

Stukenholtz Laboratory, Inc.

ADDISON AVENUE EAST • P.O. BOX 353 • TWIN FALLS, IDAHO 83303-0353
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December 4, 1997

Ken Steelman
JH BIOTECH
4951 Olivas Park Drive
Ventura, CA 93003

RE: BIOZYME and PHOSGARD research on potatoes

Dear Ken:

The following is my report covering the research we conducted this year on Russet Burbank potatoes using BIOZYME and PHOSGARD. Several locations were utilized in the evaluations including Aberdeen, Rupert, Hazelton, and Eden. BIOZYME was applied at the rate of 8 ounces per acre in the liquid starter fertilizer prior to planting. Another 8 ounces was applied foliarly at approximately row closure.

PHOSGARD was applied at three application timings: first when plants were 6-8 inches high, second was just prior to row closure, and the third application was three weeks later. The rate of application was 1 quart per acre each time. Small plot technique was used with plot size being 4 rows by 50 feet long replicated 4 times. Potatoes were harvested by hand using the center rows.

Results and discussion of each experimental site are as follows:

A. KROWN FIELDS #5 and #6 at Aberdeen. Tables 1 and 2 show the initial soil test for the field in which the experiment was conducted. Both soils were medium textured and were strongly calcareous.

Tables 3 and 4 show the plant analysis data for both fields during the entire season. The data shows that both fields had fairly adequate tissue test levels throughout most of the season, especially since the growth period was cut short because of the necessity of killing the vines early.

Table 5 shows the yield and quality of the potatoes grown at the KROWN #5 location. The data indicates that both BIOZYME and PHOSGARD produced increases in yield and quality as follows:

	<u>BIOZYME</u>	<u>PHOSGARD</u>
Total yield, cwt/Ac	8.2	9.6
Salable yield, cwt/Ac	40.3	41.9
U.S. No. Ones yield, cwt/Ac	46.9	51.5
Percent No. Ones	11.6	12.6
Greater than 10 oz Ones, cwt/Ac	30.5	49.3
Specific Gravity	+0.004	+0.003

elman
r 4, 1997

Table 6 shows the yield and quality of potatoes grown at the KROWN #16 location. The data indicates that both BIOZYME and PHOSGARD produced increases in yield and quality as follows;

	<u>BIOZYME</u>	<u>PHOSGARD</u>
Total yield, cwt/Ac	35.2	16.2
Salable yield, cwt/Ac	6.9	24.0
U.S. No. Ones yield, cwt/Ac	3.3	11.8

The addition of BIOZYME failed to improve percent ones, large ones, and had a great deal more undersized (28.3 cwt/Ac). In addition, specific gravity was less in this treatment as compared with the check.

The addition of PHOSGARD improved the amount of large U.S. No. Ones and the specific gravity was slightly larger than the Check treatment.

Table 7 shows the effect of BIOZYME and PHOSGARD on percent internal brown centers and on hollow heart. At both locations, BIOZYME appeared to reduce internal brown centers. The PHOSGARD treatment was not very effective at either of the KROWN locations in reducing internal problems.

Rupert (Remsburg) Location. The field we selected was in the Rupert area and pertinent characteristics of the growing conditions are as follows:

The soil is a slightly calcareous loamy sand with a fairly low supply of exchangeable calcium (see Table 8 & 9). The fertilizer program consisted of:

Broadcast -- 100-130-250 plus 4 lbs Zinc and 2 lbs Boron.
Starter -- 12-80-0 plus
Topdress Prior To Cultivation: 100-50-60
Aerial Application: 150 units N from Urea and 32-0-0.

The field was in wheat in 1996 and the straw was chopped and disced in the fall of 1996. The soil was ripped to a depth of 20 inches in one direction. The broadcast fertilizer was disced into the top six-inches of soil prior to planting. The field was bedded-up with a ripper and starter fertilizer was applied in the bed prior to planting.

season (August). Three foliar nutrient sprays were applied to the entire field to correct slight shortages of zinc, iron, copper, and boron. Table 11 shows the plant analysis for the experimental area on June 18 when the first treatment was initiated. The analysis show a very healthy plot area at the time of treatment application.

Table 12 shows tissue test results on petiole tissue at three sampling times. The data indicates the plots were similar and that PHOSGARD had no consistent effect on nutrient levels.

Table 13 shows the result of PHOSGARD on various yield and quality components of Russet Burbank Potatoes grown at the Rupert location. Three foliar applications of PHOSGARD increased the total yield, saleable yield, U.S. No. One yield, and percent ones. There was no effect upon specific gravity. PHOSGARD also decreased the percentage of tubers with internal brown centers (IBC) and hollow heart.

C. Eden East Location (G. Juchau). The field we selected was in the Eden area and pertinent characteristics of the growing conditions are as follows:

The soil was a calcareous silt loam and potatoes had previously been the crop in 1995 and Verticillium wilt was a definite limiting factor in 1995. The soil test results are enclosed in Table 14. The soil was a little shallow and calcareous and the fertilizer program consisted of:

Broadcast --- 100-150-240 plus 5 lbs Zinc and 2 lbs Boron.
Starter --- 12-80-0 plus 2 qts Humic acid and 2 qts Penetron.
Topdress Prior To Cultivation: 100-50-60-120 S
Aerial Application: 200 units N from Urea and 34-0-0.

The field was in wheat in 1996 and the straw was chopped and disced in the fall of 1996. The soil was ripped to a depth of 20 inches in one direction. The broadcast fertilizer was disced into the top six-inches of soil prior to planting. The field was bedded-up with a ripper and starter fertilizer was applied in the bed prior to planting.

Certified seed was planted with the average seed piece size of 2.25 ounces. The seed was cut and treated with hydrogen peroxide and acetic acid and was dusted with Mancozeb at the rate of about 0.9 lbs per hundred weight.

Ken Steelman
December 4, 1997
page 5

Weed control was excellent as a result of using a three-way mix of metribuzin d.f (0.45 lbs/Acre), Prowl (1.5 pints/Acre), and Eptam (2 qts/Acre).

According to the soil test, nematodes were not a problem and no nematicide was used.

No insecticides were used until the Green Peach Aphids were present in sufficient numbers in July. One application of Monitor controlled them for the remainder of the season.

The field was tissue tested each week throughout the season. Shortages of nutrients were added whenever they were needed via aerial application. Early/late blight materials were used on six separate occasions. The plants were generally quite healthy in appearance until mid-August when they gradually showed evidence of early dying.

A uniform portion of the field was selected using plot sizes of 4 rows by 50 feet, replicated 5 times.

The plots were hand harvested on September 20th and were graded using my standard method. The results are shown in Table 20.

Table 15 shows the plant analysis based on petiole sampling for the field in which this research was conducted. The overall nutrition was fairly adequate for a highly calcareous soil as this one. Phosphorus was marginally adequate whereas potassium was borderline to slightly low especially late in the season (August). Three foliar nutrient sprays were applied to the entire field to correct slight shortages of zinc, iron, manganese, and copper.

Table 15 shows tissue test results on leaf tissue at two sampling times. The July 20 and August 13 sampling dates show the Check and PHOSGARD have very similar levels of mineral nutrition.

Table 17 shows the results of yield and quality of potatoes from three foliar applications of PHOSGARD. It doesn't appear that PHOSGARD increased the yield and quality very significantly at this location. The saleable yield was increased by 12 cwt per acre but this was due primarily to an increase in two's. This soil was marginal potato

Ken Steelman
December 4, 1997
page 6

soil because of its high lime content and low organic matter.

D. Eden North Location (Paul J.). This field was in the Eden area and pertinent characteristics of the growing conditions are as follows:

The soil was a calcareous silt loam and the soil test results are enclosed in Table 18. The soil was quite sandy and tested fairly low in available potassium. The fertilizer program used is as follows:

Broadcast --- 60-110-260 plus 7 lbs Zinc and 2 lbs Boron.
Starter --- 12-80-0 plus 2 qts Humic acid and 2 qts Penetron.
Topdress Prior To Cultivation: 100-50-60-120 S
Aerial Application: 200 units N from Urea and 34-0-0.

The field was in wheat in 1996 and the straw was chopped and disced in the fall of 1996. The soil was ripped to a depth of 20 inches in one direction. The broadcast fertilizer was disced into the top six-inches of soil prior to planting. The field was bedded-up with a ripper and starter fertilizer was applied in the bed prior to planting.

