

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		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	Russet Burbank	Russet Burbank	Russet Burbank	Russet Burbank	Russet Burbank	
Description	#1 Potatoes	#2 Potatoes	Culls/Undersize	#1 Potatoes	#2 Potatoes	
Part Rated	TUGR1 C	TUGR2 C	TUBUNM C	TUGR1 C	TUGR2 C	
Rating Date	Sep-26-2018	Sep-26-2018	Sep-26-2018	Sep-26-2018	Sep-26-2018	
Rating Type	WEIGHT	WEIGHT	WEIGHT	YIELD	YIELD	
Rating Unit	LB	LB	LB	T-US	T-US	
Sample Size, Unit	1 PLOT	1 PLOT	1 PLOT	1 A	1 A	
Collection Basis, Unit	283.33 FT2	283.33 FT2	283.33 FT2	283.33 FT2	283.33 FT2	
Number of Subsamples	1	1	1	1	1	
Crop Stage Majority	99	99	99	99	99	
Assessed By	Tom Redmon	Tom Redmon	Tom Redmon	Tom Redmon	Tom Redmon	
SE Group No.	1	4	5	6	7	
Days After First/Last Applic.	146 112	146 112	146 112	146 112	146 112	
Trt-Eval Interval	146 DA-A	146 DA-A	146 DA-A	146 DA-A	146 DA-A	
Plant-Eval Interval	146 DP-1	146 DP-1	146 DP-1	146 DP-1	146 DP-1	
Days After Emergence	125 DE-1	125 DE-1	125 DE-1	125 DE-1	125 DE-1	
ARM Action Codes				TY1	TY2	
Number of Decimals		1	1	1	1	
Trt	Treatment		Rate	Appl		
No.	Name	Rate	Unit	Code	1	2
1	Ion FX	8	oz/cwt	C	212.3	a
2	Untreated Check				208.7	a
3	Untreated Check				230.3	a
4	Ion FX	1.33	oz/cwt	A	219.5	a
5	Ion FX	1	qt/a	B	249.5	a
6	Ion FX	1	qt/a	D	243.5	a
LSD P=.05	32.72	9.56	19.32	2.51	0.73	
Standard Deviation	21.93	6.44	13.00	1.69	0.49	
CV	9.65	50.31	11.91	9.65	50.31	
Levene's F	1.225	2.779	0.575	1.225	2.779	
Levene's Prob(F)	0.34	0.05*	0.719	0.34	0.05*	
Skewness	-0.4382	2.2221*	0.0167	-0.4382	2.2221*	
Kurtosis	1.0027	7.0469*	-0.1326	1.0027	7.0469*	
Treatment F	2.325	2.691	7.813	2.325	2.691	
Treatment Prob(F)	0.0880	0.0551	0.0005	0.0880	0.0551	

Means followed by same letter or symbol do not significantly differ (P=.05, Duncan's New MRT)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Missing data estimates are included in columns: Average=1,4,6,8

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		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	Russet Burbank	Russet Burbank	Russet Burbank			
Description	#1s+#2's	Culls/Undersize	Total Potatoes			
Part Rated	TUBMAR C	TUBUNM C	TUBER C			
Rating Date	Sep-26-2018	Sep-26-2018	Sep-26-2018			
Rating Type	YIELD	YIELD	YIELD			
Rating Unit	T-US	T-US	T-US			
Sample Size, Unit	1 A	1 A	1 A			
Collection Basis, Unit	283.33 FT2	283.33 FT2	283.33 FT2			
Number of Subsamples	1	1	1			
Crop Stage Majority	99	99				
Assessed By	Tom Redmon	Tom Redmon	Tom Redmon			
SE Group No.	9	10	11			
Days After First/Last Applic.	146 112	146 112	146 112			
Trt-Eval Interval	146 DA-A	146 DA-A	146 DA-A			
Plant-Eval Interval	146 DP-1	146 DP-1	146 DP-1			
Days After Emergence	125 DE-1	125 DE-1	125 DE-1			
ARM Action Codes	T3	TY4	T5			
Number of Decimals	1	1	1			
Trt	Treatment		Rate	Appl		
No.	Name	Rate	Unit	Code	6	7
1	Ion FX	8	oz/cwt	C	18.0	bc
2	Untreated Check				16.8	c
3	Untreated Check				18.8	abc
4	Ion FX	1.33	oz/cwt	A	17.6	bc
5	Ion FX	1	qt/a	B	20.3	a
6	Ion FX	1	qt/a	D	19.3	ab
LSD P=.05	2.15	1.48	1.77			
Standard Deviation	1.44	1.00	1.19			
CV	7.8	11.91	4.43			
Levene's F	0.792	0.575	1.219			
Levene's Prob(F)	0.57	0.719	0.343			
Skewness	0.2414	0.0167	-1.051*			
Kurtosis	-1.0169	-0.1326	1.2047			
Treatment F	3.134	7.813	5.934			
Treatment Prob(F)	0.0348	0.0005	0.0024			

