
Trial 3
06-20-2006

	Control	Treatment			Desired Limits
pH	**5.64**	**5.59**			5.5-6.5
Organic Matter	**1.45**	**1.67**			3-5
Phosphorous	**67**	**74**			150
Potassium	**390**	**410**			300
Calcium	**1950**	**1970**			2500
Magnesium	**145**	**176**			250
Boron	**0.3**	**0.2**			1
Copper	**8**	**3**			14
Manganese	**32**	**24**			50
Zinc	**8**	**4**			12

As can be seen from the soil data above there was no significant difference in the treatment area as compared to the control. Nothing in this analysis should significantly impact the use of this product, the growth of the crop or the evaluation of the data.

SOIL MICROBIAL LEVELS

Aroostook Testing & Consulting Laboratory Inc. Labs Inc.

160 Airport Drive Presque Isle ME 04769 207-762-5771

Soil Microbiological Analysis
Arclay Scab Trial
Trial 3
6-31-06

	Control	Treatment			
Bacterial Count	**3.45E+05**	**3.46E+05**			
Fungal Count	**1.25E+04**	**1.34E+05**			
Total	**3.58E+05**	**4.80E+05**			

This data indicates that there is no real affect on the total soil microbes seen in the soil with the application of this material.

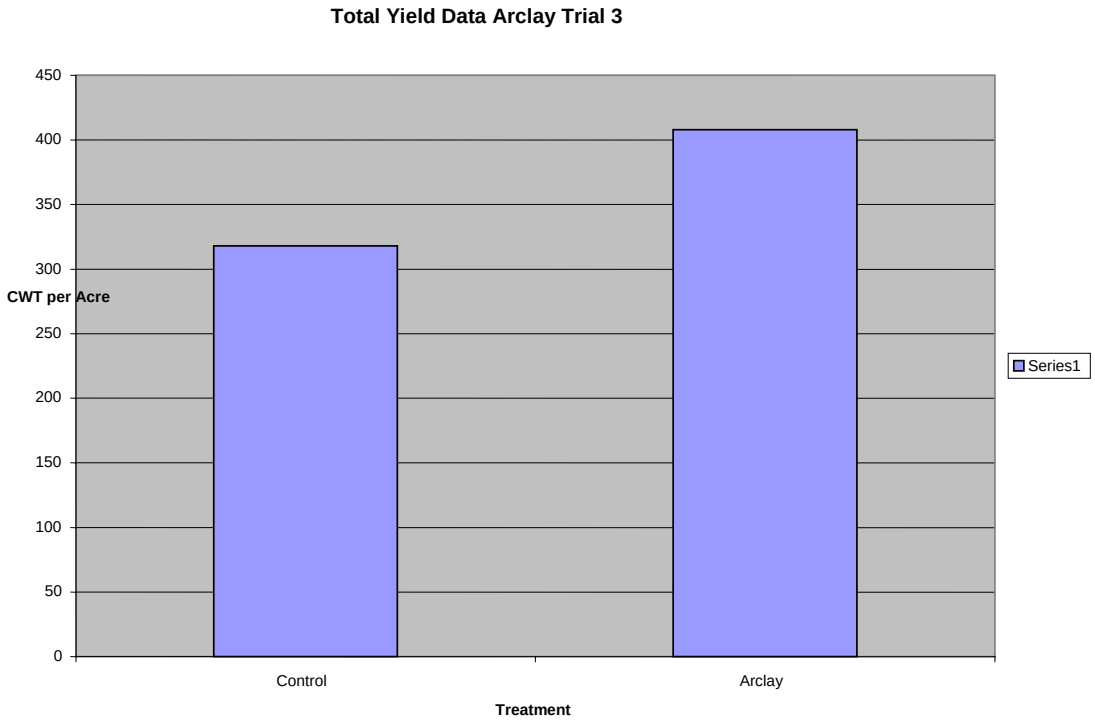
TISSUE ANALYSIS

CLIENT:	**name**	**Arclay Scab analysis**
	add	**Trial 3**

SAMPLE#					**SUFFICIENT**	
FIELD ID	control		Treatment			
ELEMENT						
NITROGEN	6.52	%	6.45	%	5	%
PHOSPHORUS	0.67	%	0.58	%	0.41	%
POTASSIUM	4.25	%	4.42	%	4.8	%
CALCIUM	0.99	%	1.26	%	2.25	%
MAGNESIUM	0.58	%	0.69	%	1	%
SULFUR	0.58	%	0.55	%	0.4	%
BORON	40	ppm	45	ppm	110	ppm
ZINC	44	ppm	75	ppm	70	ppm
MANGANESE	335	ppm	398	ppm	500	ppm
IRON	451	ppm	484	ppm	400	ppm
COPPER	11	ppm	11	ppm	15	ppm

The tissue analysis does not show any benefit or detriment from the addition of the material. There was no nutrient that showed a deficiency in the treatment that did not appear in the control. This should not significantly impact the health of the crop.

