WEED CONTROL IN PROCESSING VEGETABLES

RESEARCH RESULTS – 2023

PREPARED FOR:
THE ONTARIO PROCESSING VEGETABLE GROWERS

ACKNOWLEDGEMENTS

Purpose Of This Booklet

This booklet is provided as a guide to the 2023 processing vegetable weed control research control plots. The experiments outlined in this booklet are located at Ridgetown Campus. We appreciate the funding, cooperation and assistance provided by the Ontario Processing Vegetable Growers and the Ontario Food Processors Association. As well, we would like to thank the chemical companies and their representatives, Ag Extension personnel, and other research scientists for their ideas, plant material and herbicide samples that were used in these trials. Funding for the 2023 research program was provided by:

Ontario Processing Vegetable Growers

Agricultural Chemical Companies

Technical Support

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We trust that the information provided by this research will further the science of weed control by assisting with the registration of herbicides through the minor use system. We also hope this information will be of use in the extension of proper herbicide recommendations, thereby enabling growers to achieve consistent, broad spectrum weed control with a minimum of crop damage.

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Trial 4: Preemergence Weed Management Strategies in Tomato

Objective: To examine potential processing tomato tankmix combinations with respects to tolerance and weed management.

Materials & Methods:

Crop: Processing Tomato
Variety: N 3306 Planting date: May 23, 2023
Planting rate: 39 167 plants/ha Depth: 6 cm
Row spacing: 1.5 m Plant spacing: 34 cm
Harvest date: August 21, 2023

Design: Randomized Complete Block Design
Plot width: 1.5 m Plot length: 8 m
Reps: 4

Field Preparation: Fertilizer applied on May 10, 2023 at a rate of 594 kg/ha of a blend containing 30.31% total N, 6.4% total P, 9.46% total K, and 3.62% total S. Fertilizer was incorporated within 2 hours of application with an S-tine cultivator.

Soil Description:

Sand: 49.6%	OM: 4.1%	Texture: Loam
Silt: 28.4%	pH: 6.2	Soil: Watford/Brady
Clay: 22%	CEC 12.4	

Application Information:

	A
Application Date:	May 21, 2023
Time of Day:	4:20 PM
Application Method:	CO2 SPRAY
Application Timing:	PRE-TRANS
Application Placement:	SOIL
Air Temperature, Unit:	23.2
% Relative Humidity:	42.5
Wind Velocity, Unit:	9.4 KPH
Wind Direction:	SW
Dew Presence (Y/N):	Y yes
Soil Temperature, Unit:	27.0 C
Soil Moisture:	MOIST
% Cloud Cover:	25

Spray Equipment:

Application Method: CO2 Backpack Pressure: 207 KPA (30 PSI)
Nozzle Type: Air Induction Nozzle Size: ULD120-02
Nozzle Spacing: 50 cm (20") Boom Width: 1.5 m (60")
Spray Volume: 200 L/ha (20 GAL/AC)

Table 4.1. Effect of herbicide tankmix combinations on processing tomato visual injury 7, 14 and 28 days after transplant (DAE), and dry biomass at 28 DAE.

Herbicide	Rate	Visual Injury (%)			Dry Biomass
	(ml/ac)	7 DAE	14 DAE	28 DAE	(g)
Untreated Control		0 a	0 b	0 a	20 a
Authority	117	0 a	0 b	2 a	17 a
Authority Supreme	240	1 a	3 a	2 a	16 a
Dual II Magnum	700	0 a	0 b	1 a	19 a
Sencor 480	600				
Dual II Magnum	700	1 a	1 b	3 a	18 a
Sencor 480	600				
Prowl H2O	890				
Dual II Magnum	700	0 a	1 b	1 a	18 a
Authortity	117				
Prowl H2O	890				
Dual II Magnum	700	2 a	3 a	2 a	16 a
Authority Supreme	240				
Prowl H2O	890				
Dual II Magnum	700	0 a	0 b	0 a	19 a
Sencor 480	600				
Authority	117				
Prowl H2O	890				
LSD (P <0.05)		2	1	3	5

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

Table 4.2. Effect of herbicide tankmix combinations on processing tomato redroot pigweed (AMARE), common lambsquarters (CHEAL), and green foxtail (SETVI) control at days after transplant (DAE), and red fruit tomato yield.

Herbicide	Rate	Control 28 DAE (%)			Red Yield
	(ml/ac)	AMARE	CHEAL	SETVI	(T/AC)
Untreated Control		0 d	0 d	0 a	26.94 a
Authority	117	39 abc	55 a	5 a	24.56 a
Authority Supreme	240	21 cd	68 a	19 a	26.65 a
Dual II Magnum	700	38 abc	34 ab	13 a	31.72 a
Sencor 480	600				
Dual II Magnum	700	58 ab	49 a	19 a	27.61 a
Sencor 480	600				
Prowl H2O	890				
Dual II Magnum	700	43 abc	66 a	19 a	33.04 a
Authortity	117				
Prowl H2O	890				
Dual II Magnum	700	35 bc	68 a	26 a	30.04 a
Authority Supreme	240				
Prowl H2O	890				
Dual II Magnum	700	59 a	51 a	29 a	33.91 a
Sencor 480	600				
Authority	117				
Prowl H2O	890				
LSD (P <0.05)		23	37	25	7.4

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).

Conclusions:

This trial had front halves and back halves, where the back half was kept weed-free to test for the effect of the tankmix applications on visual injury, dry biomass and tomato yield. The weedy front halves were evaluated for weed control. It should also be noted that there was very little rain following PRE herbicide application, so weed control was very poor in 2023.

At 28 days after transplant redroot pigweed and lambsquarters control was improved for most treatments versus the untreated control. The 4-way herbicide combination of Dual II Magnum + Sencor 480 + Authority + Prowl H2O showed similar levels of tomato injury and redroot pigweed, lambsquarters, and green foxtail control as the Dual II Magnum + Sencor 480, Dual II Magnum + Sencor 480 + Prowl H2O, and Dual II Magnum + Authority + Prowl H2O treatments.

No herbicide treatment reduced red yield versus the untreated control. Additionally, there was no increase in green tomato yield for any treatment, indicating that tomato maturity was not impacted (data not shown).

2023 Harrow Processing Tomato Research Report

Dr. Robert Nurse

AAFC, Harrow

FOREWORD

The information contained in this report is a summary of the 2023 tomato weed research conducted at the Harrow Research and Development Centre, Agriculture and Agri-Food Canada. Included are summaries of site description variables, treatment lists outlining chemicals, rates, and timing of application as well as crop injury ratings, weed control ratings, and marketable crop yields.

Tomato transplanting went well in 2023. The trials received adequate precipitation within the first 2 weeks after herbicides were applied. This allowed for proper activation/movement through the soil profile of any pre-emergence herbicides. All tomato trials were successfully taken to yield.

Information regarding methods is summarized for each experiment. Any additional information required will be provided upon request. Weed ratings and crop injury are based on a 0 - 100 linear scale, where 0 represents no injury and 100 represents plant death. Individual weed species control was measure through destructive biomass collection and density counts.

Statistical analyses were conducted on crop injury, weed control ratings, and yield for each experiment where applicable. The least significant difference (LSD) was calculated whenever the F-test was significant at the 5% level.

Acknowledgment and thanks are extended to the chemical companies and producer organizations -specifically their representatives for supplying material, tomato transplants, and in-kind support. The Ontario Tomato Research Institute through The Ontario Processing Vegetable Growers is thanked for their financial assistance.

A sincere note of appreciation is extended to the technician, whose willingness and hard work has enabled the collection of these data and the assembly of this report.

It is requested that data **NOT BE PUBLISHED** or used for extension purposes without prior consent from the author. The information in this report is primarily one year's data and constitutes neither a recommendation nor an endorsement.

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2023 Executive Summary

Dr. Rob Nurse (Robert.Nurse@agr.gc.ca)

The tomato variety H1014 was used in all trials.

Trial 1 – **Tolerance of processing tomato to new herbicide modes of action.**
This trial was established to determine the tolerance of processing tomatoes to the several new herbicides. This trial was kept weed-free for the entire growing season. Several growers have enquired about the safety of Shieldex on tomatoes. Shieldex is a group 27 herbicide provides both broadleaved and some annual grass control. Two additional chemistries are also being evaluated for potential release in Canada; Tough, a group 6 herbicide and metobromusron, an herbicide being registered in potatoes. All treatments were compared to an industry standard (treatment 1) for visual injury and marketable yield. As a postemergence application Shieldex caused up 100% injury and complete yield loss. Tough was applied both as a pre-transplant and postemergence treatments and showed good crop safety. However, Tough did cause up to 25% injury and 10 T/ha yield reductions when applied pre-transplant vs. postemergence. Metobromusron was applied pre-transplant and had excellent crop safety at the 1x dose; however, at the 2x dose there was significant foliar injury and up to 13 T/ha yield loss observed. These conclusions are based on 1 year of data and warrant additional testing.

Trial 2 – **Effect of weed proximity to weed-free plots .**
This trial was established to improve the accuracy of data collected from weed-free plots in tomato research trials. Plots that were maintained weed-free for the entire season were transplanted 1.5, 3, and 4.5m away from a weedy control plot. The weed spectrum largely consisted of common lambsquarters, redroot pigweed, fall panicum and hairy galinsoga. Yield data demonstrated that plots that were within 1.5 m of a weedy plot had significantly lower yields than plots that were at least 3m apart.

