ARM 2019.4 Site Description Page 1 of 8

Ag-Quest Crop Aid Nutrition Canola 2019

Trial ID:	CA19SSK01CAPHA2019	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:	E establishe	d	Т		
ARM Trial Created On:	Oct-31-2019				
Initiation Date:	May-23-2019	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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Ag-Quest

Cron	Δid	Nutrition	Canola	2019
CIUP	Alu	Nutrition	Calibia	2013

Trial ID:	CA19SSK01CAPHA2019	Location:	Saskatoon	Trial Year:	2019
Protocol ID:		Investigator:	Paul Happ		
Project ID:		Study Director:	Kelvin Sander		
		Sponsor Contact:			

Objectives:

MATERIALS AND METHODS

This 3 year trial was initiated to evaluate a long term 3 crop rotational fertility regime. For this study, Canola was seeded into pea 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 canola 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 canola was 6 kg/ha. On May 23rd, 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 July 3rd. For trt. 2 Crop Aid Soil (.25 l /ac) as well as Crop Aid Foliar (1 l./ac) were tank mixed with Roundup herbicide and applied at the 5-7 lf prebolt 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. The data was analyzed with Duncan's New MRT at a 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. Although the yields at maturity did not show a statistically significant difference between the fertilizer regime (trt. 2) and the UTC, a 2.4 bushel/ac or 6.3% yield boost was obtained in this trial. Test weight was also 1.2% higher with the fertilizer regime vs the check.

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 As		
Organization:	Ag-Quest (Sas	sk.) Inc				
Address:	Site 204, box 8	3 RR.2		Phone No.:	306 384-1117	
City+State/Prov:	Saskatoon, Sa	isk.		Mobile No.:	306 230-8792	
Postal Code:	S7K 3J5	E-mail:		paul.happ@	agquest.com	
Country:	CAN Cana	ida				

ARM 2019.4 Site Description Page 3 of 8

Ag-Quest Crop Aid Nutrition Canola 2019

					Olop Ala	· · · · · · · · · · · · · · · · · · ·	ii Gailela	~0.0			
Trial ID:	CA19SSK0	1CAPHA2019			Location: Saska		atoon		Trial Year:	2019	
Protocol ID:					Investigator: Paul F		Нарр				
Project ID:				9	Study Director:	Kelvir	Sander				
				Spo	onsor Contact:						
Crop Description	on										
Crop 1:	C CANC	DLA									
l	Entry Date:	Nov-1	1-2019								
	Variety:	DKTF	92SC								
	Attributes:	RR C	anola								
Pla	nting Date:	May-2	23-2019		Planting	g Rate:	6		kg/ha		
	Depth:	1.5	cm								
						Pla	nting Met	thod:	DRILLE	drilled	
Row Spacing:		20	cm		Plant	ing Equ	ipment:	CP	Co	ne Planter	
							Seed	Bed:	MEDIUM	medium	
							Soil Mois	ture:	SLIDRY	slightly d	ſy
Ha	rvest Date:	Oct-4	-2019		Harvest Equi	pment:	Hege P	lot Co	mbine		
Mois	ture Meter:	AgTro	nix		Harvested	Width:	2.4	m			

Pest Description

					Entry Date	:	Nov-1-2019	

10.5

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	m2	Treatments	s: 2	Tillage Type:	NOTILL	no-till
Replications:	6				Study Design:	RACOBL	Randomized Complete Block (RCB)

Harvested Length: 6

	Previous	
No.	Crop	Year
1.	Peas	2018
2.	BARLEY	2017

% Standard Moisture:

Weighing Equipment:

Field Prep./Maintenance:

Site was harrowed prior to seeding. Site was harrowed prior to seeding.

Soil Description

Description Name % Sand: 2 % Silt: 3		Brown Soil Zor	ne				
% Sand:	25	% OM:	3.4	Texture:	CL	clay loam	
% Silt:	34	pH:	6.1	Soil Name:	Bradw	ell Association	
% Clay:	41	CEC:	16.5				

Analyzed By:

A&L Canada LaboratoriesA&L Canada Laboratories

Moisture and Weather Conditions

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

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Ag-Quest Crop Aid Nutrition Canola 2019

Trial ID:	CA19SSK01CAPHA2019	Location:	Saskatoon	Trial Year:	2019
Protocol ID:		Investigator:	Paul Happ		
Project ID:		Study Director:	Kelvin Sander		
		Sponsor Contact:			

Comment:

April Actual percip. 2.9 mm Normal precip. 22.9 % of Normal 12.7 Actual precip: 10.5mm Normal precip 39.4 May % 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

Actual precip: 25.1mm Normal precip 46.5 August % of Normal 54

Application Description

	Α	В	С
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

Α	В	С
CANOLA BCER	CANOLA BCER	CANOLA BCER
		BBCH
		16 60
		14 10
		17 10
		14 cm
	A CANOLA BCER	=

ARM 2019.4 Site Description Page 5 of 8

Ag-Quest Crop Aid Nutrition Canola 2019

Trial ID:	CA19SSK01CAPHA2019	Location:	Saskatoon	Trial Year:	2019
Protocol ID:		Investigator:	Paul Happ		
Project ID:		Study Director:	Kelvin Sander		
		Sponsor Contact:			