YIELD ANALYSIS



Grower	Trial 3
Material Tested	Arclay
Control product	Standard
Variety	

Control	**Field weight**	**# of plants**	**#of tubers**	**weight per plant**	**tubers per plant**	**Yield per acre**
Repetition						
1	26	9	100	2.89	11.11	312
2	20.5	9	106	2.28	11.78	246
3	33	9	132	3.67	14.67	396
Averages	**26.50**	**9.00**	**112.67**	**2.94**	**12.52**	**318.00**

Treated	**Field weight**	**# of plants**	**#of tubers**	**weight per plant**	**tubers per plant**	**Yield per acre**
Arclay 1	34	9	98	3.78	10.89	408
2	40	9	131	4.44	14.56	480
3	28	9	114	3.11	12.67	336
Averages	**34.00**	**9.00**	**114.33**	**3.78**	**12.70**	**408.00**

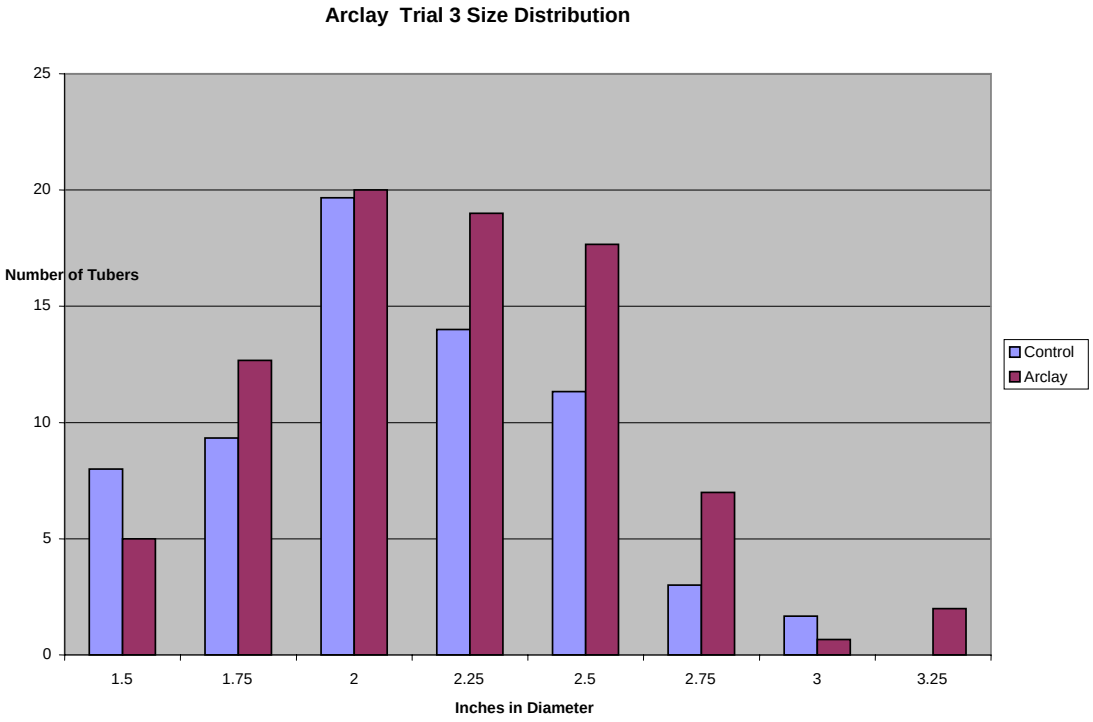
As can be seen in the data above there is an increase in total yield with the application of this material. The total yield increase is significant. And may play a role in the economics of the use of this product and this will be discussed in the final conclusions of this report.

SIZE DISTRIBUTION

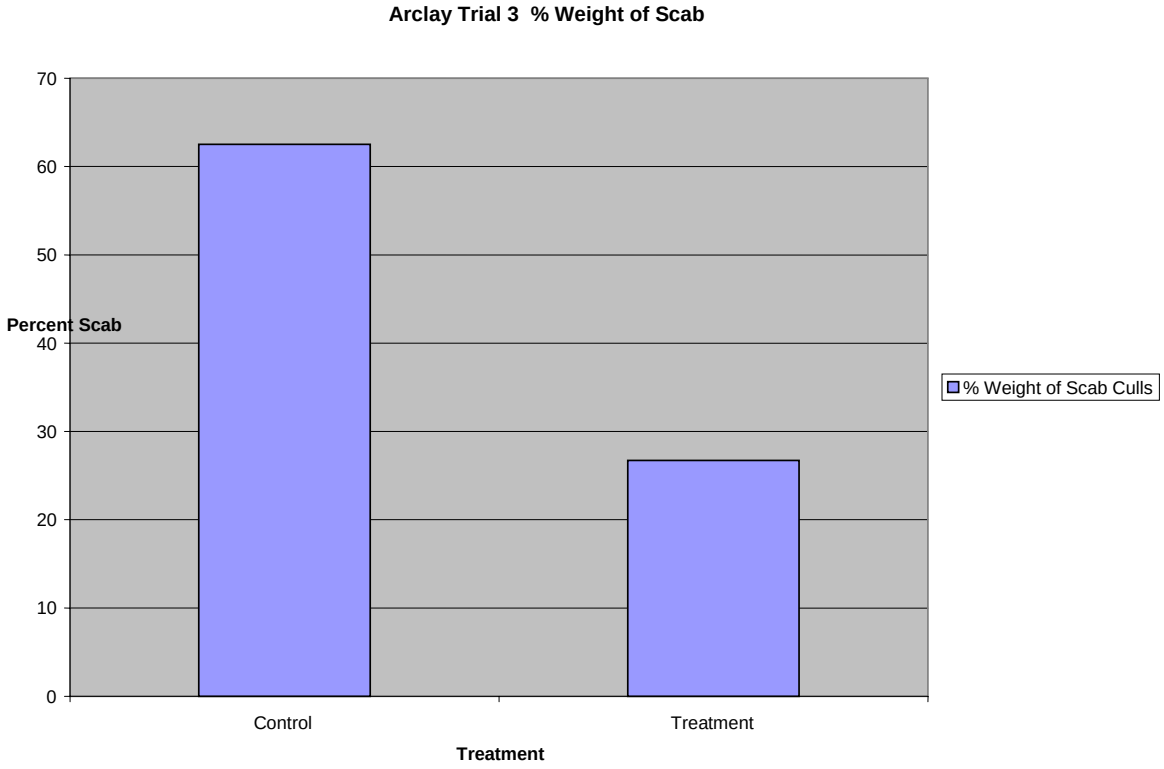
Grower Trial 3
Material Tested Arclay
Control product Standard
Variety