Certified seed was planted with the average seed piece size of 2.25 ounces. The seed was cut and treated with hydrogen peroxide and acetic acid and was dusted with Mancozeb at the rate of about 0.9 lbs per hundred weight.

Weed control was excellent as a result of using a three-way mix of metribuzin d.f (0.45 lbs/Acre), Prowl (1.5 pints/Acre), and Eptam (2 qts/Acre).

According to the soil test, nematodes were not a problem and no nematicide was used.

No insecticides were used until the Green Peach Aphids were present in sufficient numbers in July. One application of Monitor controlled them for the remainder of the season.

The field was tissue tested each week throughout the season. Shortages of nutrients were added whenever they were needed via aerial application. Early/late blight materials were used on six separate occasions. The plants were generally quite healthy in appearance until early September when they gradually showed evidence of

Ken Steelman
December 4, 1997
page 8

also decreased the frequency of IBC and hollow heart. It doesn't appear that PHOSGARD increased the yield and quality at the Eden East location. This field was not considered to be normal quality potato soil and the yields are reflective of this. The soil should have had a great deal of Verticillium wilt inoculum for the PHOSGARD to subdue.

BIOZYME at the Eden West location increased yield and quality quite impressively although it had no effect on specific gravity.

If you have any questions, please don't hesitate to call.

Sincerely,



Dale D. Stuenkel, Ph.D., CCA
Certified Professional Agronomist

DDS/mm

Ken Steelman
December 4, 1997
page 7.

early dying. One hundred pounds per acre of 0-0-60 was applied in mid-July when the tissue tests showed a definite need (see Table 19).

A uniform portion of the field was selected using plot sizes of 4 rows by 50 feet, replicated 4 times. The middle rows were harvested. The treatments were as follows:

BIOZYME at 8 ounces/acre was applied in the liquid fertilizer during the mark-out operation. Another 8 ounces was also applied just before row touching as a foliar spray.

The plots were hand harvested on September 20th and were graded using my standard method. The results are shown in Table 20.

Table 19 shows the plant analysis based on petiole sampling for the field in which this research was conducted. The overall nutrition was quite adequate except for potassium. Even though a total of 320 units K_2O were used, the petiole K dropped down to .6.04% on July 15. As a result, 60 units of K_2O as KCl was flown on by July 18. Petiole K increased gradually to 9.84% in the next three weeks and the effects of serious potassium deficiency had been averted. Three foliar nutrient sprays were applied to the entire field to correct slight shortages of zinc, iron, manganese, copper and boron.

Table 20 shows yield and quality components of the potatoes at harvest time. The data shows that BIOZYME was effective in increasing several factors including total yield, saleable yield, No. One yield and percent No. Ones. There was no effect on specific gravity.

Summary

One of the Aberdeen locations showed that BIOZYME and PHOSGARD produced increases in yield and quality of Russet Burbank potatoes. The other location at Aberdeen produced a much smaller yield increase. BIOZYME appeared to reduce internal brown centers at both locations whereas PHOSGARD was not very effective.

At the Rupert location PHOSGARD increased the yield and quality of Russet Burbank potatoes but did not influence the specific gravity. PHOSGARD

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TWIN FALLS, ID 83303-0353 1-800-759-3050

208/226-7307

KRUCKEBERG, J.P.
3250 HORNBACKER ROAD

3005

Report No. 35339

AMERICAN FALLS ID 83211

Date Received 8/25/96

GROWER: KROWN

Date Reported 8/26/96

SOIL TEST DATA	Sample 1	Sample 2	Sample 1	Sample 2
			SAMPLE IDENTITY	NO. 18 NORTH
			CROP	POTATOES
			YIELD GOAL	
			ACRES	108
			PAST CROP T/Acre	GRAIN 4
			MANURE T/Acre	0
			PREV. APPLIED NUTRIENTS	0
			<u>RECOMMENDATIONS, lbs or Units Actual Nutrients per A</u>	
			NITROGEN.....	50
			P ₂ O ₅ - PHOSPHATE.....	40
			K ₂ O - POTASH.....	90
			CALCIUM.....	0
			MAGNESIUM.....	0
			SULFATE-SULFUR.....	0
			ZINC.....	0
			IRON.....	0
			MANGANESE.....	0
			COPPER.....	0
			BORON.....	0
			ELEMENTAL SULFUR.....	0
			SOIL TEXTURE....	SEE TABLE

RATINGS : VL - Very Low L - Low M - Medium H - High VH - Very High

S A M P L E	ACTUAL AND RECOMMENDED PERCENT OF CEC								RELATION OF SOIL TEXTURE	
	Actual % Potassium	Recommended Potassium	Actual % Calcium	Recommended Calcium	Actual % Magnesium	Recommended Magnesium	Actual % Sodium	Recommended Sodium		
1	5.3	3.0-6.0%	72.0	65-80%	19.3	10-20%	3.1	<3.0%	0-5	Sand
2									5-12	Loam
									12-18	Sand
									18-24	Silt
									24-36	Clay
									36-	Clay

R BOTH: ALSO MARK-OUT OR APPLY WITH PLANTER 20 GAL 10-34-0/1QT ZINC CHELATE/1 QT COPPER CHELATE ON AN ACRE BASIS.
E BOTH: ALSO TOPDRESS PRIOR TO THE LAST CULTIVATION WITH 100 lb FROM 21-0-0.
M BOTH: ALSO EXTRA N IN THE WATER ACCORDING TO PLANT TISSUE TESTS.

Supervised by: Dr. Dale Stukenholtz
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TWIN FALLS, ID 83303-0353 1-800-759-3050

208/226-7307

KRUCKEBERG, J.P.
3250 HORNBACHER ROAD

3005

Report No. 34094

AMERICAN FALLS ID 83211

Date Received 8/13/96

GROWER: KROWN

Date Reported 8/14/96

SOIL TEST DATA	Sample 1	Sample 2	Sample 1	Sample 2
			SAMPLE IDENTITY	5 NORTH
pH.....	8.2	H	CROP	POTATOES
SALTS, mmhos/cm.....	0.6	L	YIELD GOAL	
SODIUM, meq/100g.....	0.2	VL	ACRES	147
CEC, meq/100g.....	10.7	M	PAST CROP T/Acre	GRAIN 4
EXCESS LIME, %.....	9.6	VH	MANURE T/Acre	0
ORGANIC MATTER, %....	1.55	M	PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre....	65	M	RECOMMENDATIONS, lbs or Units Actual Nutrients per	
NITRATE-N, ppm.....	105	VH	NITROGEN.....	100
PHOSPHORUS, ppm.....	18	M	P ₂ O ₅ - PHOSPHATE.....	180
POTASSIUM, ppm.....	140	L	K ₂ O - POTASH.....	225
CALCIUM, meq/100g....	8.1	VH	CALCIUM.....	0
MAGNESIUM, meq/100g..	1.9	H	MAGNESIUM.....	0
SULFATE-S, ppm.....	9	L	SULFATE-SULFUR.....	0
ZINC, ppm.....	2.0	M	ZINC.....	4
IRON, ppm.....	6.2	M	IRON.....	0
MANGANESE, ppm.....	4.5	M	MANGANESE.....	0
COPPER, ppm.....	1.0	M	COPPER.....	0
BORON, ppm.....	0.60	L	BORON.....	2.0
SOIL TEXTURE....	SEE TABLE		ELEMENTAL SULFUR.....	0.

RATINGS : VL - Very Low L - Low M - Medium H - High VH - Very High

SAMPLE	ACTUAL AND RECOMMENDED PERCENT OF CEC								RELATION OF SOIL TEXTURE	
	Actual % Potassium	Recommended Potassium	Actual % Calcium	Recommended Calcium	Actual % Magnesium	Recommended Magnesium	Actual % Sodium	Recommended Sodium		
1	4.4	3.0-6.0%	75.7	65-80%	17.8	10-20%	1.9	<3.0%	0-5	Sand
2									5-12	Loam
									12-18	Sand
									18-24	Silt
									24-36	Clay
									36-	Clay

R BOTH :ALSO MARK-OUT OR APPLY WITH THE PLANTER 20 GAL 10-34-0/1 QT ZINC CHELATE/1 QT COPPER CHELATE ON AN ACRE BASIS.
 E BOTH :ADD EXTRA N IN THE WATER ACCORDING TO PLANT TISSUE TESTS.
 M BOTH :ALSO TOPDRESS PRIOR TO THE LAST CULTIVATION WITH 100 N FROM 21-0-0.
 A BOTH :THIS SOIL SHOULD BENEFIT FROM THE USE OF PENETRON AND HIGH QUALITY HUMIC ACID PRODUCTS.
 R
 K
 S

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STUKENHOLTZ LABORATORY, INC.