Means followed by same letter or symbol do not significantly differ (P=.05, Duncan's New MRT)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Missing data estimates are included in columns: Average=1,4,6,8

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

Crop Code

SOLTU, BPOT, Solanum tuberosum, Potato = US

Part Rated

TUGR1 = tuber - grade 1

TUGR2 = tuber - grade 2

TUBUNM = tuber - unmarketable

TUBMAR = tuber - marketable

TUBER = tuber

C = Crop is Part Rated

Rating Type

WEIGHT = weight

YIELD = yield

Rating Unit

LB = pound

T-US = ton (short=2000 lb)

PLOT = total plot

A = acre

FT2 = square foot

Plant-Eval Interval

146 DP-1 = 1 SOLTU May-3-2018

ARM Action Codes

TY1 = 0.0768254*[C1]

TY2 = 0.0768254*[C2]

T3 = [C4]+[C5]

TY4 = 0.0768254*[3]

T5 = [C6]+[C7]

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		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	Russet Burbank	Russet Burbank	Russet Burbank	Russet Burbank	Russet Burbank	
Description	#1 Potatoes	#2 Potatoes	Culls/Undersize	#1 Potatoes	#2 Potatoes	
Part Rated	TUGR1 C	TUGR2 C	TUBUNM C	TUGR1 C	TUGR2 C	
Rating Date	Sep-26-2018	Sep-26-2018	Sep-26-2018	Sep-26-2018	Sep-26-2018	
Rating Type	WEIGHT	WEIGHT	WEIGHT	YIELD	YIELD	
Rating Unit	LB	LB	LB	T-US	T-US	
Sample Size, Unit	1 PLOT	1 PLOT	1 PLOT	1 A	1 A	
Collection Basis, Unit	283.33 FT2	283.33 FT2	283.33 FT2	283.33 FT2	283.33 FT2	
Number of Subsamples	1	1	1	1	1	
Crop Stage Majority	99	99	99	99	99	
Assessed By	Tom Redmon	Tom Redmon	Tom Redmon	Tom Redmon	Tom Redmon	
SE Group No.	1	4	5	6	7	
Days After First/Last Applic.	146 112	146 112	146 112	146 112	146 112	
Trt-Eval Interval	146 DA-A	146 DA-A	146 DA-A	146 DA-A	146 DA-A	
Plant-Eval Interval	146 DP-1	146 DP-1	146 DP-1	146 DP-1	146 DP-1	
Days After Emergence	125 DE-1	125 DE-1	125 DE-1	125 DE-1	125 DE-1	
ARM Action Codes				TY1	TY2	
Number of Decimals		1	1	1	1	
Trt	Treatment		Rate	Appl		
No.	Name	Rate	Unit	Code	Plot	1
1	Ion FX	8	oz/cwt	C	101	228
					201	213
					301	246
					401	162
Mean =	212.3	21.6	82.1	16.3	1.7	
2	Untreated Check				102	208
					202	207
					302	220
					402	199
Mean =	208.7	9.6	124.7	16.0	0.7	
3	Untreated Check				103	220
					203	248
					303	240
					403	213
Mean =	230.3	14.5	108.9	17.7	1.1	
4	Ion FX	1.33	oz/cwt	A	104	217
					204	236
					304	218
					404	207
Mean =	219.5	9.2	133.4	16.9	0.7	
5	Ion FX	1	qt/a	B	105	250
					205	224
					305	269
					405	255
Mean =	249.5	14.9	106.1	19.2	1.1	
6	Ion FX	1	qt/a	D	106	260
					206	220
					306	268
					406	226
Mean =	243.5	7.1	100.2	18.7	0.5	