						SIZING				
Control	**Field weight**	**# of plants**	**1.5**	**1.75**	**2**	**2.25**	**2.5**	**2.75**	**3**	**3.25**
Repetition 1	26	9	1	9	22	11	21	4	0	0
2	20.5	9	15	10	20	14	5	2	3	0
3	33	9	8	9	17	17	8	3	2	0
Averages	**26.50**	**9.00**	**8.00**	**9.33**	**19.67**	**14.00**	**11.33**	**3.00**	**1.67**	**0.00**

						SIZING				
Treated	**Field weight**	**# of plants**	**1.5**	**1.75**	**2**	**2.25**	**2.5**	**2.75**	**3**	**3.25**
Arclay 1	34	9	1	9	12	15	14	10	0	3
2	40	9	8	17	27	23	22	4	1	1
3	28	9	6	12	21	19	17	7	1	2
Averages	**34.00**	**9.00**	**5.00**	**12.67**	**20.00**	**19.00**	**17.67**	**7.00**	**0.67**	**2.00**



The sizing distribution showed an increase in marketable yield 2” – 2.75”.



Date	September 27 2006
Project	Arclay
Grower Name	Trial 3

% scab affect on yield

Description	**Total weight**	**Scab Weight**	**% scab**
Control 1	20.5	15.5	75.61
control 2	26	22	84.62
Control 3	33	9	27.27
Average			**62.50**
Arclay 1	40	11	27.50
Arclay 2	34	7	20.59
Arclay 3	28	9	32.14
Average			**26.74**

As can be seen in the data above there is a significant impact with the application of the material in the total weight of potatoes that were marketable as compared to the Control. This is the trial that had the best effect observed.

LESION AREA INDEX

Date	September 27 2006
Project	Arclay
Grower Name	Trial 3

Lesion area index

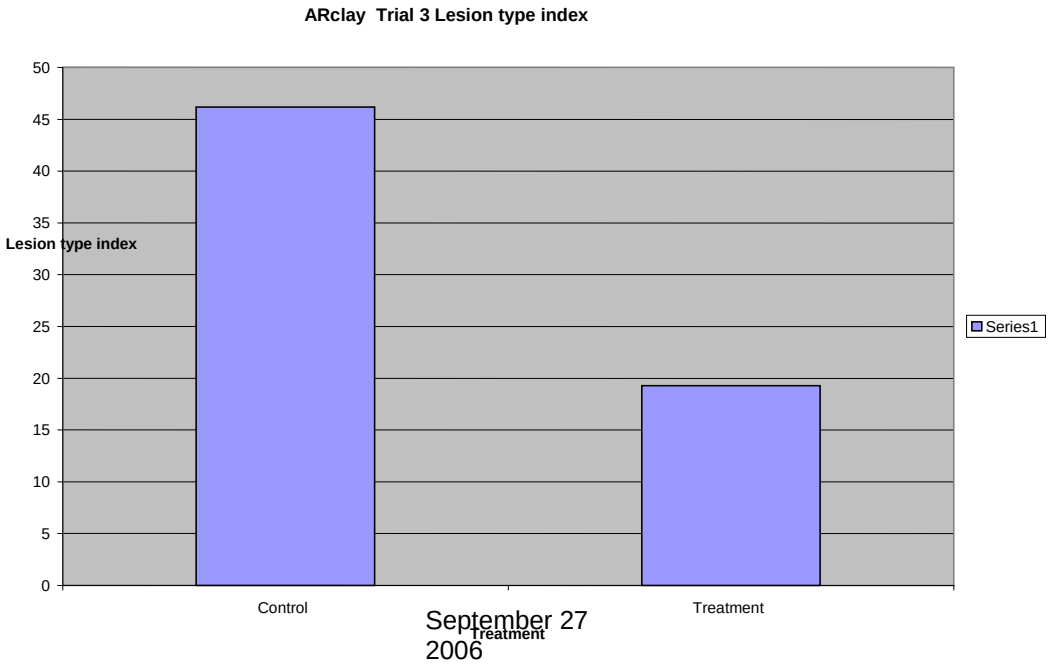
Description	Ranking						
	0	1	2	3	4	5	Total Tuber
Control 1	16	32	5	2	1	0	56
Rank	**0.00**	**0.57**	**0.18**	**0.11**	**0.07**	**0.00**	**18.57**
Control 2	16	4	3	5	23	49	100
Rank	**0.00**	**0.04**	**0.06**	**0.15**	**0.92**	**2.45**	**72.40**
Control 3	37	18	19	17	22	19	132
Rank	**0.00**	**0.14**	**0.29**	**0.39**	**0.67**	**0.72**	**43.94**