P.O. BOX 353 ADDISON AVENUE EAST 208-734-3050 TWIN FALLS, ID 83303-0353 1-800-759-3050

DEALER: JP KRUCKENBERG

GROWER: CROWN FARMS

POTATOES

SL No: 1121

FIELD: 5

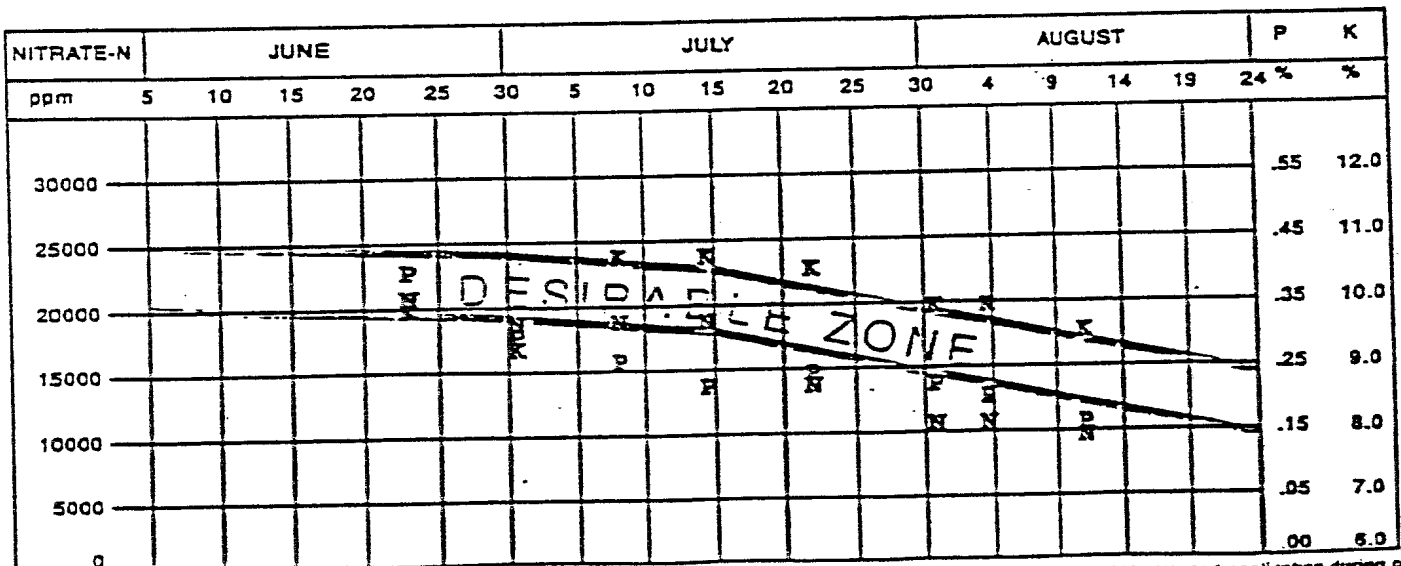
DATE SAMPLED	[1997]	06/23	06/30	07/07	07/14	07/21	07/30	08/04	08/11
Report No.									
Total N, %									
NO ₃ -N, ppm		20500	18700	19000	19100	13900	10500	11000	9800
Phosphorus, %		0.40	0.30	0.26	0.22	0.24	0.23	0.21	0.17
Potassium, %		9.97	9.24	10.67	10.72	10.51	9.91	9.98	9.42
Calcium, %		1.77	1.58	2.45	2.58	2.22	2.02	2.31	2.52
Magnesium, %		0.65	0.45	0.80	0.89	0.70	0.76	0.75	1.02
Sulfur, %		0.27	0.25	0.19	0.19	0.20	0.16	0.27	0.21
Zinc, ppm		57	47	61	73	31	41	38	54
Iron, ppm		190	125	165	165	120	121	120	133
Manganese, ppm		48	45	68	58	53	75	76	95
Copper, ppm		11	10	12	11	9	10	14	17
Boron, ppm		32	32	39	25	31	39	37	30
Soil NO ₃ -N, ppm		26	33	25	23	17	14		
Salts, mmhos/cm		0.6	0.7	0.7	0.7	0.7	0.8		
Sample Date		06/13	06/20	06/27	07/11	07/25	08/08		

RECOMMENDATIONS In-the-water-or Broadcast

Units N	25	25	25	20	25	35	25	20
Units P ₂ O ₅	0	15	15	15	15	15	10	10
Units K ₂ O	0	0-20	0	0	0	0	0	0
Units S	0	0	0	0	0	0	0	0

FOLIAR NUTRIENTS lb/Acre

N	2	2	2	2	2	2	2	2
P ₂ O ₅	1	3	3	4	4	4	4	4
K ₂ O	0	0	0	0	0	2	0	0
S	0	0	0	0	0	0	0	0
Zn	0	0	0	0	0.10	0	0	0
Fe	0.10	0.20	0.10	0.10	0.15	0.15	0.10	0.10
Mn	0.20	0.20	0	0	0	0	0	0
Cu	0	0	0	0	0	0	0	0
B	0.15	0.15	0	0.20	0	0	0	0
Formula No.								



The above safe and effective foliar nutrient spray recommendations are made for inorganic products, use of 10 gallons water per acre, and application during cool parts of the day. Substitutions with organic products and less water/acre may alter the above safe and effective application rates. Plants should not be under stress when foliar nutrients are applied. Do not exceed label rates of any product used to supply above recommendations.

STUKENHOLTZ LABORATORY, INC.

P.O. BOX 153 ADDISON AVENUE EAST 208-734-3050 TWIN FALLS, ID 83303-0353 1-800-759-3050

DEALER: JP KRUCKBERG

GROWER: KROWN FARMS POTATOES SL No: 1123 FIELD: NELSON 16

DATE SAMPLED [1997]	06/23	06/30	07/07	07/14	07/21	07/30	08/04	08/11
Report No.								
Total N, %								
NO ₃ -N, ppm	22000	19200	18400	18100	15900	16100	18000	13700
Phosphorus, %	0.38	0.29	0.25	0.20	0.21	0.21	0.20	0.18
Potassium, %	10.31	10.12	10.00	10.26	8.94	7.91	8.13	7.37
Calcium, %	1.99	1.81	2.33	2.82	2.17	2.12	2.26	2.72
Magnesium, %	0.81	0.60	0.87	1.13	0.79	1.07	0.98	1.17
Sulfur, %	0.26	0.24	0.19	0.08	0.18	0.16	0.20	0.16
Zinc, ppm	55	46	41	35	28	41	34	61
Iron, ppm	190	159	211	116	145	175	154	190
Manganese, ppm	51	41	66	59	51	62	75	106
Copper, ppm	12	14	11	9	11	13	11	15
Boron, ppm	38	30	39	22	27	33	29	32
Soil NO ₃ -N, ppm	43	35	37	28	26	19		
Salts, mmhos/cm	1.1	0.9	0.8	0.9	0.7	1.2		
Sample Date	06/13	06/20	06/27	07/11	07/25	08/08		