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		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	Russet Burbank	Russet Burbank	Russet Burbank			
Description	#1s+#2's	Culls/Undersize	Total Potatoes			
Part Rated	TUBMAR C	TUBUNM C	TUBER C			
Rating Date	Sep-26-2018	Sep-26-2018	Sep-26-2018			
Rating Type	YIELD	YIELD	YIELD			
Rating Unit	T-US	T-US	T-US			
Sample Size, Unit	1 A	1 A	1 A			
Collection Basis, Unit	283.33 FT2	283.33 FT2	283.33 FT2			
Number of Subsamples	1	1	1			
Crop Stage Majority	99	99				
Assessed By	Tom Redmon	Tom Redmon	Tom Redmon			
SE Group No.	9	10	11			
Days After First/Last Applic.	146 112	146 112	146 112			
Trt-Eval Interval	146 DA-A	146 DA-A	146 DA-A			
Plant-Eval Interval	146 DP-1	146 DP-1	146 DP-1			
Days After Emergence	125 DE-1	125 DE-1	125 DE-1			
ARM Action Codes	T3	TY4	T5			
Number of Decimals	1	1	1			
Trt	Treatment		Rate	Appl		
No.	Name	Rate	Unit	Code	Plot	6
1	Ion FX	8	oz/cwt	C	101	18
					201	18
					301	20
					401	15
Mean =	18.0	6.3	24.3			
2	Untreated Check				102	16
					202	16
					302	17
					402	16
Mean =	16.8	9.6	26.4			
3	Untreated Check				103	17
					203	20
					303	20
					403	17
Mean =	18.8	8.4	27.2			
4	Ion FX	1.33	oz/cwt	A	104	17
					204	18
					304	17
					404	16
Mean =	17.6	10.2	27.8			
5	Ion FX	1	qt/a	B	105	20
					205	18
					305	21
					405	20
Mean =	20.3	8.1	28.5			
6	Ion FX	1	qt/a	D	106	20
					206	17
					306	21
					406	18
Mean =	19.3	7.7	27.0			

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

Crop Code

SOLTU, BPOT, Solanum tuberosum, Potato = US

Part Rated

TUGR1 = tuber - grade 1

TUGR2 = tuber - grade 2

TUBUNM = tuber - unmarketable

TUBMAR = tuber - marketable

TUBER = tuber

C = Crop is Part Rated

Rating Type

WEIGHT = weight

YIELD = yield

Rating Unit

LB = pound

T-US = ton (short=2000 lb)

PLOT = total plot

A = acre

FT2 = square foot

Plant-Eval Interval

146 DP-1 = 1 SOLTU May-3-2018

ARM Action Codes

TY1 = 0.0768254*[C1]

TY2 = 0.0768254*[C2]

T3 = [C4]+[C5]

TY4 = 0.0768254*[3]

T5 = [C6]+[C7]

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

General Trial Information

Study Director:	Rudy Monnich
Investigator:	Mark Qualls

Discipline:	P/H	Plant health			
Trial Status:	F	one-year/final	Trial Reliability:	GOOD	
Initiation Date:	May-3-2018				
Completion Date:	Sep-26-2018				

Trial Location

City:	Ephrata	Country :	USA	United States		
State/Prov. :	Washington					
Postal Code:	98823					

Conducted Under GLP:	No
Conducted Under GEP:	No

Objectives:

Protocol for potatoes with ION FX a newly discovered bacteria.

6 treatments (4 from Caltec, 2 added by Qualls)

TRT 1 8 oz/cwt Seed Treatment -Caltec

TRT 2 UTC - Caltec

TRT 3 UTC - Qualls

TRT 4 1.33oz/cwt Seed Treatment- Qualls

TRT 5 1 qt/A in-furrow - Caltec

TRT 6 1 qt/A foliar at 8" rosette - Caltec

All plots will be 4 treated rows x 200 ft long strip plots. The strips will be divided into 50 ft replicates.