Trial 3 – **Weed control and tolerance of processing tomato to several 2 and 3 way herbicide combinations.**
In this trial Treflan or Prowl was applied with Dual II Magnum, Sencor, or Authority either PPI or PRE. There were no injury concerns for any of the treatments tested. The most common weeds in this trial were common lambsquarters, common ragweed, eastern black nightshadem, ladysthumb, fall panicum, large/smooth crabgrass and barnyardgrass. Weed control was excellent across all treatments, but were lower when each herbicide was applied alone. Yields were similar among all 2 and 3 way treatments, but were lower when either treflan, authority or sencor were applied alone.

Trial 4. - **Weed control and tolerance of processing tomato to applications of Treflan and/or Prowl with shallow or deep incorporation.**
In this trial depth of incorporation was compared when Prowl H20 or Treflan were applied in processing tomato. For the purposes of this trial incorporation depth was set at either 2.5cm (1") or 10cm (4"). Prowl and Treflan were tankmixed with Dual II Magnum and incorporated and then followed by Authority PRE. None of the 2 or 3 way herbicide combinations or depth of incorporation had an impact on crop safety. The weed spectrum in the field consisted of large crabgrass, barnyardgrass, common lambsquarters, redroot pigweed, eastern black nightshade, common ragweed and velvetleaf. Although the majority of the trial was dominated by common lambsquarters. Control of all species was excellent for all species across all treatments. When compared by incorporation depth the marketable yield among treatments did not differ.

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(23TOM1) ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Screening of New Herbicdes In Processing Tomatoes.

Trial ID: 23TOM1
Protocol ID: 23TOM1 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Crop Description

Crop 1: LYPES Tomato
Entry Date: Jul-25-2023
Variety: Heinz 1014
Planting Date: May-18-2023 **Planting Rate:** 30000 P/ha
Rows per Plot: 2 **Planting Method:** TRAMAC
Row Spacing: 45 cm **Planting Equipment:** MT transplanter, mechanical
Spacing within Row: 45 cm
Harvest Date: Aug-23-2023 **Harvest Equipment:** Black Welder Tomato Harvester
Harvested Width: 1.5 m
Harvested Length: 8 m

Site and Design

Treated Plot Width: 2.25 m
Treated Plot Length: 8 m
Treated Plot Area: 18.0 m2
Replications: 4 **Treatments:** 9 **Plots:** 36 **Study Design:** RACOBL Randomized Complete Block (RCB)
Distance between 'Plot' Experimental Units: 0 m

No.	Previous Crop	Year
1.	SECCW	2022

Field Prep./Maintenance:

May 10- Spread the bulk tomato fertilizer for the tomato trial. Used a blend 15% Nitrogen, 10.1% Phosphorus, 6.4% Potassium, 0.3% Zinc, 9.4% Sulphur, 3.7% Calcium, 1.9% Magnesium, 0.8% Manganese. Spread the fertilizer @ 890 kg/ha product (795 lbs/acre)

May 11-Worked the field north and south with the cultivator and packers 1x to incorporate the fertilizer

May 15-Used the 10 foot triple k and packer and incorporated the PPI treatments

May 26-Irrigated the tomato trial

May 30-Irrigated the tomato trial

June 21-Side dressed the tomato trials with 28% UAN. Applied at 147 lbs/acre (150 kg/ha actual), 535 L/ha product.

June 30-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

July 21-Sprayed the tomato trial with Bravo ZN (500 g/L) @ 4 L/ha product for disease control

July 21- Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

August 4- Sprayed the tomato trial with Bravo ZN (500 g/L) @ 2.4 L/ha product for disease control

August 11-Sprayed the tomato trials with Ethrel (240 g/L) @ 6.4 L/ha product for vine ripening

(23TOM1)
Description

ARM 2023.3 Site

Agriculture and Agri-Food Canada Harrow

Soil Description
Description Name: G1+2
% Sand: 70 **% OM:** 2.4 **Texture:** SL
% Silt: 20 **Soil Name:** Tuscola Fine Sandy Loam
% Clay: 10
pH: 6.4 **CEC:** 7.1

Weather Conditions
Weather Station Name: HRDC Weather Station **Distance:** 0.5 km

Application Description

	A	B	C	D	E
Date	May-15-2023	May-16-2023	Jun-7-2023	Jun-8-2023	Jun-8-2023
Start Time	9:00 AM	9:00 AM	8:30 AM	9:00 AM	9:00 AM
Timing	PPI	PRE-T	5LF+	3WPT	3WPT
Air Temperature Start, Stop	9, - C	15, - C	78.8, - C	16.9, - C	16.9, - C
% Relative Humidity Start, Stop	52.6, -	46.2, -	52, -	58, -	58, -
Wind Velocity+Dir. Start	5 KPH, NE	7.2 KPH, NW	4.6 KPH, NW	3.5 KPH, N	3.5 KPH, N
Wet Leaves (Y/N)	N, no	N, no	N, no	N, no	N, no
First Moisture Occurred On	May-19-2023	May-19-2023	Jul-11-2023	Jul-11-2023	Jul-11-2023
Time to First Moisture	4.0 DAY	3.0 DAY	4.0 DAY	3.0 DAY	3.0 DAY
Moisture 6 Hours after Appl.	0 mm	0 mm	0 mm	0 mm	0 mm
Moisture 1 Week after Appl.	13.2 mm	13.2 mm	41 mm	41.2 mm	41.2 mm

Crop Stage At Each Application

	A	B	C	D	E
Crop 1 Code, BBCH Scale	LYPES, BVSO	LYPES, BVSO	LYPES, BVSO	LYPES, BVSO	LYPES, BVSO
Stage Majority, Percent			5-7LF, -		
Height Average			15 cm		

Application Equipment

	A	B	C	D	E
Equipment Name	5 nozzle	5 nozzle	5 nozzle	5 nozzle	5 nozzle
Equipment Type	BACCAI	BACCAI	BACCAI	BACCAI	BACCAI
Operation Pressure	275 kPa	275 kPa	275 kPa	275 kPa	275 kPa
Nozzle Model	ULD120-02	ULD120-02	ULD120-02	ULD120-02	ULD120-02
Nozzle Spacing	50 cm	50.0 cm	50.0 cm	50.0 cm	50.0 cm
Band Width	2.25 m	2.25 m	2.25 m	2.25 m	2.25 m
Boom Height	50 cm	50.0 cm	50.0 cm	50.0 cm	50.0 cm
Incorporation Equip.	CULFIE				
Hours to Incorp.	2.0				
Incorp. Depth	2.5 cm				
Carrier	WATER	WATER	WATER	WATER	WATER
Application Amount	197 L/ha	197 L/ha	197 L/ha	197 L/ha	197 L/ha
Mix Size	1.6 L	1.6 L	1.6 L	1.6 L	1.6 L
Propellant	COMCO2	COMCO2	COMCO2	COMCO2	COMCO2

(23TOM1)

ARM 2023.3 Trial Treatments

Agriculture and Agri-Food Canada Harrow

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Description	Supplier	Rate	Rate Unit	Appl Code	Appl Timing
1	Weedfree Ck									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Pinnacle	50	%	SG	thifensulfuron-methyl	FMC	6.0	g ai/ha	D	3WPT
	Agral 90	92	%	L	Non-Ionic Surfactant	SYN	0.2	% v/v	D	3WPT
	Poast Ultra	450	g/L	EC	sethoxydim	BAS	0.5	kg ai/ha	D	3WPT
	Merge	100	%	L		BAS	2	l/ha	D	3WPT
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.14	kg ai/ha	D	3WPT
2	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Shieldex	400	g/L	SL	tolpyralate	ISK	0.03	kg ai/ha	D	3WPT
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.14	kg ai/ha	D	3WPT
	MSO Concentrate	70	%	L	methylated seed oil	LOV	1	% v/v	D	3WPT
3	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Shieldex	400	g/L	SL	tolpyralate	ISK	0.03	kg ai/ha	D	3WPT
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.14	kg ai/ha	D	3WPT
	MSO Concentrate	70	%	L	methylated seed oil	LOV	2	% v/v	D	3WPT
	Shieldex	400	g/L	SL	tolpyralate	ISK	0.03	kg ai/ha	E	3WPTsplit
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.14	kg ai/ha	E	3WPTsplit
	MSO Concentrate	70	%	L	methylated seed oil	LOV	2	% v/v	E	3WPTsplit
4	Tough	600	g/L	EC	pyridate	BEL	0.9	kg ai/ha	B	PRE-T
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.3	kg ai/ha	B	PRE-T
	Pinnacle	50	%	SG	thifensulfuron-methyl	FMC	6.0	g ai/ha	D	3WPT
	Agral 90	92	%	L	Non-Ionic Surfactant	SYN	0.2	% v/v	D	3WPT
	Poast Ultra	450	g/L	EC	sethoxydim	BAS	0.5	kg ai/ha	D	3WPT
	Merge	100	%	L		BAS	2	l/ha	D	3WPT
5	Tough	600	g/L	EC	pyridate	BEL	1.8	kg ai/ha	B	PRE-T
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.3	kg ai/ha	B	PRE-T
	Pinnacle	50	%	SG	thifensulfuron-methyl	FMC	6	g ai/ha	D	3WPT
	Agral 90	92	%	L	Non-Ionic Surfactant	SYN	0.2	% v/v	D	3WPT
	Poast Ultra	450	g/L	EC	sethoxydim	BAS	0.5	kg ai/ha	D	3WPT
	Merge	100	%	L		BAS	2	l/ha	D	3WPT
6	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Tough	600	g/L	EC	pyridate	BEL	0.9	kg ai/ha	C	5LF+
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.3	kg ai/ha	C	5LF+
7	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Tough	600	g/L	EC	pyridate	BEL	1.8	kg ai/ha	C	5LF+
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.7	kg ai/ha	C	5LF+
8	metobromusron	500	g/L	SC	metobromuron	BEL	1.5	kg ai/ha	B	PRE-T
	Pinnacle	50	%	SG	thifensulfuron-methyl	FMC	6.0	g ai/ha	D	3WPT
	Agral 90	92	%	L	Non-Ionic Surfactant	SYN	0.2	% v/v	D	3WPT
	Poast Ultra	450	g/L	EC	sethoxydim	BAS	0.5	kg ai/ha	D	3WPT
	Merge	100	%	L		BAS	2	l/ha	D	3WPT
9	metobromusron	500	g/L	SC	metobromuron	BEL	3	kg ai/ha	B	PRE-T
	Pinnacle	50	%	SG	thifensulfuron-methyl	FMC	6.0	g ai/ha	D	3WPT
	Agral 90	92	%	L	Non-Ionic Surfactant	SYN	0.2	% v/v	D	3WPT
	Poast Ultra	450	g/L	EC	sethoxydim	BAS	0.5	kg ai/ha	D	3WPT
	Merge	100	%	L		BAS	2	l/ha	D	3WPT