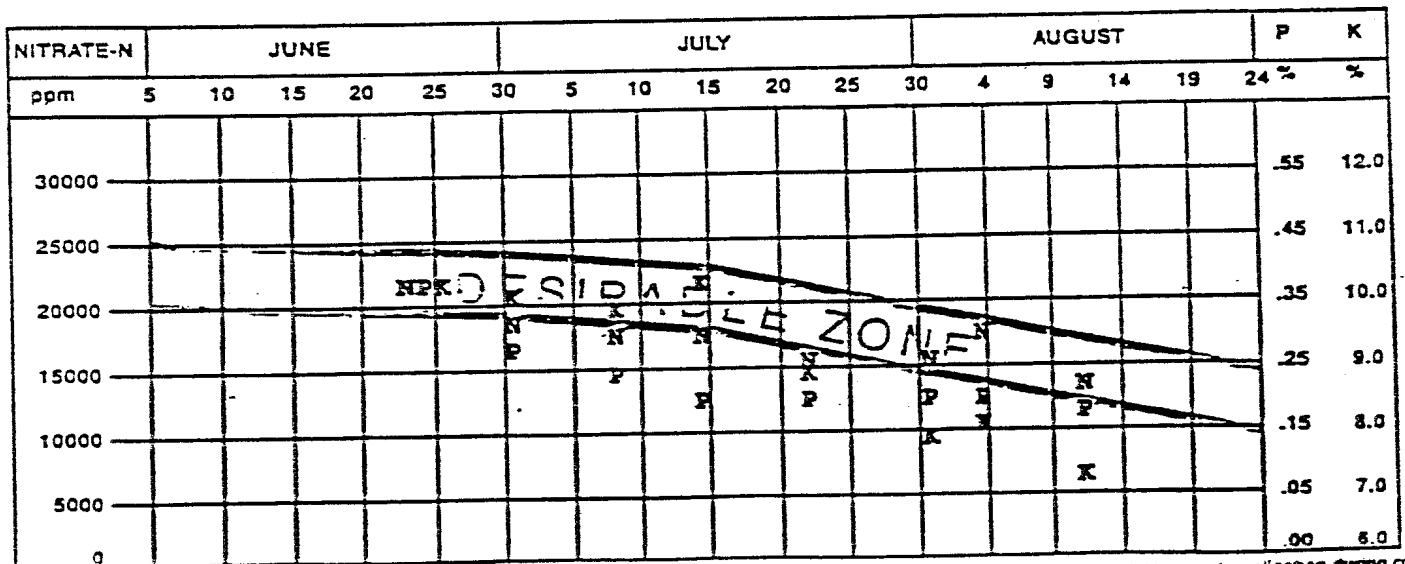
RECOMMENDATIONS In-the-water-or Broadcast

Units N	20	25	25	20	20	15	0	15
Units P ₂ O ₅	0	15	20	20	15	15	10	10
Units K ₂ O	0	0	0	0	0	20	0	0
Units S	0	0	0	20	0	0	0	0

FOLIAR NUTRIENTS lb/Acre

N	2	2	2	2	2	2	2	2
P ₂ O ₅	1	3	4	5	4	4	4	4
K ₂ O	0	0	0	0	0	2	0	1
S	0	0	0	3	0	0	0	0
Zn	0	0	0	0.10	0.20	0	0	0
Fe	0.10	0.10	0	0.15	0.15	0.10	0	0
Mn	0.10	0.20	0	0	0	0	0	0
Cu	0	0	0	0	0	0	0	0
B	0	0.20	0	0.20	0.15	0	0	0

Formula No.



The above safe and effective foliar nutrient spray recommendations are made for inorganic products, use of 10 gallons water per acre, and application during cool parts of the day. Substitutions with organic products and less water/acre may alter the above safe and effective application rates. Plants should not be under stress when foliar nutrients are applied. Do not exceed label rates of any product used to supply above recommendations.

Table 5

Yield and Quality of Russet Burbank potatoes grown in the KROWN #5 field near Aberdeen in 1997.

Treatment	Total Yield cwt/Ac	Saleable Yield cwt/Ac	No. One Yield cwt/Ac	No. One %	One#		Two#		Culls cwt/Ac	Specific Gravity
					>10 oz cwt/Ac	<10 oz cwt/Ac	>10 oz cwt/Ac	<10 oz cwt/Ac		
Check	1	349.8	276.8	262.8	75.1	80.3	182.5	7.0	73.0	1.085
	2	357.4	269.8	233.6	65.4	73.0	160.6	29.2	87.6	
	3	346.8	222.7	211.7	61.0	36.5	175.2	7.0	124.1	
	4	336.8	288.0	215.1	63.9	51.1	164.0	58.4	48.8	
Ave.	347.7	264.3	230.8	66.4	60.2	170.6	25.4	83.4		
BIOZYME	1	379.6	321.2	284.7	75.0	109.5	175.2	21.9	58.4	1.089
	2	313.1	269.3	258.3	82.5	80.3	178.0	7.0	43.8	
	3	383.6	332.5	292.0	76.1	94.9	197.1	36.5	51.1	
	4	347.8	295.8	276.0	79.4	102.2	174.0	14.6	52.0	
Ave.	355.9	304.6	277.7	78.0	96.7	181.0	20.0	51.3		
PHOSGARD	1	342.5	298.7	284.7	83.1	102.2	182.5	7.0	43.8	1.088
	2	375.2	324.1	308.1	82.1	124.1	184.0	9.0	51.1	
	3	353.6	302.5	277.4	78.5	116.8	160.6	14.6	51.1	
	4	358.0	299.6	259.1	72.4	94.9	164.2	36.5	58.4	
Ave.	357.3	306.2	282.3	79.0	109.5	172.8	16.8	51.1		

Table 6

Yield and quality of Russet Burbank potatoes grown in the KROWN #16 field near Aberdeen in 1997.

Treatment	Total Yield cwt/Ac	Saleable Yield cwt/Ac	No. One Yield cwt/Ac	No. One % #	>10 oz One# cwt/Ac	<10 oz One# cwt/Ac	>10 oz Two# cwt/Ac	<10 oz Two# cwt/Ac	Cull# cwt/Ac	Specific Gravity
Check	1	406.4	341.1	261.4	64.3	116.2	145.2	14.5	65.3	1.085
	2	414.1	319.7	319.7	77.2	80.0	203.3	18.2	94.4	
	3	375.1	328.7	306.7	81.8	117.9	188.8	0	46.6	
	4	440.3	367.7	309.6	70.3	120.7	188.9	7.3	72.6	
Ave.	409.0	339.3	290.3	71.0	108.0	181.6	10.0	69.7		
BIOZYME	1	464.6	363.0	290.4	62.5	116.2	174.2	21.8	101.6	1.081
	2	452.8	343.9	300.4	66.3	60.8	239.6	29.0	108.9	
	3	435.7	363.1	312.2	71.6	79.9	232.3	7.3	72.6	
	4	423.9	315.0	271.4	64.0	68.1	203.3	21.8	108.9	
Ave.	444.2	346.2	293.6	66.1	81.2	212.3	20.0	98.0		
PHOSGARD	1	445.3	365.0	299.3	67.2	138.7	160.6	21.9	80.3	1.088
	2	412.8	339.8	296.0	71.7	146.0	150.0	14.6	73.0	
	3	386.9	335.8	292.0	75.5	116.8	175.2	21.9	51.1	
	4	456.0	412.2	321.2	70.4	131.4	189.8	18.0	43.8	
Ave.	425.2	363.2	302.1	71.0	133.2	168.9	19.1	62.0		

Table 7

Effects of BIOZYME and PHOSGARD on internal brown centers and hollow heart at the KROWN #5 and #16 locations in 1997.

<u>Treatment</u>	<u>Internal Brown Centers</u>	<u>Hollow Heart</u>	<u>No Internal Defects</u>
KROWN #16	%	%	%
Check	5.7	10.0	84.3
BIOZYME	2.9	2.9	94.2
PHOSGARD	13.3	5.0	81.7

<u>Treatment</u>	<u>Internal Brown Centers</u>	<u>Hollow Heart</u>	<u>No Internal Defects</u>
KROWN #5	%	%	%
Check	12.5	2.8	84.7
BIOZYME	5.7	2.9	91.4
PHOSGARD	12.5	5.4	82.1

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208/678-7490

HELMS, TERRY
46 S 200 W

3003

Report No. 45228

BURLEY ID 83318

Date Received 2/18/97

GROWER: DUNROAMIN FARMS

Date Reported 2/19/97

SOIL TEST DATA	Sample 1	Sample 2	Sample 1	Sample 2
			SAMPLE IDENTITY	MCMILLEN
pH.....	7.3	M	CROP	POTATOES
SALTS, mmhos/cm.....	0.5	VL	YIELD GOAL	500 CWT
SODIUM, meq/100g.....	0.3	L	ACRES	37
CEC, meq/100g.....	6.3	L	PAST CROP T/Acre	GRAIN 3
EXCESS LIME, %.....	0.6	L	MANURE T/Acre	0
ORGANIC MATTER, %.....	1.00	L	PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre....	40	L	RECOMMENDATIONS, lbs or Units Actual Nutrients per Ac	
NITRATE-N, ppm.....	4	VL	NITROGEN.....	100
PHOSPEORUS, ppm.....	17	M	P ₂ O ₅ - PHOSPHATE.....	130
POTASSIUM, ppm.....	125	L	K ₂ O - POTASH.....	250
CALCIUM, meq/100g....	3.4	L	CALCIUM.....	0
MAGNESIUM, meq/100g..	2.2	VH	MAGNESIUM.....	0
SULFATE-S, ppm.....	4	VL	SULFATE-SULFUR.....	0
ZINC, ppm.....	1.7	M	ZINC.....	4
IRON, ppm.....	29.0	H	IRON.....	0
MANGANESE, ppm.....	13.6	VH	MANGANESE.....	0
COPPER, ppm.....	0.5	L	COPPER.....	0
BORON, ppm.....	0.65	M	BORON.....	2.0
SOIL TEXTURE....	SEE TABLE		ELEMENTAL SULFUR.....	0