	0	1	2	3	4	5	Total Tuber
Treatment 1	73	10	15	0	0	0	98
Rank	**0.00**	**0.10**	**0.31**	**0.00**	**0.00**	**0.00**	**8.16**
Treatment 2	75	29	9	15	0	0	128
Rank	**0.00**	**0.23**	**0.14**	**0.35**	**0.00**	**0.00**	**14.38**
Treatment 3	79	19	14	4	0	0	116
Rank	**0.00**	**0.16**	**0.24**	**0.10**	**0.00**	**0.00**	**10.17**

Mean Rank Control	**44.97**
Mean Rank Treatment	**10.90**

The data above indicates that there was an improvement in the area of the tuber affected and size of the lesions when the material is applied.

LESION TYPE INDEX



Date
Project Arclay
Grower Trial 3

Lesion type index form

Description	Ranking						
	0	1	2	3	4	5	Total Tuber
Control 1	20	46	29	11	0	0	106
Rank	**0.0 0**	**0.43**	**0.55**	**0.31**	**0.00**	**0.00**	**25.85**
Control 2	16	0	0	0	84	0	100
Rank	**0.0 0**	**0.00**	**0.00**	**0.00**	**3.36**	**0.00**	**67.20**
Control 3	22	20	23	34	33	0	132
Rank	**0.0 0**	**0.15**	**0.35**	**0.77**	**1.00**	**0.00**	**45.45**

	0	1	2	3	4	5	Total Tuber
Arclay 1	21	56	18	18	9	9	131
Rank	**0.0 0**	**0.43**	**0.27**	**0.41**	**0.27**	**0.34**	**34.66**
Arclay 2	73	25	0	0	0	0	98
Rank	**0.0 0**	**0.26**	**0.00**	**0.00**	**0.00**	**0.00**	**5.10**
Arclay 3	47	39	20	8	0	0	114
Rank	**0.0 0**	**0.34**	**0.35**	**0.21**	**0.00**	**0.00**	**18.07**

Mean Rank Control	**46.16787**
Mean Rank Treatment	**19.27623**

The data above indicates that there is a significant effect on the lesion type that is seen in comparison to the control.

TRIAL 4

Notes for this trial are the same as the first trial

SOIL ANALYSIS

Aroostook Testing & Consulting Laboratory Inc. ATC Labs Inc.

160 Airport Drive Presque Isle ME 04769 207-762-5771

Soil Analysis & Lime Recommendations
Arclay Trial 4

06-01-2006

	Control	Treatment			Desired Limits
pH	**5.42**	**5.32**			5.5-6.5
Organic Matter	**1.45**	**1.37**			3-5
Phosphorous	**49**	**67**			150
Potassium	**494**	**562**			300
Calcium	**1900**	**2110**			2500
Magnesium	**140**	**112**			250
Boron	**0.6**	**0.4**			1
Copper	**10**	**9**			14
Manganese	**47**	**44**			50
Zinc	**10**	**4**			12

These data indicate there are no significant differences between the Control area of the field and the Treatment area of the field. The deficiencies if there area any are deficient on both sides of the field. And there does not appear to be any thing that would significantly impact the results of this trial or the evaluation of those results.

SOIL MICROBE ANALYSIS

160 Airport Drive Presque Isle ME 04769 207-762-5771

Soil Microbiological analysis
Arclay Scab Trial
Trial 4
6-31-06

	Control	Treatment			
Bacterial Count	3.76E+06	1.48E+06			
Fungal Count	**1.60E+06**	**1.40E+06**			
Total	**5.36E+06**	**2.88E+06**			

This data indicates that there is a significant decrease in total microbial counts in the treatment area as compared to the area that was not treated. This decrease in microbial counts may be significant in evaluating the cause of the efficacy or lack of efficacy with the use of their product.

TISSUE ANALYSIS

CLIENT:	**Arclay Research**	RECEIVED	7/12/2006
	Trial 4	REPORTED	7/22/2006

SAMPLE#							**SUFFICIENT**	
FIELD ID	**Control**		**Treatment**					
ELEMENT								
NITROGEN	5.11	%	5.77	%	%	%	5	%
PHOSPHORUS	0.43	%	0.411	%	%	%	0.41	%
POTASSIUM	5.55	%	5.02	%	%	%	4.8	%
CALCIUM	1.12	%	1.15	%	%	%	2.25	%
MAGNESIUM	0.58	%	0.65	%	%	%	1	%
SULFUR	0.46	%	0.43	%	%	%	0.4	%
BORON	102	ppm	59	ppm	ppm	ppm	110	ppm
ZINC	38	ppm	36	ppm	ppm	ppm	70	ppm
MANGANESE	384	ppm	380	ppm	ppm	ppm	500	ppm
IRON	387	ppm	470	ppm	ppm	ppm	400	ppm
COPPER	12	ppm	8	ppm	ppm	ppm	15	ppm