(23TOM1) ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Screening of New Herbicdes in Processing Tomatoes.

Trial ID: 23TOM1
Protocol ID: 23TOM1 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Rating Date	May-25-2023	Jun-2-2023	Jun-16-2023	Jun-14-2023	Jun-21-2023	Jul-5-2023	Aug-23-2023
Rating Type	PHYGEN	PHYGEN	PHYGEN	PHYGEN	PHYGEN	PHYGEN	YIELD
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	T-US, -, -
Crop Name	Tomato	Tomato	Tomato	Tomato	Tomato	Tomato	Tomato
Trt-Eval Interval				7 DA-C	14 DA-C	28 DA-C	100 DA-A
Plant-Eval Interval	7 DP-1	15 DP-1	29 DP-1				97 DP-1
Description	Preplant Applic>	Preplant Applic>	Preplant Applic>	Postplant Appli>	Postplant Appli>	Postplant Appli>	
Trt No.							
1	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 c	43.8 a
2	0.0 b	0.0 b	0.0 b	45.0 a	63.8 a	90.0 a	8.0 b
3	0.0 b	0.0 b	0.0 b	52.5 a	70.0 a	99.3 a	0.6 b
4	0.0 b	0.0 b	0.0 b	5.0 b	6.3 b	25.0 bc	32.9 a
5	0.0 b	0.0 b	0.0 b	2.5 b	2.5 b	12.5 c	31.3 a
6	0.0 b	0.0 b	0.0 b	0.0 b	1.3 b	0.8 c	43.0 a
7	0.0 b	0.0 b	0.0 b	0.0 b	6.3 b	0.8 c	42.6 a
8	0.0 b	0.0 b	0.0 b	6.3 b	7.5 b	0.0 c	42.5 a
9	17.5 a	20.0 a	25.0 a	47.5 a	62.5 a	41.3 b	30.3 a
LSD P=.05	2.43	3.97	1.99	8.26	12.58	18.89	11.79
Standard Deviation	1.67	2.72	1.36	5.66	8.62	12.95	8.08
CV	85.71	122.47	48.99	32.1	35.26	43.24	26.44
Grand Mean	1.94	2.22	2.78	17.64	24.44	29.94	30.56
Levene's F^	0.681	2.042	2.042	0.831	0.563	2.521*	3.566*
Levene's Prob(F)	0.704	0.079	0.079	0.583	0.799	0.034*	0.006*
Rank X2	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.
Skewness^	-2.9835*	0.0	0.0	0.8428*	0.3646	0.6455	-0.6025
P(Skewness)^	0.0*	1.0	1.0	0.0467*	0.3785	0.1233	0.1494
Kurtosis^	15.913*	13.1718*	13.1718*	2.7273*	0.2895	1.126	1.8784*
P(Kurtosis)^	0.0*	0.0*	0.0*	0.0017*	0.7195	0.1679	0.0246*

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

(2322TOM1) ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Effect of weeds on weedfree plots by distance from weedy check

Trial ID: 2322TOM1
Protocol ID: 2322TOM1 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Crop Description

Crop 1: LYPES Tomato
Entry Date: Jul-25-2023
Variety: Heinz 1014
Planting Date: May-18-2023
Rows per Plot: 2
Row Spacing: 45 cm
Spacing within Row: 45 cm
Harvest Date: Aug-23-2023
Planting Rate: 30000 P/ha
Planting Method: TRAMAC
Planting Equipment: MT transplanter, mechanical
Harvest Equipment: Black Welder Tomato Harvester
Harvested Width: 1.5 m
Harvested Length: 8 m

Pest Description

Code: CHEAL
Common Name: lambsquarters, common

Code: AMARE
Common Name: pigweed, redroot

Code: ABUTH
Common Name: velvetleaf

Code: POLPE
Common Name: ladysthumb

Code: GASCI
Common Name: hairy galinsoga

Code: PANDI
Common Name: panicum, fall

Code: ECHCG
Common Name: barnyardgrass

Code: DIGSA
Common Name: crabgrass, large

Site and Design

Treated Plot Width: 1.5 m
Treated Plot Length: 8 m
Treated Plot Area: 12.0 m2
Replications: 4 **Treatments:** 7 **Plots:** 28
Tillage Type: MINTIL minimum-till
Study Design: NONRAN Non-Randomized

No.	Previous Crop	Year
1.	SECCW	2022

(2322TOM1) ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Field Prep./Maintenance:

May 10- Spread the bulk tomato fertilizer for the tomato trial. Used a blend 15% Nitrogen, 10.1% Phosphorus, 6.4% Potassium, 0.3% Zinc, 9.4% Sulphur, 3.7% Calcium, 1.9% Magnesium, 0.8% Manganese. Spread the fertilizer @ 890 kg/ha product (795 lbs/acre)

May 11-Worked the field north and south with the cultivator and packers 1x to incorporate the fertilizer

May 15-Used the 10 foot triple k and packer and incorporated the PPI treatments

May 26-Irrigated the tomato trial

May 30-Irrigated the tomato trial

June 21-Side dressed the tomato trials with 28% UAN. Applied at 147 lbs/acre (150 kg/ha actual), 535 L/ha product.

June 30-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

July 21-Sprayed the tomato trial with Bravo ZN (500 g/L) @ 4 L/ha product for disease control

July 21- Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

August 4- Sprayed the tomato trial with Bravo ZN (500 g/L) @ 2.4 L/ha product for disease control

August 11-Sprayed the tomato trials with Ethrel (240 g/L) @ 6.4 L/ha product for vine ripening

Soil Description

Description Name: G1+2

% Sand:	70	**% OM:**	2.4	**Texture:**	SL
% Silt:	20			**Soil Name:**	Tuscola Fine Sandy Loam
% Clay:	10				
		pH:	6.4	**CEC:**	7.1

Weather Conditions

Weather Station Name: HRDC Weather Station **Distance:** 0.5 km

Application Description

	A
Date	May-15-2023
Start Time	9:00 AM
Standard	PRTI
Timing	PRETRA
Air Temperature Start, Stop	9, - C
% Relative Humidity Start, Stop	52.6, -
Wind Velocity+Dir. Start	5 KPH, NE
First Moisture Occurred On	May-19-2023
Time to First Moisture	4.0 DAY
Moisture 6 Hours after Appl.	0 mm
Moisture 1 Week after Appl.	13.2 mm

(2322TOM1) ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Application Equipment

	A
Equipment Name	5 nozzle
Equipment Type	BACCAI
Operation Pressure	275 kPa
Nozzle Model	ULD120-02
Nozzle Spacing	50 cm
Band Width	2.25 m
Boom Height	50 cm
Incorporation Equip.	CULFIE
Hours to Incorp.	2.0
Incorp. Depth	2.5 cm
Carrier	WATER
Application Amount	204 L/ha
Mix Size	1.1 L
Propellant	COMCO2

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Description	Supplier	Rate	Rate Unit	Appl Code	Appl Timing
1	Weedfree 4.5m away									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
2	Weedfree 3m away									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
3	Weedfree 1.5m away									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
4	Weedy									
5	Weedfree 1.5m away									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
6	Weedfree 3m away									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
7	Weedfree 4.5m away									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI

(2322TOM1)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Effect of weeds on weedfree plots by distance from weedy check