Application Equipment

	Α	В	С
Appl. Equipment	Seed Treat	Bike Sprayer	Bike 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		6.4 kph	6.4 kph
Carrier		WATER	WATER
Application Amount		100 L/ha	100 L/ha
Mix Size	1 L	1 L	1 L
Propellant	CO2	CO2	CO2

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

SE Definitions

	1.
Crop Type, Code	С

Instructions:

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

ARM 2019.4 AOV Means Table Page 6 of 8

Ag-Quest Crop Aid Nutrition Canola 2019

	Trial ID:	CA19S	SK010	CAPHA	A2019				Location:		askatoon			Trial \	ear:	2019					
	otocol ID:								estigator:		aul Happ										
Р	roject ID:								Director:	Ke	elvin San	der					Щ				
							Spoi		Contact:	_											
	p Type, Code	•				C	ANO	C LA	CAN	C OLA			C CANOLA		C CANOLA		CA	C CANOLA		C CANOLA	
Crop	o Name													F	RAW		RAW	/ ADJU	STED		TES1
Rati	ng Date					Jul-	15-20)19	Jul-30-2	2019	Aug-	19-2	201 9	Oct-4-2	019	Oct-4-	2019	Oct-4	-2019	Oct-4	I-2019
	Rated						GOU		VIGO					YIEL	.D -		IST -		ELD -	WE	GHT
	ng Type						VISU		VIS	UAL		ISU.					IELD		YIELD		
Rati	ng Unit						(0-5		0-5		(0-5	G/P			G/HA		BU/AC		KG/H
Data	a Entry Date						′-1-20		Nov-1-2	2019	Nov-	1-20	19	Oct-31	·201 9	Oct-31	1-201 9		1-201 9	Nov-	I-201
	Eval Interval						56 DA	\-A	71 🖸	A-A	91	1 DA	۸-A	113 C	A-A	113	DA-A	113	DA-A	113	DA-
	Action Cod																		T1		
	nber of Decin	nals		D-4	Δ	4				_	1						0		1		
Tr t	Treatment			Rat e	Ap pl																
No	Name		R	at ι	Jnit	Cod e		1		2		3	3		4	į	5	6	3	7	
1	Untreated Check						2.8	а	3.0	а	3.	.7	а	3254.6 5	а	2098	а	37.8	а	63.93	b
2	Round Up Weather m	ıax	0. 51	l/ acr e			2.8	а	3.0	а	3.	.7	а	3436.2 1	а	2231	а	40.2	а	64.69	а
	Crop Aid S	oil	0. 25	l/ acr e																	
	Round Up Weather M	lax	0. 33	l/ acr e	А																
	Crop Aid F	oliar	1	l/ acr e	А																
	Crop Aid S	oil	0. 25	l/ acr e	А																
LSD	P=.10						0	.52			Ì	0.	.52	663	.001	4	401.6	i	7.23		0.69
Star	ndard Deviati	ion						.45		0.00			.45		.665		326.3		5.87		0.56
CV								.78		0.0			2.2		16.1		15.08		15.08		0.8
	lett's X2					-	0	.00		0.00	-	0.	.00		.094		0.154		0.154	-	2.0
P(Ba	artlett's X2)										-			0	759	(0.695)	0.695	-	0.15
Rep	licate F					+	0.6	67	0	.000		1.6	67	6	.561	7	7.604		7.604		5.05
	licate Prob(F	-)					0.66	664	1.0	0000		0.29)44	0.0	462	0.	0359	C	0.0359	(0.070
	atment F							000		.000		0.0			.341		0.495		0.495		5.47
Trea	atment Prob(F)					1.00	000	1.0	0000		1.00	000	0.5	907	0.	5204).5204	(0.079

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.

Missing data estimates are included in columns: Yates=4,5,6,7

Column 1: EPPO species (Bayer) codes; CANOLA, , , ; VIGOUR; VISUAL; 0-5 index/scale

Column 2: EPPO species (Bayer) codes; CANOLA, , , ; VIGOUR; VISUAL; 0-5 index/scale Column 3: EPPO species (Bayer) codes; CANOLA, , , ; VIGOUR; VISUAL; 0-5 index/scale Column 4: EPPO species (Bayer) codes; CANOLA, , , RAW; yield; G/PLOT Column 5: EPPO species (Bayer) codes; CANOLA, , , RAW; MOIST; yield; kilograms per hectare Column 6: EPPO species (Bayer) codes; CANOLA, , , ADJUSTED; yield; bushels per acre; T1

Column 7: EPPO species (Bayer) codes; CANOLA, , , TEST; WEIGHT; kilogram per hectoliter