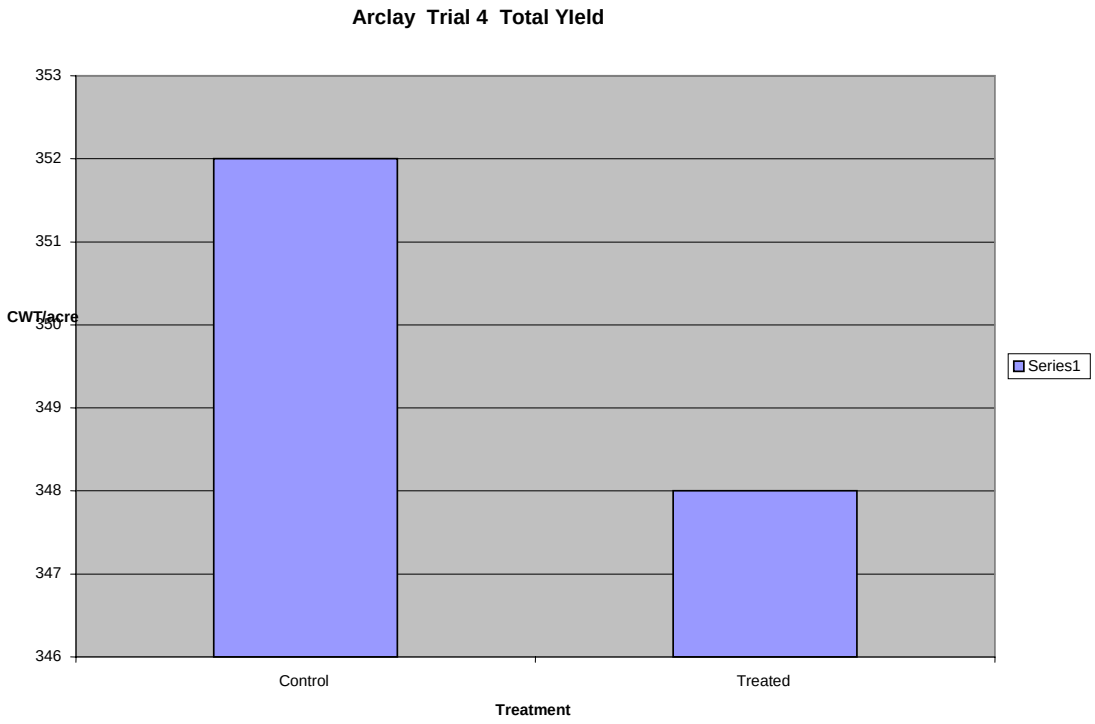
These data indicate there are no significant differences between the Control area of the field and the treatment area of the field. The deficiencies if there area any are deficient on both parts of the field. And there does not appear to be any tissue nutrient level that would significantly impact the results of this trial or the evaluation of those results.

TOTAL YIELD

Grower	Trial 4
Material Tested	Arclay
Control product	Standard
Variety	

Control	**Field weight**	**# of plants**	**#of tubers**	**weight per plant**	**tubers per plant**	**Yield per acre**
Repetition 1	31	10	111	3.10	11.10	372
2	30	10	116	3.00	11.60	360
3	27	9	120	3.00	13.33	324
Averages	**29.33**	**9.67**	**115.67**	**3.03**	**12.01**	**352.00**

Treated	**Field weight**	**# of plants**	**#of tubers**	**weight per plant**	**tubers per plant**	**Yield per acre**
Repetition1	24	9	105	2.67	11.67	288
2	29	9	128	3.22	14.22	348
3	34	11	126	3.09	11.45	408
Averages	**29**	**9.67**	**119.67**	**2.99**	**12.45**	**348.00**



As can be seen from the above data there was no significant impact on total yield.