Trial ID: 2322TOM1
Protocol ID: 2322TOM1 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Rating Date	Jul-25-2023	Jul-25-2023	Jul-25-2023	Jul-25-2023	Jul-25-2023	Jul-25-2023	Jul-25-2023	Jul-25-2023
Rating Type	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass
Rating Unit/Min/Max	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -
Crop Name	Tomato	Tomato	Tomato	Tomato	Tomato	Tomato	Tomato	Tomato
Pest Code	CHEAL	CHEAL	AMARE	AMARE	PANDI	PANDI	GASCI	GASCI
Pest Height Average	183 cm	183 cm	- cm	- cm	- cm	- cm		- cm
Pest Density	67.5 %	67.5 %	20.25 %	- %	2.25 %	- %	1.75 %	- %
Pest Density Min/Max	50, 90	50, 90	8, 30		1, 4		0, 5	
Trt-Eval Interval	71 DA-A	71 DA-A	71 DA-A	71 DA-A	71 DA-A	71 DA-A	71 DA-A	71 DA-A
Plant-Eval Interval	68 DP-1	68 DP-1	68 DP-1	68 DP-1	68 DP-1	68 DP-1	68 DP-1	68 DP-1
Trt No.								
1	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a
2	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a
3	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a
4	9.3 a	298.5 a	1.3 a	25.0 a	0.8 a	4.2 a	0.3 a	0.4 a
5	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a
6	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a
7	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a
LSD P=.05	0.95	42.16	0.53	11.65	0.28	2.29	0.28	0.42
Standard Deviation	0.65	28.67	0.36	7.92	0.19	1.56	0.19	0.28
CV	48.85	67.23	202.65	221.82	176.38	257.71	529.15	529.15
Grand Mean	1.32	42.64	0.18	3.57	0.11	0.60	0.04	0.05
Levene's F^	4.058*	1.576	5.357*	8.346*	0.595	67.881*	0.595	0.595
Levene's Prob(F)	0.007*	0.203	0.002*	0.00*	0.731	0.00*	0.731	0.731
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness^	-0.9383	2.085*	-1.065*	-0.268	-2.4926*	-0.1078	2.4926*	2.4926*
P(Skewness)^	0.0531	0.0001*	0.0296*	0.5682	0.0*	0.818	0.0*	0.0*
Kurtosis^	8.1228*	10.2158*	6.7684*	6.4461*	11.1577*	3.3907*	11.1577*	11.1577*
P(Kurtosis)^	0.0*	0.0*	0.0*	0.0*	0.0*	0.0008*	0.0*	0.0*

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

(2322TOM1)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Aug-23-2023
Rating Type	YIELD
Rating Unit/Min/Max	T-US, -, -
Crop Name	Tomato
Pest Code	
Pest Height Average	
Pest Density	
Pest Density Min/Max	
Trt-Eval Interval	100 DA-A
Plant-Eval Interval	97 DP-1
Trt No.	
1	38.6 a
2	29.0 abc
3	24.1 bc
4	2.0 d
5	22.6 c
6	33.1 ab
7	34.1 ab
LSD P=.05	7.79
Standard Deviation	5.30
CV	20.22
Grand Mean	26.21
Levene's F^	0.351
Levene's Prob(F)	0.901
Rank X2	.
P(Rank X2)	.
Skewness^	-0.3185
P(Skewness)^	0.4981
Kurtosis^	-0.5824
P(Kurtosis)^	0.5247

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

(2321TOM2) ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Resistance management in processing tomatoes.

Trial ID: 2321TOM2
Protocol ID: 2321TOM2 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Crop Description

Crop 1: LYPES Tomato
Entry Date: Jul-25-2023
Variety: Heinz 1014
Planting Date: May-18-2023
Rows per Plot: 2
Row Spacing: 45 cm
Spacing within Row: 45 cm
Harvest Date: Aug-23-2023

Planting Rate: 30000 P/ha
Planting Method: TRAMAC
Planting Equipment: MT transplanter, mechanical

Harvest Equipment: Black Welder Tomato Harvester
Harvested Width: 1.5 m
Harvested Length: 8 m

Pest Description

Code: SOLPT
Common Name: nightshade, eastern black

Code: CHEAL
Common Name: lambsquarters, common

Code: AMARE
Common Name: pigweed, redroot

Code: ABUTH
Common Name: velvetleaf

Code: POLPE
Common Name: ladysthumb

Code: AMBEL
Common Name: ragweed, common

Code: GASCI
Common Name: hairy galinsoga

Code: PANDI
Common Name: panicum, fall

Code: ECHCG
Common Name: barnyardgrass

Code: DIGSA
Common Name: crabgrass, large

Code: ERACN
Common Name: stinkgrass

Site and Design

Treated Plot Width: 2.25 m
Treated Plot Length: 8 m
Treated Plot Area: 18.0 m2
Replications: 4 **Treatments:** 15 **Plots:** 60

Tillage Type: MINTIL minimum-till
Study Design: RACOBL Randomized Complete Block (RCB)

No.	Previous Crop	Year
1.	SECCW	2022

(2321TOM2)

ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Field Prep./Maintenance:

May 10- Spread the bulk tomato fertilizer for the tomato trial. Used a blend 15% Nitrogen, 10.1% Phosphorus, 6.4% Potassium, 0.3% Zinc, 9.4% Sulphur, 3.7% Calcium, 1.9% Magnesium, 0.8% Manganese. Spread the fertilizer @ 890 kg/ha product (795 lbs/acre)

May 11-Worked the field north and south with the cultivator and packers 1x to incorporate the fertilizer

May 15-Used the 10 foot triple k and packer and incorporated the PPI treatments

May 26-Irrigated the tomato trial

May 30-Irrigated the tomato trial

June 21-Side dressed the tomato trials with 28% UAN. Applied at 147 lbs/acre (150 kg/ha actual), 535 L/ha product.

June 30-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

July 21-Sprayed the tomato trial with Bravo ZN (500 g/L) @ 4 L/ha product for disease control

July 21- Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

August 4- Sprayed the tomato trial with Bravo ZN (500 g/L) @ 2.4 L/ha product for disease control

August 11-Sprayed the tomato trials with Ethrel (240 g/L) @ 6.4 L/ha product for vine ripening

Soil Description

Description Name: G1+2

% Sand:	70	**% OM:**	2.4	**Texture:**	SL
% Silt:	20			**Soil Name:**	Tuscola Fine Sandy Loam
% Clay:	10				
		pH:	6.4	**CEC:**	7.1

Weather Conditions

Weather Station Name: HRDC Weather Station **Distance:** 0.5 km

Application Description

	A	B
Date	May-15-2023	May-16-2023
Start Time	9:00 AM	9:00 AM
Timing	PPI	PRE
Air Temperature Start, Stop	9, - C	15, - C
% Relative Humidity Start, Stop	52.6, -	46.2, -
Wind Velocity+Dir. Start	5 KPH, NE	7.2 KPH, NW
First Moisture Occurred On	May-19-2023	May-19-2023
Time to First Moisture	4.0 DAY	3.0 DAY
Moisture 6 Hours after Appl.	0 mm	0 mm
Moisture 1 Week after Appl.	13.2 mm	13.2 mm

(2321TOM2)

ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Application Equipment

	A	B
Equipment Name	5 nozzle	5 nozzle
Equipment Type	BACCAI	BACCAI
Operation Pressure	275 kPa	275 kPa
Nozzle Model	ULD120-02	ULD120-02
Nozzle Spacing	50 cm	50 cm
Band Width	2.25 m	2.25 m
Boom Height	50 cm	50 cm
Incorporation Equip.	CULFIE	
Hours to Incorp.	2.0	
Incorp. Depth	2.5 cm	
Carrier	WATER	WATER
Application Amount	197 L/ha	197 L/ha
Mix Size	1.6 L	1.6 L
Propellant	COMCO2	COMCO2

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Description	Supplier	Rate	Rate Unit	Appl Code	Appl Timing
1	Weedy Check									
2	Weedfree Check									
3	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
4	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
5	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	B	PRE
6	Prowl H20	240	g/L	MS	pendimethalin	BAS	1	kg ai/ha	B	PRE
7	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
8	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
9	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	B	PRE
10	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	B	PRE
11	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	B	PRE
12	Prowl H20	240	g/L	MS	pendimethalin	BAS	1	kg ai/ha	B	PRE
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	B	PRE
13	Prowl H20	240	g/L	MS	pendimethalin	BAS	1	kg ai/ha	B	PRE
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	B	PRE
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	B	PRE
14	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1	kg ai/ha	B	PRE
15	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Sencor 480	480	g/L	SL	metribuzin	BAY	0.24	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1	kg ai/ha	B	PRE
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	B	PRE

(2321TOM2)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Resistance management in processing tomatoes.