Data to be taken:

1. Yield
2. Field Grade into marketable sizes- US #1, US #2 and Culls/Undersize

Conclusions:

Formulation of ION FX:

Product was a clear opaque liquid slightly more viscous than water. Odor was a strong earthy/fungus smell. Product readily went into solution with water and caused no issues with spray equipment. Overall, we see no issues with the formulation of this product.

Application methods:

There were 3 different application methods for this trial:

1. Seed Treatment.
2. In-Furrow spray.
3. Foliar spray.
- 4.
- 5.
6. Seed treatment:
7. Seed treatments were conducted in 180 lb lots in a 9 cubic foot concrete mixer modified for research seed treatment. Typical seed slurry rates for potato seed treatment is 2-4 fluid ounces per hundred weight of seed (cwt). Treatment 4 was applied at 4 oz/cwt and was not excessively wet when application was complete. Treatment 1 called for 8 oz/cwt so the product was applied undiluted. This caused no issues with the application but did leave the seed pieces excessively wet with product when the application was complete. Commercially, this could cause diseases to enter the seed as it sits in trucks for several hours to days waiting to be planted. Both Treatments 1 and 4 were planted within 2 hours of applications.
- 8.
9. In-Furrow application:
10. The in-furrow application on Treatment 5 was made on the planter. A single nozzle is mounted

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

right behind each shoe of the planter but in front of the hill up disks. The planter shoe plows a furrow into the soil approximately 4 inches deep, the seed piece drops down into the furrow followed by a 4" band of spray covering the seed and furrow. Finally, the cover up disks create a hill of 6-8" over the seed pieces.

Foliar Applications:

The foliar application on Treatment 6 was applied using an ATV sprayer with an 11.7' offset spray boom. Nozzles were Spraying Systems Turbo Tee Jet flat fan nozzles (TT11003-VP) at 21 PSI. Spray Volume was 15 Gallons/A.

Stand and Vigor:

While no stand counts were requested for this trial, drone photos were taken on a 1-3 week schedule. From the photos included in this report all of the treatments look normal in comparison to the untreated controls with exception of TRT 1. **TRT 1 (8oz/cwt):** A significant reduction in stand is evident at 3 weeks after planting (5/25/18), 6 WAP (6/14/18) and continued to be visible throughout the season. Reduction in vigor is visible up until 8 WAP (6/29/18) but then it appears to have normal vigor when compared to the other treatments. There is a slight indication by the photo on 8/21/18 that this treatment's plants stayed greener longer than all of the other treatments.

Yield Data:

A 2 row Lockwood potato harvester modified for research was used to harvest the potatoes for yield. The middle two rows (5.67 feet wide) by the entire length of the plot (50 feet) was harvested. Tubers were graded into 3 categories, US #1, US #2, and Undersize/culls, and recorded in pounds per plot. The yield was then converted to Tons/A. The total Tons/A includes all tubers harvested. The Marketable Tons/A was calculated by adding US #1 and US #2 tubers. Statistical analysis was conducted using Gylling Data Managements , Agricultural Research Manager. The Mean comparison test was Duncan's New MRT using a significance level of 5%. Comparing the marketable potatoes US#1's and US#2's tons/A in column 6 of the data, TRT 5 (In-Furrow) and TRT 6 (Foliar) show to be the highest yielding plots.

Contacts

Study Director:	Rudy Monnich
------------------------	--------------

Investigator:	Mark Qualls			
Organization:	Qualls Agricultural Laboratory			
Address:	3975 Dodson Rd N	Phone No.:	509-787-4210	
City+State/Prov:	Ephrata, WA			
Postal Code:	98823	E-mail:	mqualls@qa-lab.com	
Country:	USA	United States		

Cooperator/Landowner

Cooperator:	Mick Qualls	Role:	Cooperator
Organization:	Qualls Agricultural Laboratory	Org. Type:	Research Facility
Address 1:	3975 Dodson Rd N		
City:	Ephrata		
State/Prov:	WA		