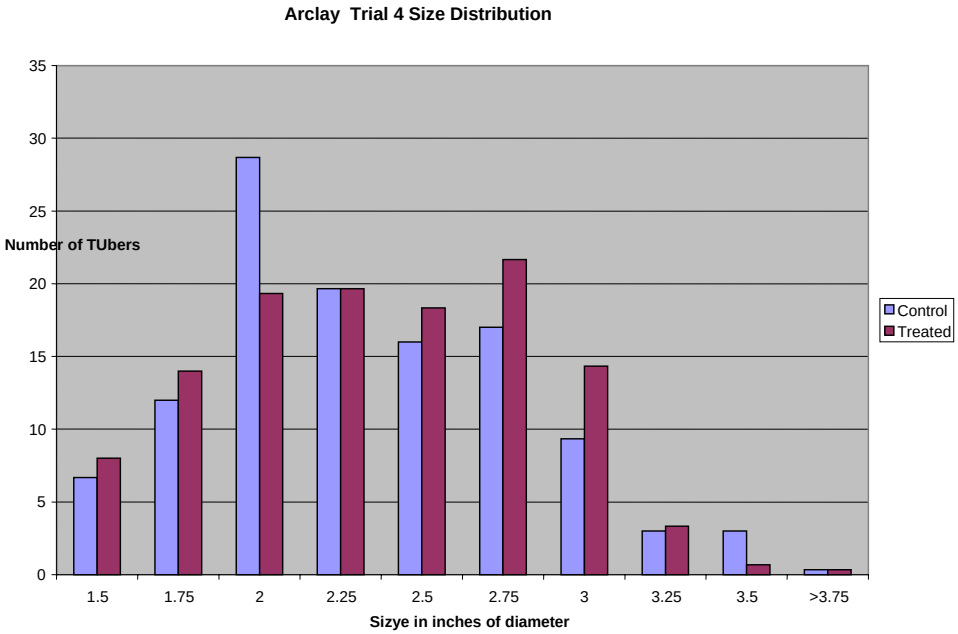
SIZE DISTRIBUTION

Grower Trial 4
Material Tested Arclay
Control product Standard
Variety

Control	**1.5**	**1.75**	**2**	**2.25**	**2.5**	**2.75**	**3**	**3.25**	**3.5**	**>3.75**
Repetition 1	4	9	26	22	15	20	9	3	3	0
2	9	14	29	14	19	15	10	2	4	0
3	7	13	31	23	14	16	9	4	2	1
Averages	**6.67**	**12.00**	**28.67**	**19.67**	**16.00**	**17.00**	**9.33**	**3.00**	**3.00**	**0.33**

SIZING

Treated	**1.5**	**1.75**	**2**	**2.25**	**2.5**	**2.75**	**3**	**3.25**	**3.5**	**>3.75**
Repetition1	8	12	17	14	15	19	16	4	0	**0**
2	9	16	119	22	19	24	14	3	1	1
3	7	14	22	23	21	22	13	3	1	0
Averages	**8.00**	**14.00**	**52.67**	**19.67**	**18.33**	**21.67**	**14.33**	**3.33**	**0.67**	**0.33**



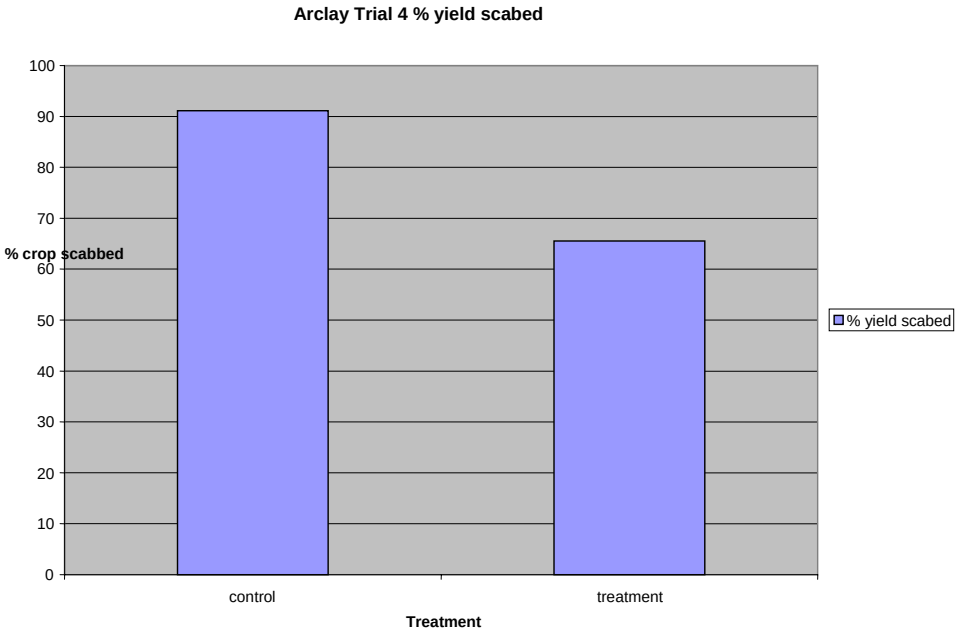
As can be seen from the data above there was no significant impact on the size distribution with the use of this product.