Trial ID: 2321TOM2
Protocol ID: 2321TOM2 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Rating Date	May-25-2023	Jun-2-2023	Jun-8-2023	Jun-16-2023	Jun-16-2023	Jun-16-2023	Jun-16-2023	Jun-16-2023	Jun-16-2023	Jun-16-2023
Rating Type	PHYGEN	PHYGEN	PHYGEN	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Crop Name	Tomato	Tomato	Tomato							
Pest Code				CHEAL	AMARE	ABUTH	AMBEL	POLPE	DIGSA	SOLPT
Trt-Eval Interval										
Plant-Eval Interval	7 DP-1	15 DP-1	21 DP-1	29 DP-1	29 DP-1	29 DP-1	29 DP-1	29 DP-1	29 DP-1	29 DP-1
Trt No.										
1	0.0 a	0.0 a	0.0 a	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b
2	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
3	0.0 a	0.0 a	0.0 a	74.0 a	85.8 a	86.5 a	92.5 a	92.5 a	99.5 a	76.5 a
4	0.0 a	0.0 a	0.0 a	87.5 a	87.5 a	87.5 a	87.5 a	87.5 a	87.5 a	82.5 a
5	0.0 a	0.0 a	0.0 a	100.0 a	92.5 a	83.8 a	100.0 a	98.8 a	82.5 a	100.0 a
6	0.0 a	0.0 a	0.0 a	100.0 a	95.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
7	0.0 a	0.0 a	0.0 a	92.5 a	87.5 a	87.5 a	97.5 a	100.0 a	100.0 a	87.5 a
8	0.0 a	0.0 a	0.0 a	92.5 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
9	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	98.8 a	100.0 a	100.0 a	100.0 a	100.0 a
10	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
11	0.0 a	0.0 a	0.0 a	75.0 a	100.0 a	100.0 a	100.0 a	100.0 a	87.5 a	92.5 a
12	0.0 a	0.0 a	0.0 a	100.0 a	95.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
13	0.0 a	0.0 a	0.0 a	95.0 a	100.0 a	100.0 a	100.0 a	100.0 a	95.0 a	93.8 a
14	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
15	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
LSD P=.05	.	.	.	22.38	14.96	15.87	10.19	10.03	15.83	14.74
Standard Deviation	0.00	0.00	0.00	15.67	10.48	11.11	7.13	7.02	11.08	10.32
CV	0.0	0.0	0.0	17.86	11.7	12.4	7.77	7.64	12.3	11.62
Grand Mean	0.00	0.00	0.00	87.77	89.55	89.60	91.83	91.91	90.13	88.85
Levene's F^	.	.	.	0.766	0.836	0.868	0.817	0.793	0.876	1.439
Levene's Prob(F)	.	.	.	0.698	0.628	0.596	0.647	0.671	0.589	0.176
Rank X2	.	.	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.	.	.
Skewness^	.	.	.	-2.818*	-2.2643*	-2.1948*	-3.2998*	-3.3987*	-1.8875*	-1.7004*
P(Skewness)^	.	.	.	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*
Kurtosis^	.	.	.	14.9465*	8.9043*	7.507*	20.356*	21.5758*	6.1083*	6.3811*
P(Kurtosis)^	.	.	.	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in
columns:Yates=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38; Average=41
Could not calculate LSD (% mean diff) for columns 1,2,3 because error mean square = 0.
^Calculated from residual.

(2321TOM2)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Crop Name										
Pest Code	SOLPT	CHEAL	AMARE	ABUTH	POLPE	AMBEL	GASCI	PANDI	ECHCG	DIGSA
Trt-Eval Interval	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A
Plant-Eval Interval	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1
Trt No.										
1	0 c	0 c	0 b	0 b	0 c	0 b	0 c	0 d	0 c	0 b
2	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a
3	0 c	34 b	98 a	29 ab	73 ab	100 a	0 c	86 a	95 a	68 a
4	0 c	56 b	0 b	63 ab	68 ab	100 a	98 a	18 cd	0 c	70 a
5	0 c	100 a	43 ab	25 ab	0 c	63 a	66 ab	20 cd	0 c	38 a
6	59 ab	84 a	0 b	25 ab	50 abc	88 a	70 ab	73 ab	38 b	78 a
7	100 a	34 b	70 a	25 ab	30 bc	88 a	85 a	93 a	100 a	100 a
8	40 bc	43 b	73 a	50 ab	59 abc	81 a	93 a	75 ab	88 a	95 a
9	40 bc	80 a	100 a	0 b	6 c	88 a	68 ab	75 ab	98 a	100 a
10	95 a	100 a	100 a	50 ab	83 ab	100 a	73 ab	70 ab	100 a	100 a
11	99 a	100 a	100 a	25 ab	78 ab	100 a	73 ab	56 abc	95 a	100 a
12	98 a	100 a	50 ab	63 ab	24 bc	100 a	28 bc	18 cd	85 a	44 a
13	70 ab	95 a	46 ab	93 ab	75 ab	100 a	75 ab	28 bcd	60 ab	91 a
14	88 a	100 a	93 a	75 ab	100 a	81 a	76 ab	90 a	100 a	98 a
15	98 a	100 a	100 a	98 a	98 a	100 a	91 a	98 a	100 a	95 a
LSD P=.05	30.2	18.2	36.6	54.1	38.9	26.6	33.3	34.5	26.3	35.5
Standard Deviation	21.1	12.8	25.6	37.9	27.3	18.6	23.3	24.1	18.4	24.8
CV	35.81	17.04	39.52	79.15	48.57	21.7	35.15	40.32	26.09	31.72
Grand Mean	59.0	75.0	64.8	47.9	56.1	85.8	66.3	59.8	70.5	78.3
Levene's F^	2.258*	3.165*	13.157*	1.564	0.567	0.734	1.41	0.879	2.899*	1.553
Levene's Prob(F)	0.02*	0.002*	0.00*	0.129	0.876	0.729	0.189	0.586	0.004*	0.133
Rank X2	.	.	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.	.	.
Skewness^	-0.3801	-0.2922	-0.0864	0.2678	-0.1133	-1.4557*	-0.4998	0.0017	-0.4591	-0.3066
P(Skewness)^	0.2383	0.3635	0.7875	0.4047	0.7238	0.0*	0.1227	0.9957	0.1555	0.3447
Kurtosis^	6.4079*	2.2492*	0.6108	0.3502	0.7442	3.4664*	0.8658	0.4115	4.5892*	0.4114
P(Kurtosis)^	0.0*	0.0007*	0.3353	0.5797	0.2414	0.0*	0.1738	0.5153	0.0*	0.519

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in
columns:Yates=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38; Average=41
Could not calculate LSD (% mean diff) for columns 1,2,3 because error mean square = 0.
^Calculated from residual.

(2321TOM2) ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023
Rating Type	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass
Rating Unit/Min/Max	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -
Crop Name								
Pest Code	CHEAL	CHEAL	SOLPT	SOLPT	AMARE	AMARE	GASCI	GASCI
Trt-Eval Interval								
Plant-Eval Interval	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1
Trt No.								
1	13.3 a	201.5 a	0.0 b	0.0 b	1.8 a	26.4 a	1.0 b	1.6 c
2	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a	0.0 b	0.0 c
3	2.8 b	137.2 a	0.6 b	12.3 b	0.2 a	2.4 a	2.4 a	34.1 a
4	1.0 b	20.8 b	1.8 a	23.6 a	1.5 a	23.2 a	0.0 b	0.0 c
5	0.0 b	0.0 b	0.5 b	6.0 b	0.0 a	0.0 a	1.3 b	9.3 c
6	0.3 b	8.0 b	0.0 b	0.0 b	0.8 a	27.3 a	0.5 b	4.8 c
7	2.0 b	130.5 a	0.0 b	0.0 b	1.8 a	44.0 a	0.0 b	0.0 c
8	1.3 b	43.5 b	0.3 b	0.6 b	0.0 a	0.0 a	0.0 b	0.0 c
9	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a	0.0 b	0.0 c
10	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a	0.0 b	0.0 c
11	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a	0.0 b	0.0 c
12	0.0 b	0.0 b	0.0 b	0.0 b	0.5 a	14.3 a	1.0 b	21.3 b
13	0.0 b	0.0 b	0.0 b	0.0 b	0.5 a	1.4 a	0.0 b	0.0 c
14	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a	0.0 b	0.0 c
15	0.0 b	0.0 b	0.0 b	0.0 b	0.0 a	0.0 a	0.0 b	0.0 c
LSD P=.05	3.10	67.36	0.67	10.85	1.33	31.22	1.01	9.85
Standard Deviation	2.17	47.17	0.47	7.60	0.93	21.86	0.71	6.90
CV	158.81	130.68	223.31	268.13	201.34	236.19	171.58	145.74
Grand Mean	1.37	36.10	0.21	2.83	0.46	9.25	0.41	4.74
Levene's F^	1.273	1.702	9.379*	17.964*	1.335	2.322*	2.203*	1.482
Levene's Prob(F)	0.262	0.09	0.00*	0.00*	0.227	0.017*	0.023*	0.158
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness^	-3.4869*	-0.8638*	-0.4132	0.3079	1.5831*	1.6146*	0.9478*	0.6069
P(Skewness)^	0.0*	0.0089*	0.2004	0.3385	0.0*	0.0*	0.0043*	0.0621
Kurtosis^	25.7494*	7.4658*	6.9876*	7.4135*	6.5534*	6.6424*	3.055*	4.549*
P(Kurtosis)^	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in
columns:Yates=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38; Average=41
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^Calculated from residual.

(2321TOM2)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023
Rating Type	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass
Rating Unit/Min/Max	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -
Crop Name								
Pest Code	ABUTH	ABUTH	PANDI	PANDI	POLPE	POLPE	ECHCG	ECHCG
Trt-Eval Interval								
Plant-Eval Interval	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1
Trt No.								
1	0.5 a	3.8 a	0.5 a	5.0 a	3.3 a	17.3 a	0.0 a	0.0 a
2	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
3	0.3 a	2.4 a	0.1 a	0.6 a	1.1 b	2.7 a	0.0 a	-0.1 a
4	0.0 a	0.0 a	0.5 a	3.8 a	0.3 b	3.8 a	0.0 a	0.0 a
5	0.5 a	23.3 a	2.8 a	32.2 a	0.5 b	19.8 a	1.3 a	4.3 a
6	1.0 a	24.5 a	0.0 a	0.0 a	0.3 b	2.4 a	0.0 a	0.0 a
7	1.0 a	41.8 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
8	0.8 a	15.3 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
9	0.5 a	15.8 a	0.3 a	2.0 a	0.0 b	0.0 a	0.0 a	0.0 a
10	0.3 a	10.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
11	0.0 a	0.0 a	0.3 a	0.4 a	0.0 b	0.0 a	0.0 a	0.0 a
12	0.0 a	0.0 a	0.8 a	16.5 a	0.3 b	2.2 a	0.0 a	0.0 a
13	0.0 a	0.0 a	0.3 a	1.9 a	0.0 b	0.0 a	0.0 a	0.0 a
14	0.0 a	0.0 a	2.8 a	25.3 a	0.0 b	0.0 a	0.0 a	0.0 a
15	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
LSD P=.05	1.05	36.78	2.34	24.82	1.00	16.79	0.93	3.17
Standard Deviation	0.73	25.75	1.64	17.38	0.70	11.76	0.65	2.22
CV	231.32	282.72	302.53	297.68	189.2	367.36	802.88	802.88
Grand Mean	0.32	9.11	0.54	5.84	0.37	3.20	0.08	0.28
Levene's F^	0.43	0.363	1.046	1.619	1.345	1.145	0.788	0.788
Levene's Prob(F)	0.956	0.979	0.429	0.112	0.221	0.349	0.676	0.676
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness^	0.974*	1.5609*	3.0344*	2.3041*	1.7486*	2.9542*	4.0795*	4.0795*
P(Skewness)^	0.0034*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*
Kurtosis^	2.1792*	6.5415*	18.8929*	11.8009*	7.0311*	17.5914*	29.4992*	29.4992*
P(Kurtosis)^	0.001*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*

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Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in
columns:Yates=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38; Average=41
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^Calculated from residual.

