

WEED CONTROL IN TOMATOES

RESEARCH RESULTS – 2006

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**FOR THE ONTARIO TOMATO
RESEARCH INSTITUTE**

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EXECUTIVE SUMMARY – WEED CONTROL IN TOMATOES (2007)

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Biologically Effective Rate of Sulfentrazone in Transplanted Tomato

This trial was established to determine tolerance of transplanted tomato to pre-transplant applications of sulfentrazone applied at rates from 21 to 672 ml/ac. Sulfentrazone caused stunting and leaf necrosis at 672 ml/ac at 14 and 28 days after transplanting. Injury was also observed at the 336 ml/ac rate at 28 days after transplanting. Plant dry weight and marketable yield were not less than the untreated check in any of the herbicide treatments.

Tolerance of Eight Tomato Varieties to Rimsulfuron (Prism)

Prism applied at 40 or 80 g/ac did not injure any of the tomato varieties tested, nor did it reduce plant dry weight or marketable yield. Some Pinnacle-sensitive varieties (T900 and H9909) were included in the trial, none of which were injured.

Tolerance of Processing Tomato Varieties to Pinnacle

Pinnacle injured H2206, H2306, H3907, H4707, H5007 and reduced yield of H2306, H3907, H4707 and H5007.

Tolerance of Tomatoes to Pinnacle and Soybean Oil Versus Agral 90

Soybean oil increased injury in tomato caused by Pinnacle alone in H9909, CC337, T900, CC390. The injury symptoms included chlorosis, leaf burning and stunting in T900 and CC390, both of which showed delayed maturity in the soybean oil treatment than the untreated check.

Recropping After Prism Use in Tomato

A recropping study was established this year to determine the potential for carryover from Prism applied at 40 and 80 g/ac. Winter wheat was planted into a portion of the trial area this fall, and seed corn, soybean, and sugar beet will be planted in the spring, and followed next year for injury, growth and yield.

ACKNOWLEDGEMENTS

Purpose Of This Report

This report is provided as a guide to the 2007 tomato weed control research control plots. The experiments outlined in this booklet are located at Ridgetown College. We appreciate the funding, cooperation and assistance provided by the Ontario Tomato Research Institute (tomato growers and processing companies). As well, we would like to thank the chemical companies and their representatives, agextension personnel, and other research scientists for their ideas, plant material and herbicide samples that were used in these trials. Funding for the 2007 research program was provided by:

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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 1: Biologically Effective Rate of Sulfentrazone in Transplanted Tomato

Objectives:

1. Determine the efficacy and tolerance of tomato to sulfentrazone applied PRE-T at various rates from 21 to 672 ml/ac to support a potential minor use. This herbicide gives good control of triazine-tolerant lamb's-quarters.

Materials & Methods:

Crop: Tomato

Variety: H9478

Planting rate: 14850 plants/ha

Row spacing: 1.5m

Planting date: May 23

Depth: 5 cm

Plant spacing: 45 cm

Design: Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

Field Preparation: Field was worked with an S-tine cultivator and fertilizer was applied at 77 kg N/ha on May 7.

Soil Description:

Sand: 54%

Silt: 29%

Clay: 17%

OM: 4.7%

pH: 7.5

CEC 18

Texture: V. Fine Sandy Loam

Soil: Watford/Brady

Application Information:

APPLICATION DATE	A MAY 23
TIME OF DAY	7:15AM
TIMING	PRE-T
AIR TEMP (c)	16
RH (%)	78
WIND SPEED (KPH)	10
SOIL TEMP (c)	15
CLOUD COVER (%)	0
CROP STAGE	PRE

Spray Equipment:

Application Method: CO2 Backpack

Nozzle Type: Air Induction

Nozzle Spacing: 50 cm (20")

Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)

Nozzle Size: ULD120-02

Boom Width: 1.5 m (60")

Table 1.1. Effect of herbicide treatment on tomato visual injury 7, 14 and 28 days after planting, and plant dry weight 28 days after planting.

HERBICIDE	RATE	VISUAL INJURY			DRY WT G
		7D	14D	28D	
1. Check (WEEDFREE)		0C	0C	0C	24A
2. SULFENTRAZONE	21 ML/AC	0C	0C	1C	22A
3. SULFENTRAZONE	42 ML/AC	1C	0C	1C	23A
4. SULFENTRAZONE	84 ML/AC	1C	2C	2C	18A
5. SULFENTRAZONE	168 ML/AC	2C	1C	4C	22A
6. SULFENTRAZONE	336 ML/AC	4AB	4B	11B	22A
7. SULFENTRAZONE	672 ML/AC	9A	14A	18A	17A
LSD (P <0.05)		2	3	6	9

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

Table 1.2. Effect of herbicide treatment on ragweed and lamb's-quarters control 28 and 56 days after application.