PERCENT YIELD SCABBED

Date	September 27 2006
Project	Arclay
Grower	Trial 4

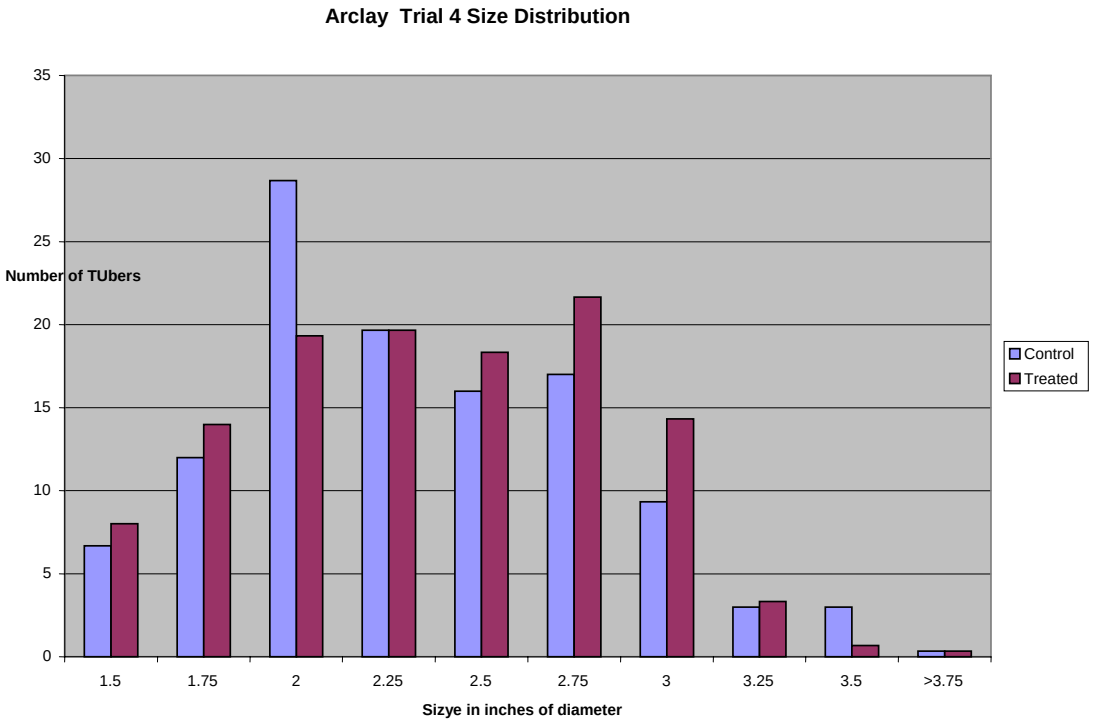
% scab affect on yield

Description	**Total weight**	**Scab Weight**	**% scab**
Control 1	31	27	87.10
control 2	30	27	90.00
Control 3	27	26	96.30
Average			**91.13**
Treatment 1	24	19	79.17
Treatment 2	29	17	58.62
Treatment 3	34	20	58.82
Average			**65.54**



As can be seen with the data above there was a significant impact on the weight of the crop that was discarded due to scab. These numbers indicate that the multiple application of this product may have had an impact on the scab levels in this trial.

SIZE DISTRIBUTION



There did seem to be increase in the number of tuber in part of the marketable range 2.5” – 3”.

LESION AREA INDEX

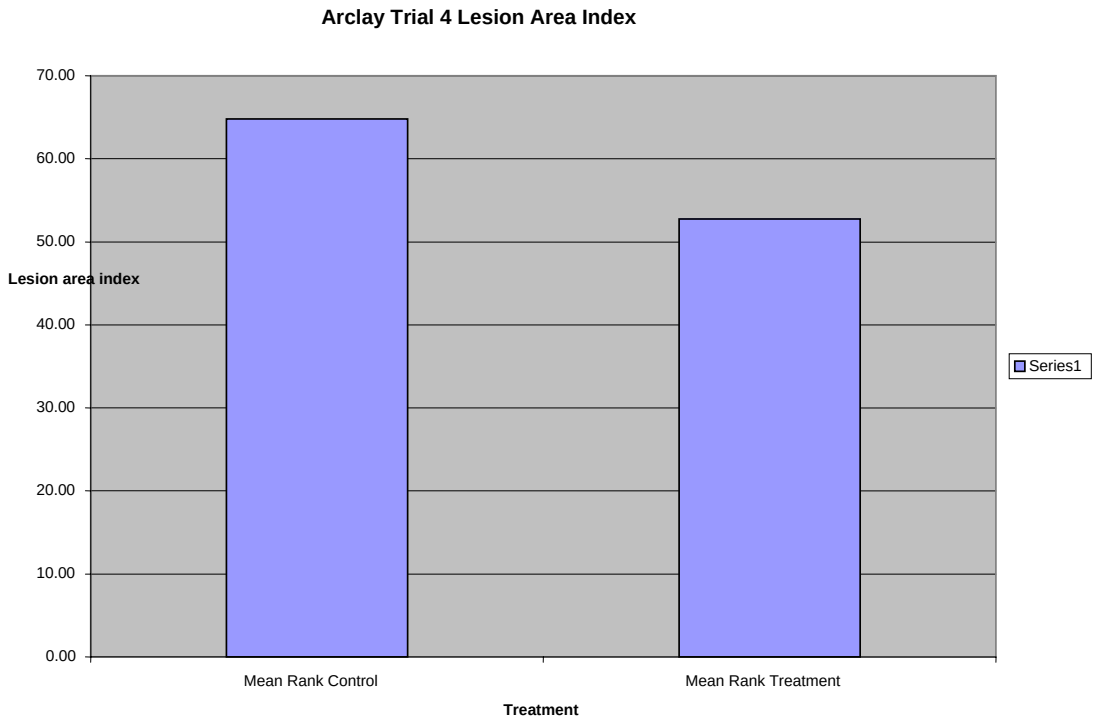
Date September 27 2006
Project Arclay
Grower Trial 4

Lesion area index

Description	Ranking						
	0	1	2	3	4	5	Total Tuber
Control 1	0	9	23	24	27	28	111
Rank	**0.00**	**0.08**	**0.41**	**0.65**	**0.97**	**1.26**	**67.57**
Control 1	0	11	34	39	15	17	116
Rank	**0.00**	**0.09**	**0.59**	**1.01**	**0.52**	**0.73**	**58.79**
Control 1	0	6	29	17	47	21	120
Rank	**0.00**	**0.05**	**0.48**	**0.43**	**1.57**	**0.88**	**68.00**