(2321TOM2)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jul-20-2023	Jul-20-2023	Aug-23-2023
Rating Type	WeedBiomass	WeedBiomass	YIELD
Rating Unit/Min/Max	#/m2, -, -	g/m2, -, -	T-US, -, -
Crop Name			Tomato
Pest Code	DIGSA	DIGSA	
Trt-Eval Interval			100 DA-A
Plant-Eval Interval	63 DP-1	63 DP-1	97 DP-1
Trt No.			
1	0.8 a	1.5 a	2.6 c
2	0.0 a	0.0 a	32.0 ab
3	0.0 a	1.1 a	12.5 bc
4	0.3 a	2.2 a	13.2 bc
5	0.0 a	0.0 a	19.5 ab
6	0.3 a	15.8 a	30.9 ab
7	0.0 a	0.0 a	16.2 bc
8	0.0 a	0.0 a	23.8 ab
9	0.0 a	0.0 a	37.0 a
10	0.0 a	0.0 a	32.0 ab
11	0.0 a	0.0 a	32.2 ab
12	0.0 a	0.0 a	31.2 ab
13	0.0 a	0.0 a	38.1 a
14	0.0 a	0.0 a	36.7 a
15	0.0 a	0.0 a	37.6 a
LSD P=.05	0.45	11.92	11.97
Standard Deviation	0.31	8.35	8.36
CV	372.44	610.57	31.72
Grand Mean	0.08	1.37	26.37
Levene's F^	2.871*	0.801	0.873
Levene's Prob(F)	0.004*	0.663	0.591
Rank X2	.	.	.
P(Rank X2)	.	.	.
Skewness^	1.6795*	3.9218*	0.5526
P(Skewness)^	0.0*	0.0*	0.0972
Kurtosis^	9.2257*	27.6738*	0.6437
P(Kurtosis)^	0.0*	0.0*	0.3226

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in
columns:Yates=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38; Average=41
Could not calculate LSD (% mean diff) for columns 1,2,3 because error mean square = 0.
^Calculated from residual.

(2321TOM3)

ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Tolerance and Weed Control using 2 and 3-way PPI and PRE tankmixes in processing tomatoes.

Trial ID: 2321TOM3
Protocol ID: 2321TOM3 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Crop Description

Crop 1: LYPES Tomato
Entry Date: Jul-25-2023
Variety: Heinz 1014
Planting Date: May-18-2023 **Planting Rate:** 30000 P/ha
Rows per Plot: 2
Row Spacing: 45 cm **Planting Equipment:** MT transplanter, mechanical
Spacing within Row: 45 cm
Harvest Date: Aug-23-2023 **Harvest Equipment:** Black Welder Tomato Harvester
Harvested Width: 1.5 m
Harvested Length: 8 m

Pest Description

Code: SOLPT
Common Name: nightshade, eastern black

Code: CHEAL
Common Name: lambsquarters, common

Code: AMARE
Common Name: pigweed, redroot

Code: ABUTH
Common Name: velvetleaf

Code: POLPE
Common Name: ladysthumb

Code: AMBEL
Common Name: ragweed, common

Code: GASCI
Common Name: hairy galinsoga

Code: PANDI
Common Name: panicum, fall

Code: ECHCG
Common Name: barnyardgrass

Code: DIGSA
Common Name: crabgrass, large

Code: ERACN
Common Name: stinkgrass

Site and Design

Treated Plot Width: 2.25 m
Treated Plot Length: 8 m
Treated Plot Area: 18.0 m2
Replications: 4 **Treatments:** 16 **Plots:** 64 **Study Design:** SPLPLO Split-Plot

No.	Previous Crop	Year
1.	SECCW	2022

(2321TOM3)

ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Field Prep./Maintenance:

May 10- Spread the bulk tomato fertilizer for the tomato trial. Used a blend 15% Nitrogen, 10.1% Phosphorus, 6.4% Potassium, 0.3% Zinc, 9.4% Sulphur, 3.7% Calcium, 1.9% Magnesium, 0.8% Manganese. Spread the fertilizer @ 890 kg/ha product (795 lbs/acre)

May 11-Worked the field north and south with the cultivator and packers 1x to incorporate the fertilizer

May 15-Used the 10 foot triple k and packer and incorporated the PPI treatments

May 26-Irrigated the tomato trial

May 30-Irrigated the tomato trial

June 21-Side dressed the tomato trials with 28% UAN. Applied at 147 lbs/acre (150 kg/ha actual), 535 L/ha product.

June 30-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Admire (240 g/L) @ 200 mL/ha product for Colorado Potato beetle control

July 10-Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

July 21-Sprayed the tomato trial with Bravo ZN (500 g/L) @ 4 L/ha product for disease control

July 21- Sprayed the tomatoes with Stopit Calcium @ 5 L/ha product

August 4- Sprayed the tomato trial with Bravo ZN (500 g/L) @ 2.4 L/ha product for disease control

August 11-Sprayed the tomato trials with Ethrel (240 g/L) @ 6.4 L/ha product for vine ripening

Soil Description

Description Name: G1+2

% Sand:	70	**% OM:**	2.4	**Texture:**	SL
% Silt:	20			**Soil Name:**	Tuscola Fine Sandy Loam
% Clay:	10				
		pH:	6.4	**CEC:**	7.1

Weather Conditions

Weather Station Name: HRDC Weather Station **Distance:** 0.5 km

Application Description

	A
Date	May-15-2023
Start Time	9:00 AM
Timing	PPI
Air Temperature Start, Stop	9, - C
% Relative Humidity Start, Stop	52.6, -
Wind Velocity+Dir. Start	5 KPH, NE
Wet Leaves (Y/N)	N, no
First Moisture Occurred On	May-19-2023
Time to First Moisture	4.0 DAY
Moisture 6 Hours after Appl.	0 mm
Moisture 1 Week after Appl.	13.2 mm

(2321TOM3)

ARM 2023.3 Site Description

Agriculture and Agri-Food Canada Harrow

Application Equipment

	A
Equipment Name	5 nozzle
Equipment Type	BACCAI
Operation Pressure	275 kPa
Nozzle Model	ULD120-02
Nozzle Spacing	50 cm
Band Width	2.25 m
Boom Height	50 cm
Incorporation Equip.	CULFIE
Hours to Incorp.	2.0
Carrier	WATER
Application Amount	197 L/ha
Mix Size	1.6 L
Propellant	COMCO2

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Description	Supplier	Rate	Rate Unit	Appl Code	Appl Timing
1	Shallow Incorporation Weedy									
2	Shallow Incorporation Weedfree									
3	Shallow Incorporation Boundary	777	g/L	EC	s-metolachlor/metribuzin	SYN	1.943	kg ai/ha	A	PPI
4	Shallow Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1.0	kg ai/ha	A	PPI
5	Shallow Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
6	Shallow Incorporation									
	Boundary	777	g/L	EC	s-metolachlor/metribuzin	SYN	1.943	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1.0	kg ai/ha	A	PPI
7	Shallow Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1.0	kg ai/ha	A	PPI
8	Shallow Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	A	PPI
9	Deep Incorporation Weedy									
10	Deep Incorporation Weedfree									
11	Deep Incorporation Boundary	777	g/L	EC	s-metolachlor/metribuzin	SYN	1.943	kg ai/ha	A	PPI
12	Deep Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1.0	kg ai/ha	A	PPI
13	Deep Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
14	Deep Incorporation									
	Boundary	777	g/L	EC	s-metolachlor/metribuzin	SYN	1.943	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1.0	kg ai/ha	A	PPI
15	Deep Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	A	PPI
	Prowl H20	240	g/L	MS	pendimethalin	BAS	1.0	kg ai/ha	A	PPI
16	Deep Incorporation									
	Dual II Magnum	915	g/L	EC	s-metolachlor	SYN	1.6	kg ai/ha	A	PPI
	Treflan	480	g/L	EC	trifluralin	GOW	1.15	kg ai/ha	A	PPI
	Authority	480	g/L	SL	sulfentrazone	FMC	0.14	kg ai/ha	A	PPI

(2321TOM3)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Tolerance and Weed Control using 2 and 3-way PPI and PRE tankmixes in processing tomatoes.