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

Ag-Quest Crop Aid Nutrition Canola 2019

Trial ID: CA19SS		CA19SSK0	9SSK01CAPHA2019			Location:		Saskatoon			Trial Yea	ar: 2019			
Pro	tocol ID:					Inves	stigator:	Paul	I Нарр						
Pr	roject ID:					Study D	Director:	Kelv	in Sander						
Sp					ponsor Contact:										
Crop	Crop Type, Code						ANOLA	СС	CANOLA	С	CANOLA	C CANOLA	C CANOLA	C CANOLA	
Crop	Crop Name											RAW	/ RAW	ADJUSTED	
Ratir	Rating Date						Jul-15-2019		Jul-30-2019		g-19-2019	Oct-4-2019	Oct-4-2019	Oct-4-2019	
Part	Part Rated					VIGOUR -		VIGOUR -			VIGOUR -	YIELD	- MOIST -	YIELD -	
Ratir	Rating Type					VISUAL		VISUAL		VISUAL			YIELD	YIELD	
Ratir	Rating Unit					0-5		0-5		0-5		G/PLO1	KG/HA	BU/AC	
	Data Entry Date					Nov-1-2019		Nov-1-2019		Nov-1-2019		Oct-31-2019	Oct-31-2019	Oct-31-2019	
Trt-E	Trt-Eval Interval					5	56 DA-A		71 DA-A		91 DA-A	113 DA-A	113 DA-A	113 DA-A	
ARM	ARM Action Codes													T1	
Num	ber of Decin	nals											0	1	
Trt	Treatment			Rate	Appl										
No	Name		Rat e	Unit	Cod e	Plot	1	2			3	4	5	6	
1	Untreated	Check				101		2.0		3.0	3	3.0 2031	.50 1332	24.0	
						202		3.0		3.0	3	3.0 2672	40 1659	29.9	
						301		3.0		3.0	4	.0 4154	.80 2685	48.3	
						402		3.0		3.0	4	.0 4630	.80 2943	53.0	
						501		3.0		3.0	4	.0 3121	20 2044	36.8	
						602		3.0		3.0	4	.0 2917	20 1926	34.7	
	Mean =						2.8		3.0		3.7	3254.65	2098	37.8	
2	Round Up max	Weather	0.51	l/ acre		102		3.0		3.0 4		.0 3354	.10 2108	37.9	
	Crop Aid S	Soil	0.25	l/ acre		201		2.0		3.0	3	3.0 2232	.10 1427	25.7	
	Round Up Max	Weather	0.33	l/ acre	Α	302		3.0		3.0	4	4336.3	36* 2818*	50.7*	
	Crop Aid F	oliar	1	l/ acre	Α	401		3.0		3.0	4	5021	.80 3296	59.3	
	Crop Aid S	Soil	0.25	l/ acre	Α	502				3.0	4	.0 3340		39.3	
						601		3.0		3.0		3.0 2332		27.9	
Mean =							2.8		3.0		3.7	3436.2	2231	40.2	

Column 1: EPPO species (Bayer) codes; CANOLA, , , ; VIGOUR; VISUAL; 0-5 index/scale

Column 2: EPPO species (Bayer) codes; CANOLA, , , , , VIGOUR, VISUAL; 0-5 index/scale Column 3: EPPO species (Bayer) codes; CANOLA, , , ; VIGOUR; VISUAL; 0-5 index/scale Column 4: EPPO species (Bayer) codes; CANOLA, , , RAW; yield; G/PLOT Column 5: EPPO species (Bayer) codes; CANOLA, , , RAW; MOIST; yield; kilograms per hectare Column 6: EPPO species (Bayer) codes; CANOLA, , , ADJUSTED; yield; yield; bushels per acre; T1 Column 7: EPPO species (Bayer) codes; CANOLA, , , TEST; WEIGHT; kilogram per hectoliter

ARM 2019.4 Assessment Data Summary Page 8 of 8

Ag-Quest Crop Aid Nutrition Canola 2019

			Crop Aid Nutrition Canola 2019									
Trial ID:	Trial ID: CA19SSK01CAPHA2019					skatoon	Trial Year:	2019				
Protocol ID:				Investigate	or: Pa	ul Happ						
Project ID:			St	udy Direct	or: Ke	lvin Sander						
			Spor	nsor Conta	ct:							
Crop Type, C	ode		-	С	CANOL	A						
Crop Name						T						
Rating Date	•					9						
Part Rated						-						
Rating Type												
Rating Unit						IL						
						19						
Trt-Eval Inter	• ••••			113 DA-	·A							
ARM Action C												
Number of De	ecimals											
Trt Treat	ment		Rate	Appl								
No. Name	9	Rate	Unit	Code	Plot	7						
1 Untre	ated Check				101	62.5	50					
					202	62.7	-					
					301	65.2	-					
					402	64.1	-					
					501	64.9	-					
					602	64.2	20					
		Mean	=	63.9								
	d Up Weather max	0.51	l/acre		102	63.5	-					
	Aid Soil	0.25	l/acre		201	64.6						
	d Up Weather Max	0.33	l/acre	A	302	65.9	-					
	Aid Foliar	1	l/acre	A	401	64.7	-					
Crop	Aid Soil	0.25	l/acre	Α	502	64.6	-					

Mean =

601

64.69

64.80