

Ag-Quest**Crop Aid Nutrition Barley 2019**

Trial ID:	CA19SSK01BAPHA2019	Location:	Saskatoon	Trial Year:	2019
Protocol ID:		Investigator:	Paul Happ		
Project ID:		Study Director:	Kelvin Sander		
		Sponsor Contact:			

General Trial Information

Study Director:	Kelvin Sander		
Investigator:	Paul Happ	Title:	Research Associate

Discipline:	D	fertilizer	
Trial Status:	K	multi-year/final	
ARM Trial Created On:	Nov-1-2019		
Initiation Date:	May-20-2019	Planned Completion Date:	Sep-30-2019
Completion Date:	Oct-31-2019		

Trial Location

City:	Saskatoon	Country:	CAN	Canada
State/Prov.:	Saskatchewan			
Postal Code:	S7K 3J5	Climate Zone:	Cwb	Temperate, Dry Winter, Warm Summer

Latitude of LL Corner °:	52.123252	N
Longitude of LL Corner °:	106.825101	W

Conducted Under GLP:	No
Conducted Under GEP:	No

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Objectives:

MATERIALS AND METHODS

This 3 year trial was initiated to evaluate a long term 3 crop rotational fertility regime. For this study, Barley was seeded into Canola stubble from 2018. Soil tests were taken in spring of 2019 prior to seeding and the recommended fertilizer rates were applied prior to or with the barley at seeding. The Crop Aid Seed treatment was applied to the seed 4.3 mls/kg seed (100 mls/bu of seed) prior to seeding in treatment 2. Seeding rate for barley was 120kg/ha. On May 20th, a preseed soil application of Crop Aid Soil at .25 l/ac was performed on trt. 2. The crop was then seeded following this application. The herbicide application was performed on June 24th. For trt. 2 Crop Aid Soil (.25 l/ac) as well as Crop Aid Foliar (1 l./ac) were tank mixed with Tundra and applied at the 5-6 lf 2 tiller stage of development.

Visual vigour assessments were performed on 3 occasions throughout the season using a 0-5 scale where 0 represented a dead plant and 5 represented excellent vigour.

At maturity, the plots were harvested, cleaned, weighed and moisture tested to compare yields. Data was analyzed using Duncan's New Mrt at at 10% significance level.

RESULTS AND DISCUSSION

The visual vigour ratings showed consistent vigour ratings between the two treatments with virtually no visual differences between the treatments at any of the three rating intervals. The yields at maturity revealed a statistically significant increase with the fertilizer regime (trt. 2) versus the unfertilized check. A 2.9 bushel/ac or 3.1% yield boost was obtained in this trial.

No consistent test weight differences were observed between the two treatments.

NOTE: The 2019 growing season was initially very dry with only 21.5% of normal precipitation from April 1 to June 15th. Rains in later June and into July helped improve crop development.

Contacts

Study Director:	Kelvin Sander		
Organization:	Crop Aid Nutrition		
City+State/Prov:	Saskatoon, Sask.		

Investigator:	Paul Happ	Title:	Research Associate		
Organization:	Ag-Quest (Sask.) Inc				
Address:	Site 204, box 8 RR.2	Phone No.:	306 384-1117		
City+State/Prov:	Saskatoon, Sask.	Mobile No.:	306 230-8792		
Postal Code:	S7K 3J5	E-mail:	paul.happ@agquest.com		
Country:	CAN	Canada			

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Crop Description

Crop 1:	C	HORVS	Hordeum vulgare (spring)	Spring barley
Entry Date:	Nov-1-2019			
Variety:	Copeland			
Planting Date:	May-20-2019	Planting Rate:	75	kg/ha
Depth:	4	cm		
		Planting Method:	DRILLE	drilled
Row Spacing:	20	cm	Planting Equipment:	CP Cone Planter
		Seed Bed:	MEDIUM	medium
		Soil Moisture:	SLIDRY	slightly dry
Harvest Date:	Sep-3-2019		Harvest Equipment:	Hege Plot Combine
Moisture Meter:	AgTronix		Harvested Width:	2.4 m
% Standard Moisture:	14.8		Harvested Length:	6 m
Weighing Equipment:	Uline Scale			

Site and Design

Treated Plot Width:	2.4	m	Site Type:	FIELD	field
Treated Plot Length:	6	m			
Treated Plot Area:	14.4	m ²	Treatments:	2	
Replications:	6		Tillage Type:	NOTILL	no-till
			Study Design:	RACOB	Randomized Complete Block (RCB)

Previous		
No.	Crop	Year
1.	Canola	2018
2.	PEA	2016

Field Prep./Maintenance:

Site was harrowed prior to seeding.