RATINGS : VL - Very Low L - Low M - Medium H - High VH - Very High

SAMPLE #	ACTUAL AND RECOMMENDED PERCENT OF CEC								RELATION OF CEC TO SOIL TEXTURE	
	Actual % Potassium	Recommended Potassium	Actual % Calcium	Recommended Calcium	Actual % Magnesium	Recommended Magnesium	Actual % Sodium	Recommended Sodium		
1	6.6	3.0-6.0%	54.0	65-80%	34.9	10-20%	4.8	<3.0%	0-5	Sand
2									5-12	Loamy
									12-18	Sandy
									18-24	Silt
									24-36	Clay
									36+	Clay

R ALSO USE 20 GAL/ACRE OF EPO'S LIQUID STARTER WITH ONE POUND ACTUAL ZINC. 0.5% ACTUAL COPPER PER ACRE.
E CROP1: ALSO TOPDRESS PRIOR TO THE LAST CULTIVATION WITH 100-50-60.
M CROP1: ADD EXTRA N IN THE WATER ACCORDING TO PLANT TISSUE TESTS.

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Supervised by: Dr. Dale Stukenholtz

STUKENHOLTZ LABORATORY, INC.

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208/734-3050

STUKENHOLTZ, DALE 3001
2924 ADDISON AVENUE EAST
P.O. BOX 353
TWIN FALLS ID 83303-0353

Report No. 59532
Date Received 6/18/97
Date Reported 6/19/97

GROWER: REMSBURG RESEARCH

SOIL TEST DATA	Sample 1	Sample 2	Sample 1	Sample 2
			SAMPLE IDENTITY	NONE GIVEN
pH.....	7.0	M	CROP	POTATOES
SALTS, mmhos/cm.....	1.1	L	YIELD GOAL	NG
SODIUM, meq/100g.....	0.3	L	ACRES	NG
CEC, meq/100g.....	7.2	L	PAST CROP T/Acre	NONE GIVEN
EXCESS LIME, ‰.....	0.1	VL	MANURE T/Acre	0
ORGANIC MATTER, ‰.....	0.80	L	PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre...	35	L	RECOMMENDATIONS, lbs or Units Actual Nutrients per A	
NITRATE-N, ppm.....	8	L	NITROGEN.....	
PHOSPHORUS, ppm.....	40	H	P ₂ O ₅ - PHOSPHATE.....	
POTASSIUM, ppm.....	140	L	K ₂ O - POTASH.....	
CALCIUM, meq/100g....	4.6	M	CALCIUM.....	
MAGNESIUM, meq/100g..	1.8	VH	MAGNESIUM.....	
SULFATE-S, ppm.....	15	M	SULFATE-SULFUR.....	
ZINC, ppm.....	2.7	H	ZINC.....	
IRON, ppm.....	7.6	M	IRON.....	
MANGANESE, ppm.....	16.4	VH	MANGANESE.....	
COPPER, ppm.....	0.8	M	COPPER.....	
BORON, ppm.....	0.50	L	BORON.....	
SOIL TEXTURE....	SEE TABLE		ELEMENTAL SULFUR.....	

RATINGS : VL - Very Low L - Low M - Medium H - High VH - Very High

S A M P L E	ACTUAL AND RECOMMENDED PERCENT OF CEC								RELATION OF SOIL TEXTURE	
	Actual % Potassium	Recommended Potassium	Actual % Calcium	Recommended Calcium	Actual % Magnesium	Recommended Magnesium	Actual % Sodium	Recommended Sodium	0-5	Sand
1	6.5	3.0-6.0%	63.9	65-80%	25.0	10-20%	4.2	<3.0%	5-12	Loam
2									12-18	Sand
									18-24	Silt
									24-36	Clay
									36-	Clay

R
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STUKENHOLTZ LABORATORY, INC.

P.O. BOX 153 ADDISON AVENUE EAST 208-734-3050 TWIN FALLS, ID 83303-0353 1-800-759-3050

DEALER: TERRY HELMS

GROWER: REMSBERG, JOHN

POTATOES

SL No: 621

FIELD: MCMILLAN

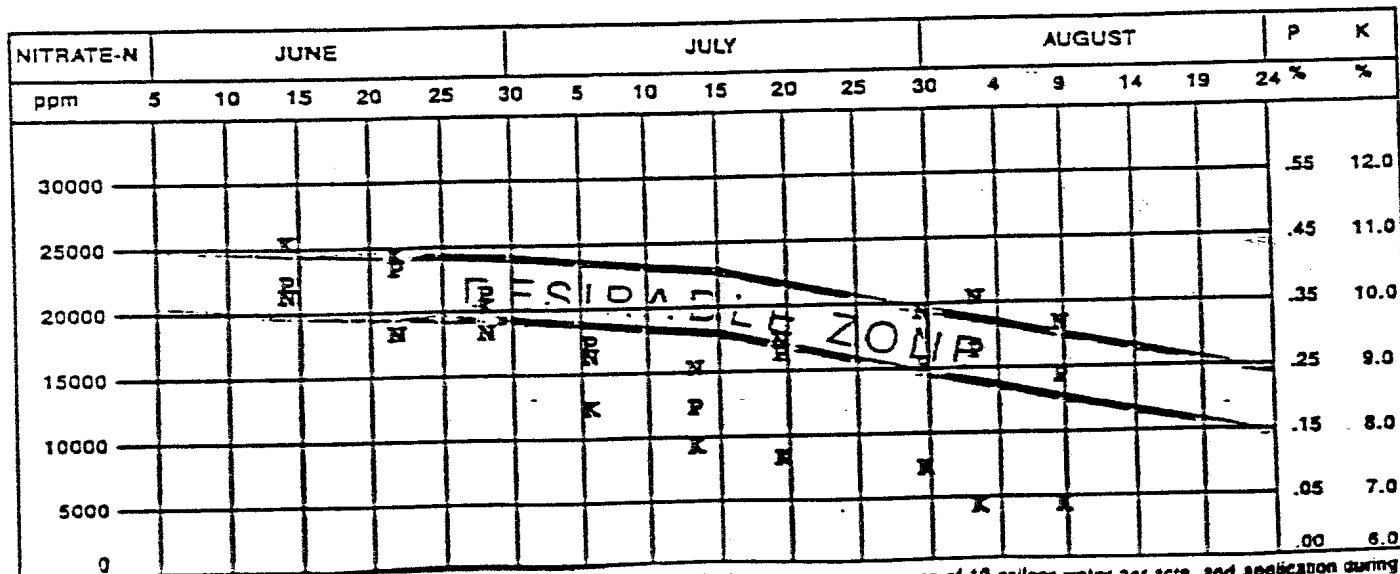
DATE SAMPLED	[1997]	06/14	06/21	06/28	07/05	07/12	07/19	07/29	08/02	08/09
Report No.										
Total N, %										
NO ₃ -N, ppm		21600	19400	18900	16800	16300	18400	20100	20900	19100
Phosphorus, %		0.41	0.43	0.38	0.31	0.21	0.29	0.27	0.28	0.25
Potassium, %		11.17	10.83	10.04	8.45	7.85	7.63	7.59	6.83	6.95
Calcium, %		1.41	1.41	1.54	1.92	2.21	2.05	2.48	2.30	2.12
Magnesium, %		0.66	0.69	0.82	1.04	1.20	1.13	1.25	1.46	1.39
Sulfur, %		0.25	0.26	0.23	0.20	0.08	0.16	0.10	0.14	0.12
Zinc, ppm		67	46	58	48	54	58	30	22	27
Iron, ppm		160	127	122	105	154	103	117	106	90
Manganese, ppm		130	152	194	227	195	111	109	102	174
Copper, ppm		15	9	11	10	11	9	11	11	11
Boron, ppm		31	31	30	27	24	33	34	38	23
Soil NO ₃ -N, ppm		12	17	7	21					
Salts, mmhos/cm		0.7	0.6	0.8	1.0					
Sample Date		06/06	06/12	06/26	07/10					

RECOMMENDATIONS In-the-water-or Broadcast

Units N	20	25	25	35	30	20	15	0	0
Units P ₂ O ₅	0	0	0	10	15	10	10	0	0
Units K ₂ O	0	0	0	40	40	40	40	40	20
Units S	0	0	0	0	20	0	10	0	5

FOLIAR NUTRIENTS lb/Acre

N	2	2	2	2	2	2	2	2	2
P ₂ O ₅	0	0	1	3	4	3	3	1	2
K ₂ O	0	0	0	1	2	2	2	2	1
S	0	0	0	0	3	0	2	0	1
Zn	0	0	0	0	0	0	0.20	0.10	0
Fe	0.10	0.20	0.20	0.20	0.10	0.15	0.15	0.10	0.15
Mn	0	0	0	0	0	0	0	0	0
Cu	0	0	0	0	0	0	0	0	0
B	0.15	0.15	0.20	0.20	0.20	0	0	0	0.10
Formula No.									