Postal Code:	98823			
Country:	USA	United States	E-mail:	mqualls@qa-lab.com

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

Crop Description

Crop 1:	SOLTU	Solanum tuberosum	Potato	
Variety:	Russet Burbank		BBCH Scale:	BPOT
Planting Rate, Unit:	2450	LB/A		
Depth, Unit:	8	IN		
Row Spacing, Unit:	34	IN		
Spacing within Row, Unit:	10	IN		
Rows per Plot:	4			
Soil Temperature, Unit:	62	F		
Soil Moisture:	NORMAL	normal, adequate		
Seed Bed:	FINE	fine		

Site and Design

Treated Plot Width:	11.33	FT			Site Type:	FIELD	field		
Treated Plot Length:	50	FT							
Treated Plot Area:	566.5	FT ²	Treatments :	6	Tillage Type:	CONTIL	conventional-till		
Replications:	4				Study Design:	NONRAN	Non-Randomized		
% Slope:	1.0								

Maintenance

			Maintenance	Form	Form	Form		Rate	Tank	Tank
N o.	Date	Type	Product Name	Conc	Unit	Type	Rate	Unit	Mix Code	Mix
1.	May-17-2018	HERB	Roundup PowerMax	5.5	LBA/GALL	AS	1.375	LB A/A		
2.	May-22-2018	HERB	Eptam	7	LBA/GALL	EC	4.375	LB A/A	Y	yes
3.	May-22-2018	HERB	Boundary 6.5 EC	6.5	LBA/GALL	SL	1.2	LB A/A	Y	yes
4.	Jun-12-2018	HERB	Eptam	7	LBA/GALL	EC	3	LB A/A	Y	yes
5.	Jun-12-2018	HERB	Matrix	75	%AW/W	DF	0.02	LB A/A	Y	yes
6.	Aug-31-2018	HERB	Reglone	2	LBA/GALL	SL	0.5	LB A/A		
7.	Sep-5-2018	HERB	Reglone	2	LBA/GALL	SL	0.5	LB A/A		

Field Prep./Maintenance:

23APR18 Field Disked and cultivated in preparation for planting.

18MAY18 Potatoes hilled up with cultivator.

Soil Description

Description Name:	Timmerman Sandy Loam		
% Sand:	77	% OM:	1.4
% Silt:	18	pH:	7.2
% Clay:	5	CEC:	11.3

Moisture and Weather Conditions

Overall Moisture Conditions:	NORMAL	normal		
Closest Weather Station:	Qualls Ag Lab	Distance, Unit:	0.2	MI

Comment:

IRRIGATION:

Irrigation for this trial was applied by a center pivot with low pressure Nelson Rotator sprinklers. The total for the season was 31.5 inches of water.

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

Application Description

	A	B	C	D
Application Date:	May-3-2018	May-3-2018	May-3-2018	Jun-6-2018
Appl. Start Time:	11:30 AM	2:30 PM	1:30 PM	1:45 PM
Appl. Stop Time:	12:00 PM	2:40 PM	2:00 PM	2:00 PM
Interval to Prev. Appl., Unit:		HOURS	1 HOURS	34 DAYS
Application Method:	SEETRL	SEEAPO	SEETRL	SPRAY
Application Timing:	SEETRE	ATPLAN	SEETRE	POEMCR
Application Placement:	SEED	INFURR	SEED	PLANT
Applied By:	Tom Redmon	Tom Redmon	Tom Redmon	Tom Redmon
Air Temperature, Unit:	70 F	70 F	66 F	80 F
% Relative Humidity:	20	20	20	20
Wind Velocity, Unit:	0 MPH	1 MPH	0 MPH	1 MPH
Wind Direction:	s	N	s	W
Dew Presence (Y/N):	N no	N no	N no	N no
Soil Temperature, Unit:		62 F	64 F	70 F
Soil Moisture:		NORMAL		NORMAL
% Cloud Cover:	0	0	0	0

Crop Stage At Each Application

	A	B	C	D
Crop 1 Code, BBCH	SOLTU	SOLTU	SOLTU	SOLTU
Scale:	BPOT	BPOT	BPOT	BPOT
Stage Scale Used:	BBCH	BBCH	BBCH	BBCH
Stage Majority, Percent:	00 100	00 100	00 100	24 100
Average Diameter, Unit:				8 IN