Soil Description

Description Name:	Brown Soil Zone				
% Sand:	25	% OM:	3.4	Texture:	CL clay loam
% Silt:	34	pH:	6.1	Soil Name:	Bradwell Association
% Clay:	41	CEC:	16.5		

Analyzed By:

A&L Canada Laboratories

Moisture and Weather Conditions

Overall Moisture Conditions:	BELNOR	below normal
Closest Weather Station:	on-site	Distance: 200 m

Comment:

April	Actual precip. 2.9 mm	Normal precip. 22.9	% of Normal 12.7
May	Actual precip: 10.5mm	Normal precip 39.4	% of Normal 27
June	Actual precip: 80mm	Normal precip 66.6	% of Normal 120
July	Actual precip: 53.4mm	Normal precip 59	% of Normal 90
August	Actual precip: 25.1mm	Normal precip 46.5	% of Normal 54

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Application Description

	A	B	C
Application Date	May-20-2019	May-20-2019	Jun-24-2019
Appl. Start Time	10:50 AM	9:30 AM	7:45 AM
Appl. Stop Time	11:10 AM	9:45 AM	8:00 AM
Application Method	SEETRL	SPRAY	SPRAY
Application Timing	SETRLI	PREPLA	POSPOS
Application Placement	SEED	SOIL	FOLIAR
Applied By	Paul H	Ausitn T	Austin T
Appl. Entry Date	Nov-1-2019	Nov-1-2019	Nov-1-2019
Air Temperature Start, Stop	10 C	8 C	14 C
% Relative Humidity Start, Stop	28	28	81
Wind Velocity+Dir. Start		8 kph W	18 kph W
Soil Moisture	VERDRY	VERDRY	NORMAL
% Cloud Cover	0	0	50

Crop Stage At Each Application

	A	B	C
Crop 1 Code, BBCH Scale	HORVS BCER	HORVS BCER	HORVS BCER
Stage Scale Used			BBCH
Stage Majority, Percent			21 50
Stage Minimum, Percent			14 20
Stage Maximum, Percent			23 20
Height Average			12 cm

Application Equipment

	A	B	C
Appl. Equipment	Sample treat	SPRAYER	SPRAYER
Equipment Type	ZIPLOC	BICSPR	BICSPR
Operation Pressure		275 kpa	275 kpa
Nozzle Type		ARINDH	ARINDH
Nozzle Size		110015	110015
Nozzle Spacing		50 cm	50 cm
Nozzles/Row		4	4
Boom Length		1.5 m	1.5 m
Boom Height		40 cm	40 cm
Ground Speed		8 kph	8 kph
Carrier		WATER	WATER
Application Amount		100 L/ha	100 L/ha
Mix Size		1 L	1 L
Propellant		CO2	CO2

Date	By	Context	Notes
Nov-1-2019	Paul Happ	STATUS	Automatically added by ARM: Trial Status updated to 'E' when Rating Date entered.

SE Definitions

	1.	
Crop Type, Code	C	

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Instructions:

Please Note: Vigor Rating uses 1-9 scale where 1 is the most vigorous and 9 is the least.