The above safe and effective foliar nutrient spray recommendations are made for inorganic products, use of 10 gallons water per acre, and application during cool parts of the day. Substitutions with organic products and less water/acre may alter the above safe and effective application rates. Plants should not be under stress when applied. Do not exceed label rates of any product used to supply above recommendations.

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STUKENHOLTZ, DALE
2924 ADDISON AVENUE EAST
P.O. BOX 353
TWIN FALLS ID 83303-0353

3001

Report Number: 59533
Date Received: 6/18/97
Date Reported: 6/19/97

208/734-3050

Grower: REMSBURG RESEARCH

TISSUE TEST DATA

PLANT NUTRIENT RECOMMENDATIONS

Crop	RESULTS		Topdress or Water Application	Nutrient	Foliar Application
	POTATOES	SUFFICIENCY RANGE			
Field	NONE GIVEN				
Total N, %					
Nitrate-N, ppm	18600	20000-25000	0	N	0
Phosphorus, %	0.41	0.40-0.50	0	P ₂ O ₅	0
Potassium, %	9.18	10.00-14.00	0	K ₂ O	0
Calcium, %	1.20	0.80-1.80	0	Ca	0
Magnesium, %	0.53	0.30-0.70	0	Mg	0
Sulfur, %	0.24	0.16-0.30	0	S	0
Zinc, ppm	46	40-80	0	Zn	0
Iron, ppm	221	150-250	0	Fe	0
Manganese, ppm	124	60-90	0	Mn	0
Copper, ppm	15	8-15	0	Cu	0
Boron, ppm	32	31-50	0	B	0

REMARKS:

Supervised by: Dr. Dale Stukenholtz

The above foliar nutrient spray recommendations are made for inorganic products, use of 10 gallons water per acre and application during the cool parts of the day. Substitution with organic products and less water per acre may alter the above safe and effective application rates. Plants should not be under stress when foliar nutrients are applied. Do not exceed label rates of product used to supply above recommendations.

Table 12

Potato petiole analysis of the Rupert location taken on July 13, August 6, and August 17.

	July 13		August 6		August 17	
	<u>Check</u>	<u>PHOSGUARD</u>	<u>Check</u>	<u>PHOSGUARD</u>	<u>Check</u>	<u>PHOSGUARD</u>
NO ₃ -N, ppm	20100	19200	13500	14200	15000	16100
P, %	0.27	0.24	0.26	0.24	0.24	0.23
K, %	9.25	8.84	5.22	6.07	6.24	5.89
Ca, %	2.02	2.34	1.95	2.30	1.93	2.00
Mg, %	1.09	1.25	1.09	1.27	1.10	1.01
S, %	0.16	0.17	0.16	0.16	0.17	0.19
Zn, ppm	48	42	34	38	19	23
Fe, ppm	122	101	125	125	101	96
Mn, ppm	160	213	239	272	179	222
Cu, ppm	10	10	9	9	9	8
B, ppm	28	29	33	34	38	33

Table 13

Yield and quality of Russet Burbank potatoes grown near Rupert in 1997.

Treatment	Total Yield cwt/Ac	Saleable Yield cwt/Ac	No. One Yield cwt/Ac	No. One %	One		Two		Culls cwt/Ac	Specific Gravity
					>10 oz cwt/Ac	<10 oz cwt/Ac	>10 oz cwt/Ac	<10 oz cwt/Ac		
Check	1	593.8	507.9	499.9	84.2	140.6	359.3	8.0	0	85.9
	2	589.2	448.6	425.5	72.2	208.0	208.0	23.1	0	140.6
	3	515.2	398.1	382.7	74.3	109.3	273.4	15.4	15.0	117.2
	4	547.1	453.4	445.4	81.4	125.0	320.4	8.0	0	93.7
Ave.	565.0	455.6	438.3	77.6	128.0	310.2	13.6	3.75	109.4	1.083
PHOSGARD	1	646.1	553.8	511.2	79.1	191.7	319.5	42.6	0	92.3
	2	514.7	426.0	418.9	81.3	149.1	269.8	7.1	0	88.7
	3	665.6	580.4	575.1	86.4	170.4	404.7	5.3	0	85.2
	4	717.3	646.3	639.3	89.1	262.7	376.3	7.0	0	71.0
Ave.	635.9	551.5	536.0	84.3	193.4	342.6	15.5	0	84.3	1.084
Treatment	Tubers with IBC		Tubers with Cavities		Tubers without Defects					
	17.0 %	27.7 %	55.3 %							
PHOSGARD	12.5 %	6.3 %	81.2 %							

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208/678-7490

HELMS, TERRY
46 S 200 W

3003

Report No. 86841

BURLEY ID 83318

Date Received 11/26/97

GROWER: LOCKWOOD FARMS

Date Reported 11/27/97

SOIL TEST DATA :	Sample 1	Sample 2	Sample 1	Sample 2
			SAMPLE IDENTITY	GJ-5
pH.....	8.4	H	CROP	POTATOES
SALTS, mmhos/cm.....	0.5	VL	YIELD GOAL	
SODIUM, meq/100g.....	0.3	VL	ACRES	31
CEC, meq/100g.....	20	H	PAST CROP T/Acre	GRAIN 3
EXCESS LIME, %.....	8.5	H	MANURE T/Acre	0
ORGANIC MATTER, %....	1.45	M	PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre...	60	M	<u>RECOMMENDATIONS, lbs or Units Actual Nutrients per Ac</u>	
NITRATE-N, ppm.....	10	L	NITROGEN.....	100
PHOSPHORUS, ppm.....	15	M	P ₂ O ₅ - PHOSPHATE.....	150
POTASSIUM, ppm.....	75	L	K ₂ O - POTASH.....	240
CALCIUM, meq/100g....	16.5	VH	CALCIUM.....	0
MAGNESIUM, meq/100g..	2.9	H	MAGNESIUM.....	0
SULFATE-S, ppm.....	8	L	SULFATE-SULFUR.....	0
ZINC, ppm.....	2.0	M	ZINC.....	5
IRON, ppm.....	6.2	M	IRON.....	0
MANGANESE, ppm.....	4.0	M	MANGANESE.....	0
COPPER, ppm.....	1.2	M	COPPER.....	0
BORON, ppm.....	0.65	M	BORON.....	1.5
SOIL TEXTURE....	SEE TABLE		ELEMENTAL SULFUR.....	0

RATINGS :		VL - Very Low	L - Low	M - Medium	H - High	VH - Very High		RELATION OF CE SOIL TEXTURE		
S A M P L E	ACTUAL AND RECOMMENDED PERCENT OF CEC									
	Actual % Potassium	Recommended Potassium	Actual % Calcium	Recommended Calcium	Actual % Magnesium	Recommended Magnesium	Actual % Sodium	Recommended Sodium	0-5	Sand
	1.3	3.0-6.0%	82.5	65-80%	14.5	10-20%	1.5	<3.0%	5-12	Loamy
									12-18	Sandy
									18-24	SILT L
									24-36	Clay L
									36+	Clay

R BOTH: ALSO MARK-OUT OR APPLY WITH THE PLANTER 20 GAL 10-34-0/1 QT ZINC CHELATE/1 QT COPPER CHELATE ON AN ACRE BASIS.
E BOTH: ALSO TOPDRESS PRIOR TO THE LAST CULTIVATION WITH 100-50-60.
M BOTH: THIS SOIL SHOULD BENEFIT FROM THE USE OF PENETRON AND HIGH QUALITY HUMIC ACID PRODUCTS.
A BOTH: ADD EXTRA N IN THE WATER ACCORDING TO PLANT TISSUE TESTS.
R
K
S

STUKENHOLTZ LABORATORY, INC.