HERBICIDE	RATE	COMMON RAGWEED		LAMBSQUARTERS	
		28D	56D	28D	56D
1. Check (WEEDFREE)		0C	0C	0D	0D
2. SULFENTRAZONE	21 ML/AC	25BC	25BC	36C	18D
3. SULFENTRAZONE	42 ML/AC	25BC	43ABC	51C	49C
4. SULFENTRAZONE	84 ML/AC	21BC	23BC	75B	70BC
5. SULFENTRAZONE	168 ML/AC	65AB	64AB	76B	80AB
6. SULFENTRAZONE	336 ML/AC	79A	57AB	89AB	88AB
7. SULFENTRAZONE	672 ML/AC	96A	80A	99A	98A
LSD (P <0.05)		47	50	17	22

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

Trial 2: Tolerance of Eight Tomato Varieties to Rimsulfuron (Prism)

Objective: Determine the tolerance of eight varieties of tomato to Prism at 40 and 80 g/ac, to support an URMULE submission to increase the current Prism rate for control of triazine-tolerant lamb's-quarters.

Materials & Methods:

Crop: Tomato

Variety: various

Planting rate: 14850 plants/ha

Row spacing: 1.5m

Planting date: May 23

Depth: 5 cm

Plant spacing: 45 cm

Design: Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

Field Preparation: Field was worked with an S-tine cultivator and fertilizer was applied at 77 kg N/ha on May 7.

Soil Description:

Sand: 54%

Silt: 29%

Clay: 17%

OM: 4.7%

pH: 7.5

CEC 18

Texture: V. Fine Sandy Loam

Soil: Watford/Brady

Application Information:

	A
APPLICATION DATE	JUN 11
TIME OF DAY	8:40PM
TIMING	21DAT
AIR TEMP (c)	18
RH (%)	74
WIND SPEED (KPH)	5
SOIL TEMP (c)	25
CLOUD COVER (%)	0
CROP STAGE	4-10 LF

Spray Equipment:

Application Method: CO2 Backpack

Nozzle Type: Air Induction

Nozzle Spacing: 50 cm (20")

Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)

Nozzle Size: ULD120-02

Boom Width: 1.5 m (60")

Table 2.1. Effect of tomato variety and Prism rate on visual injury in tomatoes 7, 14 and 28 days after treatment.

Variety	PRISM RATE (G/AC)	VISUAL INJURY (D AFTER TREATMENT)		
		7D	14D	28D
H9909	40	2	2	4
	80	4	3	3
CC337	40	1	2	3
	80	1	1	2
T900	40	1	0	0
	80	1	1	1
CC390	40	1	1	4
	80	1	3	2
SUNCHIEF	40	3	6	6
	80	3	6	7
FLORIDA47	40	0	2	7
	80	2	4	5
MTN FRESH	40	1	6	8
	80	2	5	5
SUNOMA	40	2	2	5
	80	3	4	4
LSD (P <0.05)		NS	NS	NS

Table 2.2. Effect of tomato variety and Prism rate on plant dry weight at 28 days after transplanting and marketable yield in tomatoes.

Variety	PRISM RATE (G/AC)	DRY WT (G)	YIELD (T/AC)
H9909	0	188	26
	40	272	20
	80	201	29
CC337	0	219	21
	40	225	26
	80	234	27
T900	0	262	28
	40	299	30
	80	262	32
CC390	0	138	24
	40	115	30
	80	156	29
SUNCHIEF	0	134	ND
	40	144	18
	80	177	20
FLORIDA47	0	138	10
	40	153	14
	80	153	13
MTN FRESH	0	75	13
	40	103	12
	80	120	16
SUNOMA	0	91	18
	40	128	16
	80	122	20
LSD (P <0.05)		NS	NS

Note: Means followed by the same letter are not significantly different.

Conclusions:

Prism applied at 40 or 80 g/ac did not injure any of the tomato varieties tested, nor did it reduce plant dry weight or marketable yield. Some Pinnacle-sensitive varieties (T900 and H9909) were included in the trial, none of which were injured.

Trial 3: Tolerance of Processing Tomato Varieties to Pinnacle

Objective: Determine the tolerance of several tomato varieties to Pinnacle.