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Crop Type, Code		C BARLEY		C BARLEY		C BARLEY		C BARLEY		C BARLEY		C BARLEY		C BARLEY	
Crop Name															
Rating Date		Jun-17-2019		Jul-4-2019		Jul-29-2019		Sep-3-2019		Sep-3-2019		Sep-3-2019		Sep-3-2019	
Part Rated		VIGOUR -		VIGOUR -		VIGOUR -									
Rating Type		VISUAL		VISUAL		VISUAL		RAW YIELD		MOISTURE		YIELD		ADJ YIELD	
Rating Unit		0-5		0-5		0-5		g/plot		%		KG/HA		BU/AC	
Data Entry Date		Nov-1-2019		Nov-1-2019		Nov-1-2019		Nov-1-2019		Nov-1-2019		Nov-1-2019			
Trt-Eval Interval															
ARM Action Codes												TY1		T2	
Number of Decimals												0		1	
Trt	Treatment	Rate	Appl	Code	1	2	3	4	5	6	7				
No.	Name	Rate	Unit	Code	1	2	3	4	5	6	7				
1	Untreated Check				3.0 a	4.0 a	3.2 a	7279.7 b	17.10 a	4921 b	93.5 b				
2	Crop Aid Seed	4.6	ml/kg	A	3.0 a	4.0 a	3.3 a	7552.3 a	17.60 a	5073 a	96.4 a				
	Round Up Weather max	0.51	l/acre	B											
	Crop Aid Soil	0.25	l/acre	B											
	Tundra	0.81	l/acre	C											
	Crop Aid Foliar	1	l/acre	C											
	Crop Aid Soil	0.25	l/acre	C											
LSD P=.10					.	.	0.34	203.70	0.853	133.1	2.53				
Standard Deviation					0.00	0.00	0.29	175.09	0.733	114.4	2.17				
CV					0.0	0.0	8.88	2.36	4.23	2.29	2.29				
Bartlett's X2					0.00	0.00	0.261	0.365	5.659	0.073	0.073				
P(Bartlett's X2)					.	.	0.61	0.546	0.017*	0.787	0.787				
Replicate F					0.000	0.000	4.200	14.284	1.416	18.234	18.234				
Replicate Prob(F)					1.0000	1.0000	0.0706	0.0055	0.3559	0.0032	0.0032				
Treatment F					0.000	0.000	1.000	7.275	1.394	5.258	5.258				
Treatment Prob(F)					1.0000	1.0000	0.3632	0.0429	0.2908	0.0704	0.0704				

Means followed by same letter or symbol do not significantly differ (P=.10, Duncan's New MRT).
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
 Column 1: EPPO species (Bayer) codes; BARLEY, , , ; VIGOUR; VISUAL; 0-5 index/scale
 Column 2: EPPO species (Bayer) codes; BARLEY, , , ; VIGOUR; VISUAL; 0-5 index/scale
 Column 3: EPPO species (Bayer) codes; BARLEY, , , ; VIGOUR; VISUAL; 0-5 index/scale
 Column 4: EPPO species (Bayer) codes; BARLEY, , , ; RAW YIELD; g/plot
 Column 5: EPPO species (Bayer) codes; BARLEY, , , ; MOISTURE; percent
 Column 6: EPPO species (Bayer) codes; BARLEY, , , ; yield; kilograms per hectare; TY1
 Column 7: EPPO species (Bayer) codes; BARLEY, , , ; ADJ YIELD; bushels per acre; T2
 Column 8: EPPO species (Bayer) codes; BARLEY, , , ; TEST WT; kilogram per hectoliter
 Column 9: EPPO species (Bayer) codes; BARLEY, , , CRUDE; PROTEIN; % DRY

Could not calculate LSD (% mean diff) for columns 1,2,9 because error mean square = 0.

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Crop Type, Code		C BARLEY		C BARLEY	
Crop Name				CRUDE	
Rating Date		Sep-3-2019			
Part Rated					
Rating Type		TEST WT		PROTEIN	
Rating Unit		KG/HL		% DRY	
Data Entry Date		Nov-1-2019			
Trt-Eval Interval				MATTER	
ARM Action Codes					
Number of Decimals					
Trt	Treatment	Rate	Appl		
No.	Name	Unit	Code	8	9
1	Untreated Check			57.67	a
2	Crop Aid Seed	4.6 ml/kg	A	57.50	a
	Round Up Weather max	0.51 l/acre	B		
	Crop Aid Soil	0.25 l/acre	B		
	Tundra	0.81 l/acre	C		
	Crop Aid Foliar	1 l/acre	C		
	Crop Aid Soil	0.25 l/acre	C		
LSD P=.10		0.542		.	
Standard Deviation		0.466		.	
CV		0.81		.	
Bartlett's X2		0.031		.	
P(Bartlett's X2)		0.86		.	
Replicate F		2.804			
Replicate Prob(F)		0.1412			
Treatment F		0.383			
Treatment Prob(F)		0.5629			