Trial ID: 2321TOM3
Protocol ID: 2321TOM3 Location: Harrow Trial Year: 2023
Study Director: E. Lepp
Investigator:

Rating Date	May-25-2023	Jun-2-2023	Jun-8-2023	Jun-16-2023	Jun-16-2023	Jun-16-2023	Jun-16-2023
Rating Type	PHYGEN	PHYGEN	PHYGEN	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Crop Name							
Pest Code				CHEAL	AMARE	POLPE	GASCI
Pest Density							
Pest Density Min/Max							
Trt-Eval Interval	10 DA-A	18 DA-A	24 DA-A	32 DA-A	32 DA-A	32 DA-A	32 DA-A
Plant-Eval Interval	7 DP-1	15 DP-1	21 DP-1	29 DP-1	29 DP-1	29 DP-1	29 DP-1
Trt No.							
1	0.0 a	0.0 a	0.0 a	0.0 c	0.0 b	0.0 b	0.0 c
2	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
3	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
4	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
5	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
6	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
7	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
8	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
9	0.0 a	0.0 a	0.0 a	20.0 b	100.0 a	75.0 a	50.0 b
10	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
11	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
12	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
13	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
14	0.0 a	0.0 a	0.0 a	97.5 a	100.0 a	100.0 a	100.0 a
15	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
16	0.0 a	0.0 a	0.0 a	100.0 a	100.0 a	100.0 a	100.0 a
Planned Comparisons 1-8,9-16 (Pairwise)							
Mean square	0.00	0.00	0.00	3819.90	2500.00	2572.92	2958.33
F value	.	.	.	96.32	.	16.47	14.20
Pr > F	.	.	.	<0.01	.	<0.01	<0.01
LSD P=.05	.	.	.	8.99	.	17.84	20.60
Standard Deviation	0.00	0.00	0.00	6.30	0.00	12.50	14.43
CV	0.0	0.0	0.0	7.11	0.0	13.56	15.93
Grand Mean	0.00	0.00	0.00	88.59	93.75	92.19	90.63
Levene's F^	.	.	.	11.451*	.	0.817	
Levene's Prob(F)	.	.	.	0.00*	.	0.655	0.00*
Rank X2	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.
Skewness^	.	.	.	0.9768*	.	-4.2748*	0.0
P(Skewness)^	.	.	.	0.0022*	.	0.0*	1.0
Kurtosis^	.	.	.	16.3292*	.	32.3903*	12.0825*
P(Kurtosis)^	.	.	.	0.0*	.	0.0*	0.0*

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean separations are based on the complete error term.
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=40
Could not calculate LSD (% mean diff) for columns 1,2,3,5 because error mean square = 0.
^Calculated from residual.

(2321TOM3)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jun-16-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-24-2023
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Crop Name									
Pest Code	DIGSA	SOLPT	CHEAL	AMARE	ABUTH	POLPE	AMBEL	GASCI	PANDI
Pest Density		9.63 %	64.38 %	2.63 %	0.5 %	6 %	0.38 %	0.25 %	2 %
Pest Density Min/Max		0, 25	50, 90	1, 5	0, 2	0, 20	0, 2	0, 1	0, 5
Trt-Eval Interval	32 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A	70 DA-A
Plant-Eval Interval	29 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1	67 DP-1
Trt No.									
1	0.0 c	0 b	0 b	0 b	0 b	0 b	0 b	0 b	0 c
2	100.0 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a
3	100.0 a	55 ab	58 ab	100 a	100 a	83 a	100 a	100 a	93 ab
4	100.0 a	100 a	65 ab	88 a	88 a	40 ab	100 a	100 a	78 ab
5	100.0 a	75 ab	53 ab	100 a	88 a	100 a	100 a	100 a	75 ab
6	100.0 a	33 ab	59 ab	95 a	88 a	63 ab	100 a	100 a	93 ab
7	100.0 a	90 a	94 a	100 a	88 a	100 a	88 a	100 a	78 ab
8	100.0 a	50 ab	74 a	100 a	100 a	80 a	100 a	50 a	80 ab
9	37.5 b	0 b	0 b	0 b	0 b	0 b	0 b	0 b	0 c
10	100.0 a	100 a	100 a	100 a	100 a	100 a	75 a	100 a	100 a
11	100.0 a	25 ab	60 ab	100 a	100 a	46 ab	88 a	100 a	25 bc
12	100.0 a	43 ab	48 ab	93 a	88 a	80 a	100 a	65 a	63 abc
13	100.0 a	33 ab	39 ab	75 a	75 a	68 a	75 a	75 a	70 ab
14	98.8 a	48 ab	53 ab	100 a	100 a	98 a	100 a	100 a	50 abc
15	100.0 a	50 ab	66 ab	88 a	88 a	33 ab	75 a	0 b	33 abc
16	100.0 a	25 ab	54 ab	100 a	81 a	73 a	100 a	100 a	38 abc
Planned Comparisons 1-8,9-16 (Pairwise)									
Mean square	3261.85	4436.3	3322.5	4456.6	4150.4	4596.2	4416.7	6358.3	4382.4
F value	81.90	3.8	4.5	16.9	12.4	5.1	8.0	12.1	5.2
Pr > F	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LSD P=.05	9.01	48.6	38.9	23.2	26.1	42.9	33.6	32.7	41.4
Standard Deviation	6.31	34.0	27.3	16.3	18.3	30.1	23.5	22.9	29.0
CV	7.03	66.03	47.45	19.45	22.8	45.33	28.98	30.81	47.68
Grand Mean	89.77	51.6	57.5	83.6	80.1	66.3	81.3	74.4	60.8
Levene's F^	0.822	1.031	2.338*	0.80	0.796	1.984*	0.689	4.318*	1.232
Levene's Prob(F)	0.649	0.442	0.013*	0.672	0.676	0.037*	0.782	0.00*	0.282
Rank X2	.	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.	.
Skewness^	-4.2187*	0.1417	-0.4998	-2.7476*	-1.4601*	-0.5206	-2.045*	-1.1692*	0.05
P(Skewness)^	0.0*	0.6451	0.1077	0.0*	0.0*	0.0941	0.0*	0.0003*	0.8709
Kurtosis^	31.7034*	-0.4441	0.4262	13.3758*	1.8052*	0.5885	5.913*	5.7411*	-0.6006
P(Kurtosis)^	0.0*	0.4651	0.4832	0.0*	0.004*	0.3338	0.0*	0.0*	0.324

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Mean separations are based on the complete error term.
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=40
Could not calculate LSD (% mean diff) for columns 1,2,3,5 because error mean square = 0.
^Calculated from residual.

(2321TOM3)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jul-24-2023	Jul-24-2023	Jul-24-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023
Rating Type	CONTRO	CONTRO	CONTRO	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -
Crop Name								
Pest Code	ECHCG	DIGSA	ERACN	CHEAL	CHEAL	SOLPT	SOLPT	AMARE
Pest Density	0.63 %	0.63 %	12.13 %					
Pest Density Min/Max	0, 5	0, 3	0, 30					
Trt-Eval Interval	70 DA-A	70 DA-A	70 DA-A	66 DA-A	66 DA-A	66 DA-A	66 DA-A	66 DA-A
Plant-Eval Interval	67 DP-1	67 DP-1	67 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1
Trt No.								
1	0 b	0 b	0 c	9.0 a	182.5 a	0.8 a	3.3 b	0.0 a
2	100 a	100 a	100 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a
3	100 a	96 a	83 ab	0.8 a	102.5 a	0.0 a	0.0 b	0.0 a
4	100 a	100 a	95 a	0.8 a	69.5 a	0.0 a	0.0 b	0.0 a
5	100 a	100 a	78 ab	1.3 a	110.5 a	0.0 a	0.0 b	0.0 a
6	75 a	75 a	68 ab	1.3 a	91.8 a	0.0 a	0.0 b	0.0 a
7	100 a	100 a	91 ab	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a
8	100 a	100 a	63 ab	0.8 a	104.5 a	0.3 a	1.8 b	0.0 a
9	0 b	0 b	0 c	2.0 a	97.5 a	0.3 a	1.5 b	0.3 a
10	100 a	100 a	100 a	0.8 a	59.3 a	0.0 a	0.0 b	0.0 a
11	100 a	100 a	25 bc	0.3 a	36.3 a	0.5 a	19.3 a	0.0 a
12	100 a	100 a	58 abc	0.8 a	40.5 a	0.0 a	0.0 b	0.0 a
13	100 a	100 a	70 ab	2.3 a	158.8 a	0.0 a	0.0 b	0.3 a
14	88 a	100 a	48 abc	0.8 a	41.3 a	0.0 a	0.0 b	0.0 a
15	100 a	75 a	80 ab	0.3 a	11.8 a	0.3 a	1.0 b	0.0 a
16	100 a	75 a	43 abc	0.8 a	46.8 a	0.0 a	0.0 b	0.0 a
Planned Comparisons 1-8,9-16 (Pairwise)								
Mean square	4601.6	4542.1	4153.7	18.23	11270.69	0.20	91.39	0.03
F value	23.6	10.8	5.1	1.39	0.76	1.68	2.04	0.89
Pr > F	<0.1	<0.1	<0.1	0.20	0.72	0.09	0.03	0.58
LSD P=.05	19.9	29.3	40.6	5.17	174.32	0.49	9.54	0.26
Standard Deviation	14.0	20.5	28.4	3.62	122.16	0.35	6.69	0.18
CV	16.41	24.84	45.57	269.62	169.48	276.03	400.03	579.0
Grand Mean	85.2	82.6	62.4	1.34	72.08	0.13	1.67	0.03
Levene's F^	0.84	0.698	1.286	1.426	0.636	2.983*	3.779*	0.847
Levene's Prob(F)	0.63	0.774	0.248	0.174	0.83	0.002*	0.00*	0.623
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness^	-3.5004*	-2.3627*	-0.7168*	3.3076*	1.0693*	1.0719*	2.3816*	3.1197*
P(Skewness)^	0.0*	0.0*	0.0225*	0.0*	0.0009*	0.0009*	0.0*	0.0*
Kurtosis^	21.4727*	8.377*	0.7111	23.5669*	1.4175*	3.9209*	21.1775*	15.4796*
P(Kurtosis)^	0.0*	0.0*	0.2437	0.0*	0.0221*	0.0*	0.0*	0.0*

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean separations are based on the complete error term.
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=40
Could not calculate LSD (% mean diff) for columns 1,2,3,5 because error mean square = 0.
^Calculated from residual.