P.O. BOX 353 ADDISON AVENUE EAST 208-734-3050 TWIN FALLS, ID 83303-0353 1-800-759-3050

DEALER: TERRY HELMS

GROWER: LOCKWOOD FARMS

POTATOES

SL No: 501

FIELD: GJ-5

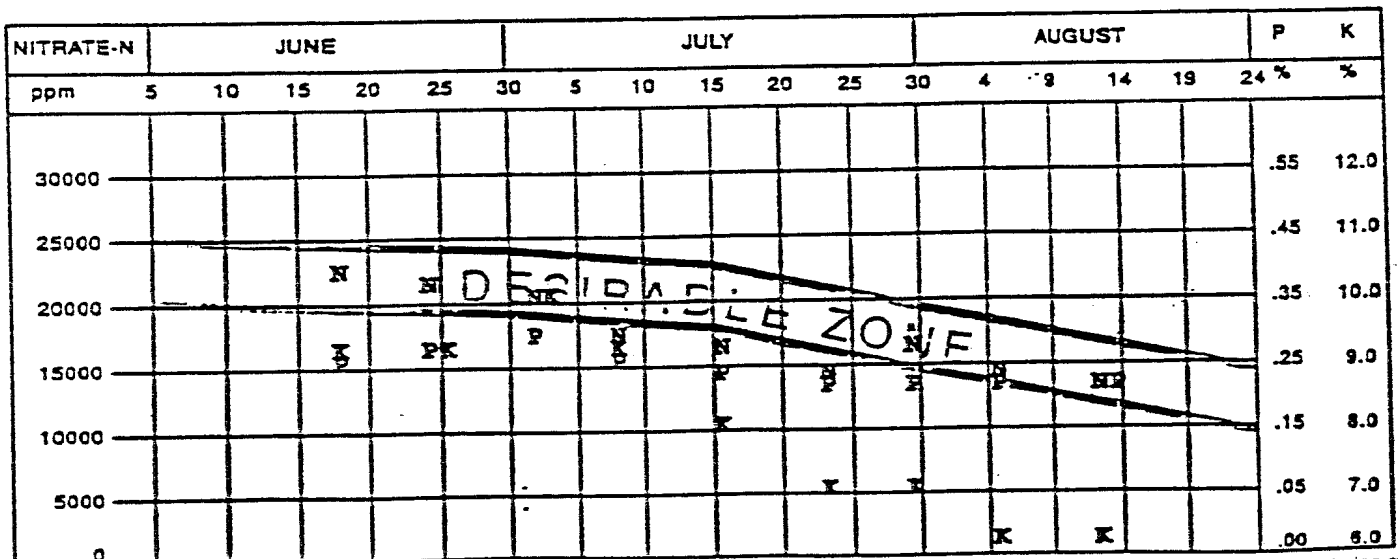
DATE SAMPLED	[1997]	06/17	06/24	07/01	07/08	07/15	07/22	07/29	08/05	08/12
Report No.										
Total N, %										
NO ₃ -N, ppm		22600	21600	20500	18000	17400	14600	17200	14900	13600
Phosphorus, %		0.26	0.29	0.31	0.26	0.25	0.23	0.23	0.22	0.22
Potassium, %		9.29	9.40	10.15	9.35	8.06	7.12	7.17	6.33	6.29
Calcium, %		2.70	2.73	1.98	2.43	2.42	2.20	2.58	2.03	2.13
Magnesium, %		1.09	1.25	0.81	1.10	1.15	0.98	1.15	1.11	1.17
Sulfur, %		0.20	0.22	0.21	0.22	0.15	0.16	0.20	0.20	0.16
Zinc, ppm		32	39	59	44	33	40	38	29	24
Iron, ppm		439	164	215	146	107	108	124	120	162
Manganese, ppm		49	42	64	70	42	59	44	50	46
Copper, ppm		12	7	10	13	11	14	11	13	11
Boron, ppm		29	32	34	31	30	29	27	25	25
Soil NO ₃ -N, ppm		36	33	33	25	35	12			
Salts, mmhos/cm		0.4	0.8	1.3	0.7	0.8	0.7			
Sample Date		06/06	06/14	06/28	07/12	07/26	08/09			

RECOMMENDATIONS In-the-water-or Broadcast

Units N	15	20	25	35	30	25	20	15	15
Units P ₂ O ₅	15	15	10	15	15	15	15	0	0
Units K ₂ O	0-20	0-20	0	0-20	40	40	40	40	40
Units S	0	0	0	0	0	0	0	0	0

FOLIAR NUTRIENTS lb/Acre

N	2	2	2	2	2	2	2	2	2
P ₂ O ₅	3	3	2	3	4	4	4	2	2
K ₂ O	0	0	0	0	1	2	2	2	2
S	0	0	0	0	1	0	0	0	0
Zn	0.20	0.10	0	0	0.10	0	0	0	0.10
Fe	0	0.10	0	0.20	0.15	0.15	0.15	0.10	0
Mn	0.20	0.20	0	0	0.10	0	0.10	0	0
Cu	0	0.05	0	0	0	0	0	0	0
B	0.20	0.15	0.15	0.15	0.15	0.15	0.20	0.10	0.10
Formula No.									



The above safe and effective foliar nutrient spray recommendations are made for inorganic products, use of 10 gallons water per acre, and application during cool parts of the day. Substitutions with organic products and less water/acre may alter the above safe and effective application rates. Plants should not be under stress when foliar nutrients are applied. Do not exceed label rates of any product used to supply above recommendations.

Table 16

Potato petiole analysis of the Rupert location taken on July 20 and on August 13.

	July 20		August 13	
	<u>Check</u>	<u>PHOSGUARD</u>	<u>Check</u>	<u>PHOSGUARD</u>
Nitrate-N, ppm	4600	4650	5000	5200
Total P, %	0.25	0.25	0.24	0.24
Total K, %	4.10	4.15	4.29	4.98
Total Ca, %	2.75	2.65	2.16	2.30
Total Mg, %	1.12	1.18	0.92	0.99
Total S, %	0.24	0.26	0.18	0.19
Total Zn, ppm	43	41	27	28
Total Fe, ppm	170	175	172	165
Total Mn, ppm	81	79	76	72
Cu, ppm	51	49	12	11
B, ppm	64	62	62	64

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TWIN FALLS, ID 83303-0353 1-800-759-3050

208/678-7490

HELMS, TERRY
46 S 200 W

3003

Report No. 86841

BURLEY ID 83318

Date Received 11/26/97

GROWER: LOCKWOOD FARMS

Date Reported 11/27/97

SOIL TEST DATA	Sample 1	Sample 2	Sample 1	Sample 2
			SAMPLE IDENTITY	PJ-2
PH.....	8.4	H	CROP	POTATOES
SALTS, mmhos/cm.....	0.6	L	YIELD GOAL	
SODIUM, meq/100g.....	0.2	VL	ACRES	70
CEC, meq/100g.....	14.3	M	PAST CROP T/Acre	ALFALFA
EXCESS LIME, %.....	1.9	M	MANURE T/Acre	0
ORGANIC MATTER, %.....	1.00	L	PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre... 40	L		<u>RECOMMENDATIONS, lbs or Units Actual Nutrients per Ac</u>	
NITRATE-N, ppm..... 6	L		NITROGEN.....	60
PHOSPHORUS, ppm..... 14	M		P ₂ O ₅ - PHOSPHATE.....	110
POTASSIUM, ppm..... 60	VL		K ₂ O - POTASH.....	260
CALCIUM, meq/100g.... 11.8	VE		CALCIUM.....	0
MAGNESIUM, meq/100g.. 2.1	H		MAGNESIUM.....	0
SULFATE-S, ppm..... 6	L		SULFATE-SULFUR.....	0
ZINC, ppm..... 1.6	M		ZINC.....	7
IRON, ppm..... 8.0	M		IRON.....	0
MANGANESE, ppm..... 5.2	H		MANGANESE.....	0
COPPER, ppm..... 1.1	M		COPPER.....	0
BORON, ppm..... 0.55	L		BORON.....	2.0
SOIL TEXTURE.... SEE TABLE			ELEMENTAL SULFUR.....	0

RATINGS :	VL - Very Low	L - Low	M - Medium	H - High	VE - Very High					
SAMPLE	<u>ACTUAL AND RECOMMENDED PERCENT OF CEC</u>							<u>RELATION OF CEC TO SOIL TEXTURE</u>		
	Actual % Potassium	Recommended Potassium	Actual % Calcium	Recommended Calcium	Actual % Magnesium	Recommended Magnesium	Actual % Sodium	Recommended Sodium	0-5 Sand	
	1	1.4	3.0-6.0%	82.5	65-80%	14.7	10-20%	1.4	<3.0%	5-12 Loamy
	2									12-18 Sandy
									18-24 Silt L	
									24-36 Clay L	
									36+ Clay	

R BOTH :ALSO MARK-OUT OR APPLY WITH THE PLANTER 20 GAL 10-34-0/1 QT ZINC CHELATE/1 QT COPPER CHELATE ON AN ACRE BASIS.
 E BOTH :ALSO TOPDRESS PRIOR TO THE LAST CULTIVATION WITH 100-50-60.
 M BOTH :THIS SOIL SHOULD BENEFIT FROM THE USE OF PENETRAN AND HIGH QUALITY HUMIC ACID PRODUCTS.
 A BOTH: ADD EXTRA N IN THE WATER ACCORDING TO PLANT TISSUE TESTS.
 R
 K
 S

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STUKENHOLTZ LABORATORY, INC.