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Crop Type, Code		C BARLEY		C BARLEY		C BARLEY		C BARLEY		C BARLEY	
Crop Name											
Rating Date		Jun-17-2019		Jul-4-2019		Jul-29-2019		Sep-3-2019		Sep-3-2019	
Part Rated		VIGOUR -		VIGOUR -		VIGOUR -					
Rating Type		VISUAL		VISUAL		VISUAL		RAW YIELD		MOISTURE	
Rating Unit		0-5		0-5		0-5		g/plot		%	
Data Entry Date		Nov-1-2019		Nov-1-2019		Nov-1-2019		Nov-1-2019		Nov-1-2019	
Trt-Eval Interval											
ARM Action Codes										TY1	
Number of Decimals										0	
Trt	Treatment	Rate	Appl	Plot	1	2	3	4	5	6	
No.	Name	Rate	Unit	Code							
1	Untreated Check				101	3.0	4.0	3.0	6998.0	17.40	4711
					202	3.0	4.0	3.0	6675.0	19.20	4396
					301	3.0	4.0	4.0	7566.0	16.50	5149
					402	3.0	4.0	3.0	7563.0	16.40	5153
					501	3.0	4.0	3.0	7751.0	16.60	5269
					602	3.0	4.0	3.0	7125.0	16.50	4849
Mean =					3.0	4.0	3.2	7279.7	17.10	4921	
2	Crop Aid Seed	4.6	ml/kg	A	102	3.0	4.0	3.0	7420.0	18.00	4959
	Round Up Weather max	0.51	l/acre	B	201	3.0	4.0	3.0	6790.0	17.70	4555
	Crop Aid Soil	0.25	l/acre	B	302	3.0	4.0	4.0	8257.0	17.60	5546
	Tundra	0.81	l/acre	C	401	3.0	4.0	3.0	7693.0	17.70	5161
	Crop Aid Foliar	1	l/acre	C	502	3.0	4.0	4.0	8009.0	17.00	5418
	Crop Aid Soil	0.25	l/acre	C	601	3.0	4.0	3.0	7145.0	17.60	4799
Mean =					3.0	4.0	3.3	7552.3	17.60	5073	

Column 1: EPPO species (Bayer) codes; BARLEY, , , ; VIGOUR; VISUAL; 0-5 index/scale
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 Column 3: EPPO species (Bayer) codes; BARLEY, , , ; VIGOUR; VISUAL; 0-5 index/scale
 Column 4: EPPO species (Bayer) codes; BARLEY, , , ; RAW YIELD; g/plot
 Column 5: EPPO species (Bayer) codes; BARLEY, , , ; MOISTURE; percent
 Column 6: EPPO species (Bayer) codes; BARLEY, , , ; yield; kilograms per hectare; TY1
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Crop Name						CRUDE	
Rating Date		Sep-3-2019		Sep-3-2019			
Part Rated							
Rating Type		ADJ YIELD		TEST WT		PROTEIN	
Rating Unit		BU/AC		KG/HL		% DRY	
Data Entry Date				Nov-1-2019			
Trt-Eval Interval						MATTER	
ARM Action Codes		T2					
Number of Decimals		1					
Trt	Treatment	Rate	Appl	7		8	
No.	Name	Rate	Unit	Code	Plot		9
1	Untreated Check				101	89.5	58.00
					202	83.5	57.10
					301	97.8	58.20
					402	97.9	57.40
					501	100.1	56.80
					602	92.1	58.50
					Mean =	93.5	57.67
2	Crop Aid Seed	4.6	ml/kg	A	102	94.2	58.30
	Round Up Weather max	0.51	l/acre	B	201	86.5	56.70
	Crop Aid Soil	0.25	l/acre	B	302	105.4	57.00
	Tundra	0.81	l/acre	C	401	98.0	57.40
	Crop Aid Foliar	1	l/acre	C	502	102.9	57.50
	Crop Aid Soil	0.25	l/acre	C	601	91.2	58.10
					Mean =	96.4	57.50