(2321TOM3)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023
Rating Type	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass
Rating Unit/Min/Max	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -
Crop Name								
Pest Code	AMARE	ERACN	ERACN	GASCI	GASCI	PANDI	PANDI	DIGSA
Pest Density								
Pest Density Min/Max								
Trt-Eval Interval	66 DA-A	66 DA-A	66 DA-A	66 DA-A	66 DA-A	66 DA-A	66 DA-A	66 DA-A
Plant-Eval Interval	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1
Trt No.								
1	0.0 a	5.3 a	34.8 a	0.5 a	1.8 a	0.8 a	5.2 a	0.3 a
2	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
4	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
5	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
6	0.0 a	0.8 b	1.3 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
7	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
8	0.0 a	0.5 b	9.5 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
9	4.5 a	2.8 b	22.0 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a
10	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
11	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.5 a	1.3 a	0.3 a
12	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.3 a	0.8 a	0.0 a
13	15.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
14	0.0 a	0.3 b	0.8 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
15	0.0 a	0.0 b	0.0 b	0.5 a	2.8 a	0.3 a	6.0 a	0.0 a
16	0.0 a	1.0 b	4.5 b	0.3 a	1.0 a	0.3 a	11.3 a	0.0 a
Planned Comparisons								
1-8,9-16 (Pairwise)								
Mean square	59.06	8.03	392.91	0.12	2.60	0.20	41.07	0.04
F value	0.94	3.81	2.36	1.38	1.13	1.23	1.04	0.84
Pr > F	0.53	<0.01	0.01	0.20	0.36	0.29	0.43	0.63
LSD P=.05	11.32	2.07	18.39	0.43	2.16	0.57	8.96	0.31
Standard Deviation	7.93	1.45	12.89	0.30	1.51	0.40	6.28	0.22
CV	650.85	221.35	283.49	384.06	440.53	322.19	411.53	469.15
Grand Mean	1.22	0.66	4.55	0.08	0.34	0.13	1.53	0.05
Levene's F^	0.833	2.081*	2.153*	0.976	0.701	1.455	0.821	0.703
Levene's Prob(F)	0.638	0.028*	0.023*	0.494	0.771	0.161	0.65	0.769
Rank X2	.	.	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.	.	.
Skewness^	3.8841*	1.5738*	2.4341*	2.2064*	2.8635*	1.7951*	2.8643*	2.3958*
P(Skewness)^	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*
Kurtosis^	27.1646*	14.7173*	16.7423*	11.4526*	17.4672*	6.0623*	16.1758*	8.5778*
P(Kurtosis)^	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*	0.0*

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
Mean separations are based on the complete error term.
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=40
Could not calculate LSD (% mean diff) for columns 1,2,3,5 because error mean square = 0.
^Calculated from residual.

(2321TOM3)

ARM 2023.3 AOV Means Table

Agriculture and Agri-Food Canada Harrow

Rating Date	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Jul-20-2023	Aug-23-2023
Rating Type	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	WeedBiomass	YIELD
Rating Unit/Min/Max	g/m2, -, -	#/m2, -, -	g/m2, -, -	#/m2, -, -	g/m2, -, -	T-US, -, -
Crop Name						Tomato
Pest Code	DIGIS	ECHCG	ECHCG	POLPE	POLPE	
Pest Density						
Pest Density Min/Max						
Trt-Eval Interval	66 DA-A	66 DA-A	66 DA-A	66 DA-A	66 DA-A	100 DA-A
Plant-Eval Interval	63 DP-1	63 DP-1	63 DP-1	63 DP-1	63 DP-1	97 DP-1
Trt No.						
1	3.7 a	0.5 a	4.8 a	0.5 a	1.2 a	11.9 a
2	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	41.5 a
3	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	24.3 a
4	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	25.1 a
5	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	28.1 a
6	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	28.0 a
7	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	41.3 a
8	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	23.1 a
9	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	6.8 a
10	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	39.4 a
11	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	28.0 a
12	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	27.3 a
13	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	20.9 a
14	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	27.1 a
15	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	26.9 a
16	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	31.4 a
Planned Comparisons						
1-8,9-16 (Pairwise)						
Mean square	3.37	0.06	5.64	0.06	0.36	342.80
F value	0.98	1.00	1.00	1.00	1.00	1.60
Pr > F	0.49	0.47	0.47	0.47	0.47	0.12
LSD P=.05	2.64	0.36	3.39	0.36	0.85	20.95
Standard Deviation	1.85	0.25	2.38	0.25	0.60	14.66
CV	707.86	800.0	800.0	800.0	800.0	54.41
Grand Mean	0.26	0.03	0.30	0.03	0.07	26.94
Levene's F^	0.822	0.817	0.817	0.817	0.817	1.303
Levene's Prob(F)	0.649	0.655	0.655	0.655	0.655	0.239
Rank X2	.	.	.	.	.	.
P(Rank X2)	.	.	.	.	.	.
Skewness^	4.2147*	4.2748*	4.2748*	4.2748*	4.2748*	0.1995
P(Skewness)^	0.0*	0.0*	0.0*	0.0*	0.0*	0.5238
Kurtosis^	31.7344*	32.3903*	32.3903*	32.3903*	32.3903*	-0.2415
P(Kurtosis)^	0.0*	0.0*	0.0*	0.0*	0.0*	0.6953

Means followed by same letter or symbol do not significantly differ (P=.05, Student-Newman-Keuls).
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Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=40
Could not calculate LSD (% mean diff) for columns 1,2,3,5 because error mean square = 0.
^Calculated from residual.

2023 Executive Summary

Dr. Rob Nurse (Robert.Nurse@agr.gc.ca)

The tomato variety H1014 was used in all trials.

Trial 1 – **Tolerance of processing tomato to new herbicide modes of action.**
This trial was established to determine the tolerance of processing tomatoes to the several new herbicides. This trial was kept weed-free for the entire growing season. Several growers have enquired about the safety of Shieldex on tomatoes. Shieldex is a group 27 herbicide provides both broadleaved and some annual grass control. Two additional chemistries are also being evaluated for potential release in Canada; Tough, a group 6 herbicide and metobromusron, an herbicide being registered in potatoes. All treatments were compared to an industry standard (treatment 1) for visual injury and marketable yield. As a postemergence application Shieldex caused up 100% injury and complete yield loss. Tough was applied both as a pre-transplant and postemergence treatments and showed good crop safety. However, Tough did cause up to 25% injury and 10 T/ha yield reductions when applied pre-transplant vs. postemergence. Metobromusron was applied pre-transplant and had excellent crop safety at the 1x dose; however, at the 2x dose there was significant foliar injury and up to 13 T/ha yield loss observed. These conclusions are based on 1 year of data and warrant additional testing.

Trial 2 – **Effect of weed proximity to weed-free plots .**
This trial was established to improve the accuracy of data collected from weed-free plots in tomato research trials. Plots that were maintained weed-free for the entire season were transplanted 1.5, 3, and 4.5m away from a weedy control plot. The weed spectrum largely consisted of common lambsquarters, redroot pigweed, fall panicum and hairy galinsoga. Yield data demonstrated that plots that were within 1.5 m of a weedy plot had significantly lower yields than plots that were at least 3m apart.

Trial 3 – **Weed control and tolerance of processing tomato to several 2 and 3 way herbicide combinations.**
In this trial Treflan or Prowl was applied with Dual II Magnum, Sencor, or Authority either PPI or PRE. There were no injury concerns for any of the treatments tested. The most common weeds in this trial were common lambsquarters, common ragweed, eastern black nightshadem, ladysthumb, fall panicum, large/smooth crabgrass and barnyardgrass. Weed control was excellent across all treatments, but were lower when each herbicide was applied alone. Yields were similar among all 2 and 3 way treatments, but were lower when either treflan, authority or sencor were applied alone.

Trial 4. - **Weed control and tolerance of processing tomato to applications of Treflan and/or Prowl with shallow or deep incorporation.**
In this trial depth of incorporation was compared when Prowl H20 or Treflan were applied in processing tomato. For the purposes of this trial incorporation depth was set at either 2.5cm (1") or 10cm (4"). Prowl and Treflan were tankmixed with Dual II Magnum and incorporated and then followed by Authority PRE. None of the 2 or 3 way herbicide combinations or depth of incorporation had an impact on crop safety. The weed spectrum in the field consisted

of large crabgrass, barnyardgrass, common lambsquarters, redroot pigweed, eastern black nightshade, common ragweed and velvetleaf. Although the majority of the trial was dominated by common lambsquarters. Control of all species was excellent for all species across all treatments. When compared by incorporation depth the marketable yield among treatments did not differ.