P.O. BOX 353 ADDISON AVENUE EAST 208-734-3050 TWIN FALLS, ID 83303-0353 1-800-759-3850

DEALER: TERRY HELMS

GROWER: LOCKWOOD FARMS

POTATOES

SL No: 500

FIELD: PJ-2

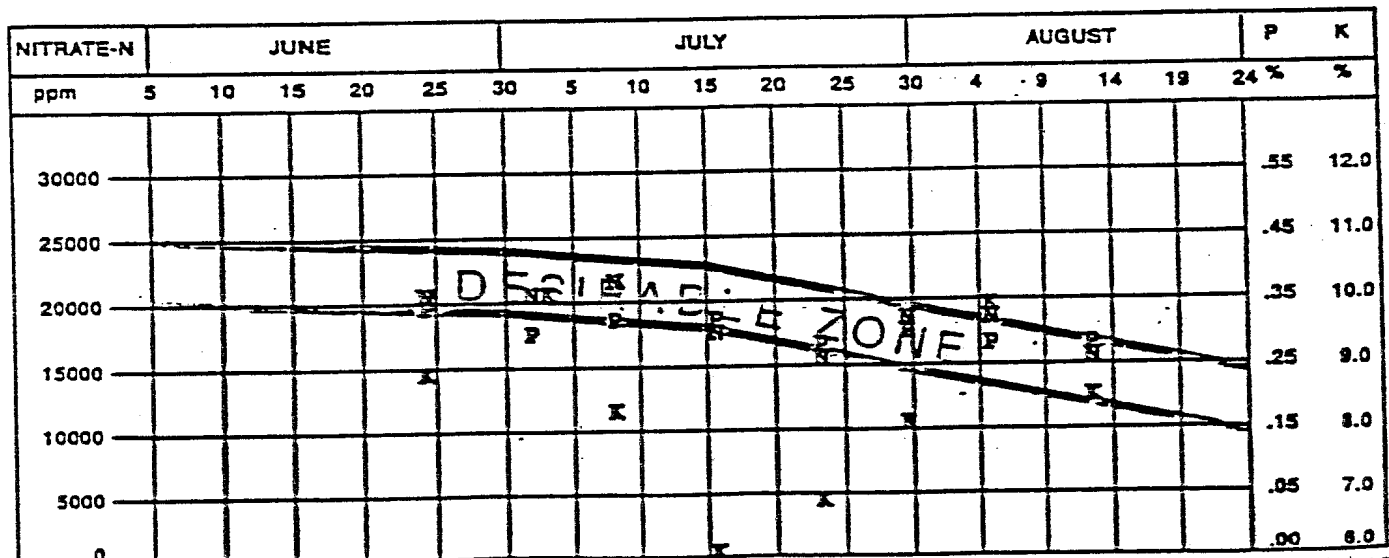
DATE SAMPLED	[1997]	06/24	07/01	07/08	07/15	07/22	07/29	08/05	08/12
Report No.									
Total N, %									
NO ₃ -N, ppm	21000	21100	21900	18300	15900	19400	19300	15800	
Phosphorus, %	0.35	0.31	0.33	0.32	0.28	0.30	0.29	0.29	
Potassium, %	8.95	10.01	8.25	6.04	6.93	8.18	9.84	8.41	
Calcium, %	2.49	2.38	2.12	1.58	1.98	1.96	1.96	1.80	
Magnesium, %	1.01	0.92	1.00	0.69	0.80	0.90	1.00	1.96	
Sulfur, %	0.23	0.25	0.27	0.18	0.16	0.24	0.16	0.12	
Zinc, ppm	56	74	64	33	51	34	32	16	
Iron, ppm	207	182	146	108	141	108	131	149	
Manganese, ppm	53	56	71	43	48	51	43	88	
Copper, ppm	15	12	12	11	11	11	14	17	
Boron, ppm	31	30	29	31	35	29	27	29	
Soil NO ₃ -N, ppm	35	41	45	39	33	23			
Salts, mmhos/cm	0.6	0.8	1.2	1.0	0.9	0.8			
Sample Date	06/06	06/14	06/28	07/12	07/26	08/09			

RECOMMENDATIONS In-the-water-or Broadcast

Units N	25	20	20	20	20	15	0	0
Units P ₂ O ₅	10	10	10	0	10	0	0	0
Units K ₂ O	0-20	0	30	60	40	0	0	0
Units S	0	0	0	0	0	0	0	5

FOLIAR NUTRIENTS lb/Acre

N	2	2	2	2	2	2	2	2
P ₂ O ₅	2	2	2	2	3	3	1	1
K ₂ O	0	0	2	3	2	1	0	0
S	0	0	0	0	0	0	0	1
Zn	0	0	0	0.10	0	0.10	0	0.20
Fe	0	0.10	0.20	0.15	0.15	0.15	0.10	0.10
Mn	0.10	0.10	0	0.10	0.10	0	0	0
Cu	0	0	0	0	0	0	0	0
B	0.15	0.20	0.20	0	0	0.15	0	0
Formula No.								



The above safe and effective foliar nutrient spray recommendations are made for inorganic products, use of 10 gallons water per acre, and application during cool parts of the day. Substitutions with organic products and less water/acre may alter the above safe and effective application rates. Plants should not be under stress when foliar nutrients are applied. Do not exceed label rates of any product used to supply above recommendations.

Table 20

Yield and quality of Russet Burbank potatoes produced from the Eden North location in 1997.

Treatment	Total Yield cwt/Ac	Saleable Yield cwt/Ac	No. One Yield cwt/Ac	No. ones %	>10 oz Oz/Ac cwt/Ac	<10 oz Oz/Ac cwt/Ac	>10 oz TWOR cwt/Ac	<10 oz TWOR cwt/Ac	Culler cwt/Ac	Specific Gravity
Check	1	421.0	392.0	355.7	85.4	210.5	145.2	21.8	14.5	29.0
	2	373.8	359.3	283.1	75.7	174.2	108.9	39.9	36.3	14.5
	3	297.8	279.6	225.1	75.6	152.5	72.6	36.3	18.2	18.2
	4	344.9	323.1	250.5	72.6	170.6	79.9	43.6	29.0	21.8
Ave.	359.4	338.5	278.6	77.1	177.0	101.6	35.4	24.5	20.8	1.083
BIOZYME	1	388.4	366.6	326.7	84.1	159.7	167.0	36.3	3.6	21.8
	2	442.8	428.3	399.3	90.2	246.8	152.5	29.0	0	14.5
	3	420.7	402.7	348.5	82.8	203.3	145.2	47.2	7.0	18.0
	4	309.8	294.8	275.9	89.1	145.2	130.7	10.9	8.0	15.0
Ave.	390.4	373.1	337.6	86.5	188.8	148.8	30.8	4.6	17.3	1.083
BIOZYME PLUS PRODUCT PT	1	362.2	347.7	290.4	80.2	203.3	87.1	50.8	6.0	14.5
	2	463.8	434.8	377.5	81.4	246.8	130.7	36.5	20.0	29.0
	3	439.0	402.7	348.5	79.4	188.8	159.7	47.2	7.0	36.5
	4	424.8	399.3	384.8	90.6	232.3	152.5	14.5	0	25.5
Ave.	422.4	396.1	350.3	82.9	217.8	132.5	37.2	8.6	26.3	1.085