Materials & Methods:

Crop: Tomato

Variety: various

Planting rate: 14850 plants/ha

Row spacing: 1.5m

Planting date: May 9

Depth: 5 cm

Plant spacing: 45 cm

Design: Factorial Design

Plot width: 1.5m

Reps: 4

Plot length: 10m

Field Preparation: Field was worked with an S-tine cultivator and fertilizer was applied at 77 kg N/ha on May 7.

Soil Description:

Sand: 54%

Silt: 29%

Clay: 17%

OM: 4.7%

pH: 7.5

CEC 18

Texture: V. Fine Sandy Loam

Soil: Watford/Brady

Application Information:

	A
APPLICATION DATE	JUN 6
TIME OF DAY	8:15AM
TIMING	28
AIR TEMP (c)	12
RH (%)	68
WIND SPEED (KPH)	5
SOIL TEMP (c)	18
CLOUD COVER (%)	10
CROP STAGE	21DAT

Spray Equipment:

Application Method: CO2 Backpack

Nozzle Type: Air Induction

Nozzle Spacing: 50 cm (20")

Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)

Nozzle Size: ULD120-02

Boom Width: 1.5 m (60")

Table 3.1. Effect of tomato variety and time of Pinnacle (6.4 G/AC) application on visual injury in tomatoes 7, 14 and 28 days after treatment.

Variety	VISUAL INJURY (D AFTER TREATMENT)		
	7D	14D	28D
H9553	4	4	7
H2206 *	20	15	20
H2306 *	28	40	40
H3907 *	30	28	45
H4707 *	33	43	48
H5007 *	30	28	55
LSD (P <0.05)	4	8	6

* ASTERISK INDICATES VARIETY IS SENSITIVE TO PINNACLE.

Table 3.2. Effect of tomato variety and time of Pinnacle (6.4 G/AC) application on red, green and total yield.

Variety	PINNACLE RATE (G/AC)	YIELD (T/AC)	
		RED	GREEN
H9553	4	4	7
H2206 *	20	15	20
H2306 *	28	40	40
H3907 *	30	28	45
H4707 *	33	43	48
H5007 *	30	28	55
LSD (P <0.05)	4	8	6

* ASTERISK INDICATES VARIETY IS SENSITIVE TO PINNACLE.

Conclusions:

Pinnacle injured H2206, H2306, H3907, H4707, H5007 and reduced yield of H2306, H3907, H4707 and H5007. A delay in maturity was observed in H2306, H4707 and H5007

Trial 4: Tolerance of Tomatoes to Pinnacle and Soybean Oil Versus Agral 90

Objective: Determine the tolerance of tomatoes treated with Pinnacle+Soybean Oil and Pinnacle+Agral 90.

Materials & Methods:

Crop: Tomato

Variety: H9478

Planting rate: 14850 plants/ha

Row spacing: 1.5m

Planting date: May 22

Depth: 5 cm

Plant spacing: 45 cm

Design: Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

Field Preparation: Field was worked with an S-tine cultivator and fertilizer was applied at 77 kg N/ha on May 7.

Soil Description:

Sand: 54%

Silt: 29%

Clay: 17%

OM: 4.7%

pH: 7.5

CEC 18

Texture: V. Fine Sandy Loam

Soil: Watford/Brady

Application Information:

APPLICATION DATE	A JUN 11
TIME OF DAY	8:40 PM
TIMING	21 DAYS POST-T
AIR TEMP (c)	18
RH (%)	74
WIND SPEED (KPH)	5
SOIL TEMP (c)	25
CLOUD COVER (%)	0
CROP STAGE	4-10 LF

Spray Equipment:

Application Method: CO2 Backpack

Nozzle Type: Air Induction

Nozzle Spacing: 50 cm (20")

Spray Volume: 200 L/ha (20 GAL/AC)

Pressure: 207 KPA (30 PSI)

Nozzle Size: ULD120-02

Boom Width: 1.5 m (60")

Table 5.1. Effect of time of day of application on the tolerance of tomato to Pinnacle (3.2 G/AC) – visual injury.

VARIETY	ADJUVANT	VISUAL INJURY		
		7D	14D	28D
H9909	AGRAL 90	3A	7B	8A
	SOYBEAN OIL	1AB	10A	12A
CC337	AGRAL 90	7A	6A	4AB
	SOYBEAN OIL	2B	8A	8A
T900	AGRAL 90	1A	6A	8A
	SOYBEAN OIL	0A	8A	11A
CC390	AGRAL 90	3B	14A	14B
	SOYBEAN OIL	0A	16A	21A
LSD (P <0.05)		3	3	6

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