Application Equipment

	A	B	C	D
Appl. Equipment:	Seed Treatme	In Furrow	Seed Treatme	Honda A
Equipment Type:	BACCAI	SPPLMO	BACCAI	ALTEVE
Operation Pressure, Unit:	22 PSI	18 PSI	22 PSI	21 PSI
Nozzle Type:	FLAEVE	FLAEVE	FLAEVE	FLAFAN
Nozzle Size:	4002	4002	4002	11003TT
Nozzle Spacing, Unit:		34 IN		20 IN
Nozzles/Row:	1	1	1	
Band Width, Unit:	8 in	4 IN	8 in	
% Coverage:	100		100	100
Boom ID:		Potato Plant		11.7' OFFSET
Boom Length, Unit:		11.3 FT		11.7 FT
Boom Height, Unit:		6 IN		30 IN
Ground Speed, Unit:		2.3 MPH		4 MPH
Carrier:		WATER		WATER
Spray Volume, Unit:	4 FL OZ/100#	10 GAL/AC	8 FL OZ/100#	15 GAL/AC
Mix Size, Unit:	180 LB seed	4.5 L	180 LB seed	5 L
Spray pH:	7	7	7	
Propellant:	COMAIR	COMN2	COMAIR	COMN2
Tank Mix (Y/N):	N no	N no	N no	N no

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

Trial Comments

25 SEP 18: Potatoes were harvested today. The middle two rows (5.67 feet wide) by the entire length of the plot (50 feet) was harvested. Tubers were graded into 3 categories, US #1, US #2, and Undersize/culls, and recorded in pounds per plot. The yield was then recorded as Tons/A. The total Tons/A includes all tubers harvested. The Marketable Tons/A was calculated by adding US #1 and US #2 tubers.

IRRIGATION:

Irrigation for this trial was applied by a center pivot with low pressure Nelson Rotator sprinklers. The total for the season was 31.5 inches of water.

FERTILIZER:

Pre-plant Actual elements applied: 200 lb N, 200 lb P, 230 lb K, 40 lb S, and 2 lb B.

Fertigation 195 lbs N/A (28-0-0-5) throughout the season.

Total Qualls Ag Lab Nitrogen for the season = 395 lbs N/A

Qualls Agricultural Laboratory

Determine the benefits of Ion FX on potatoes for yield and quality

Trial ID:	CaltecAg_IonFX_Potato_QAL	Location:	Ephrata, WA	Trial Year:	2018
Protocol ID:	CaltecAg_IonFX_Potato	Investigator:	Mark Qualls		
Project ID:		Study Director:	Rudy Monnich		
		Sponsor Contact:			

Reps: 4

Plots: 11.3 by 50 feet

Trt	Treatment	Form	Form	Form		Rate	Growth	Appl	Spray	Mix	Amt Product	Rep			
No.	Name	Conc	Unit	Type	Rate	Unit	Stage	Code	Volume	Size	to Measure	1	2	3	4
1	Ion FX	100	%	SL	8	oz/cwt	Seed TRT	C	8 FL OZ/100#	180 LB seed	425.9 mL/mx	101	201	301	401
2	Untreated Check											102	202	302	402
3	Untreated Check											103	203	303	403
4	Ion FX	100	%	SL	1.33	oz/cwt	Seed TRT	A	4 FL OZ/100#	180 LB seed	70.8 mL/mx	104	204	304	404
5	Ion FX	100	%	SL	1	qt/a	In-Furrow	B	10 GAL/AC	4.5 L	112.5 mL/mx	105	205	305	405
6	Ion FX	100	%	SL	1	qt/a	8" Roseette	D	15 GAL/AC	5 L	83.33 mL/mx	106	206	306	406

Sort Order: Replicate 1

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

Amount*	Unit	Treatment Name	Form Conc	Form Unit	Form Type	Lot Code
865.603	mL	Ion FX	100	%	SL	

* 'Per area' calculations based on spray volume= 8,4 FL OZ/100#, 10,15 GAL/AC, mix size= 180 LB seed, 4.5,5 L (mix size basis).

* Product amount calculations increased 25 % for overage adjustment.