	0	1	2	3	4	5	Total Tuber
Treatment 1	7	19	26	20	14	19	105
Rank	**0.00**	**0.18**	**0.50**	**0.57**	**0.53**	**0.90**	**53.71**
Treatment 2	8	24	31	31	20	14	128
Rank	**0.00**	**0.19**	**0.48**	**0.73**	**0.63**	**0.55**	**51.41**
Treatment 3	9	15	30	40	20	12	126
Rank	**0.00**	**0.12**	**0.48**	**0.95**	**0.63**	**0.48**	**53.17**

Mean Rank Control **64.79**
Mean Rank Treatment **52.77**



The data above indicates a small but positive effect on the potatoes treated with the Arclay product. This indicates that though there was an infection, the area of the lesions and the area of the tuber infected were less than that of the tubers that were not treated.

LESION TYPE INDEX

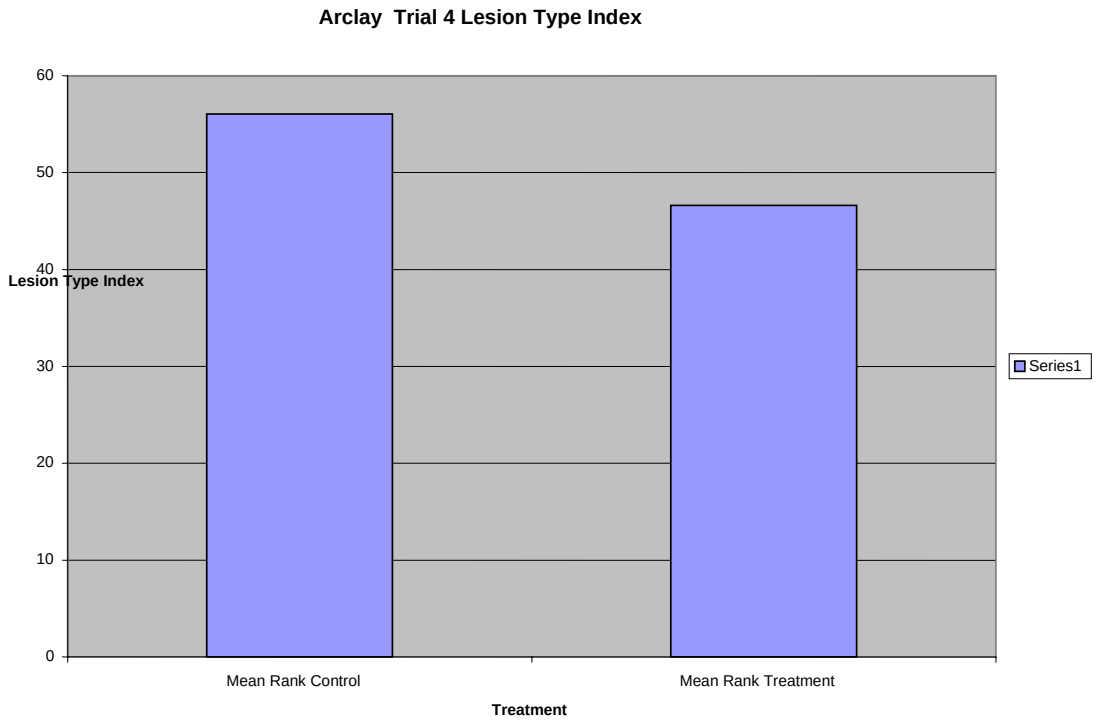
Date September 27 2006
Project Arclay
Grower Name Trial 4

Lesion type index form

Description	Ranking					
	0	1	2	3	4	5	Total Tuber
Control 1	5	12	16	27	34	17	111
Rank	**0.00**	**0.11**	**0.29**	**0.73**	**1.23**	**0.77**	**62.34**
Control 1	11	20	35	29	13	8	116
Rank	**0.00**	**0.17**	**0.60**	**0.75**	**0.45**	**0.34**	**46.38**
Control 1	11	20	16	19	22	32	120
Rank	**0.00**	**0.17**	**0.27**	**0.48**	**0.73**	**1.33**	**59.50**

	0	1	2	3	4	5	Total Tuber
Treatment 1	11	22	27	29	8	8	105
Rank	**0.00**	**0.21**	**0.51**	**0.83**	**0.30**	**0.38**	**44.76**
Treatment 2	14	24	24	31	21	14	128
Rank	**0.00**	**0.19**	**0.38**	**0.73**	**0.66**	**0.55**	**49.84**
Treatment 3	13	36	27	16	23	11	126
Rank	**0.00**	**0.29**	**0.43**	**0.38**	**0.73**	**0.44**	**45.24**

Mean Rank Control **56.07388**
Mean Rank Treatment **46.61458**



As can be seen through the data above there is a difference in the severity of the lesion in the area treated with Arclay as compared to the tubers not treated.

The combination of the scab yield data the slight reduction in both the lesion area and lesion type index may have resulted in what could be termed as a success

The combination of les area covered and less severe lesions has resulted in less of the tubers being culled in the yield evaluation