WEED MANAGEMENT IN CARROTS, RED BEETS, VINE CROPS, COLE CROPS, TOMATOES, PEPPERS AND SWEET CORN

Grant Number: 048294

CORD Reference #: CORD 9026

Final Report

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NOVEMBER 2, 2007

1. EXECUTIVE SUMMARY.

Weed Control and Tolerance of Carrot to Herbicides
Preemergence applications of Command caused some temporary bleaching of carrot at the 900 ml/ac rate, however carrot stand, length and yield were not reduced compared to the untreated check. The carrots outgrew the visual injury by 28 days after emergence. The postemergence applications of Command caused significant bleaching of carrot, though stand, carrot length and yield were unaffected. The postemergence applications of Impact did not cause visual injury to carrot, and did not reduce carrot stand, length or yield at the high rate of Impact. **Dual II Magnum has been submitted as an URMULE (2003-3426) to the PMRA. Data from this trial were submitted to support the minor use for preemergence applications of Dual II Magnum in carrot.**

Tolerance of Transplanted Broccoli/Cabbage/Cauliflower to Preemergence Herbicides
The tolerance of cole crops to pre-transplant and post-transplant (7 days after transplanting) applications of Impact and KIH-485 were determined. KIH-485 applied PRE-T caused slight stunting at 418 g a.i. ha^{-1}, however when it was applied POST-T it caused significant leaf deformation and stunting at both rates tested. Despite the visual injury observed in the PRE-T KIH-485 treatment, it did not reduce broccoli head size or yield. The POST-T treatments of KIH-485 reduced both broccoli and cauliflower head size and yield, but did not injure cabbage. IMPACT applied PRE-T did not injure cole crops, however when it was applied POST-T it caused bleaching, leaf necrosis and stunting. The POST-T treatment of the high rate of IMPACT reduced cole crop head size and yield.

Data collected from the 2003-2005 field seasons were submitted to support the Frontier (2003-0172) URMULE and a new submission was sent to the PMRA in June, 2006 to support Goal (2006-4445) in broccoli, cabbage and cauliflower.

Tolerance of Transplanted Pepper to Sulfentrazone
This trial was established to determine tolerance of transplanted pepper to pre-transplant applications of sulfentrazone applied at rates from 21 to 672 ml/ac. The only treatment to cause commercially unacceptable visual injury to pepper was the 672 ml/ac. Injury was less than 7% at all other sulfentrazone rates – injury included stunting and leaf burning. Pepper height, dry weight and yield were not less in any of the sulfentrazone treatments than in the untreated check. **We approached FMC – the manufacturer of sulfentrazone – earlier this year to confirm that the company is interested in pursuing a registration for sulfentrazone in pepper. The rate that we intend to register in pepper is either 84 or 168 ml/ac, both of which are well below the rate that caused injury. An URMULE for this use will be submitted in the fall, along with these data.**

Tolerance of Transplanted Pepper to Micro-rates of Basagran
Basagran was applied in three banded micro-rate sprays at 233 or 466 ml/ac over pepper rows at weekly intervals, starting 10 days after transplanting. We attempted to minimize drift using air induction nozzles and spraying when wind speed was 3 km/hr or less. This trial examined tolerance of transplanted pepper to postemergence applications of Basagran. Basagran did cause visual injury to pepper at the 466 ml/ac rate; however fruit size and yield were not reduced.

Tolerance of Red Beet to New Herbicides
This experiment was conducted to determine the tolerance of red beet to Betamix and Upbeet. Betamix and Upbeet did not cause significant visual injury to red beets, nor did they reduce plant dry weight, sugars or yield.
These data were submitted to support the Betamix URMULE 2006-4012 and the Upbeet URMULE (2004-4211). Residue studies will be conducted in 2007 to meet PMRA requirements for registration of this product.

Effect of Timing on Tolerance of Red Beet to Dual II Magnum
This experiment was conducted to determine the tolerance of red beet to Dual II Magnum applied PPI, PRE or POST. Dual II Magnum did not cause visual injury to red beet. Sugar content and yield were not less than the untreated check at any of the herbicide timings or rates. **These data were submitted, along with data from 2005 and 2006, as part of an URMULE this fall.**

Biologically Effective Rate of KIH-485 in Sweet Corn

KIH-485 applied preemergence from 31.25 to 1000 g/ha did not cause significant visual injury to sweet corn. Common lamb's-quarters were at the highest densities and escaped all KIH-485 treatments, including the 1000 g/ha rate in which control was only 68%. The 250 g/ha rate of KIH-485 gave excellent control of fall panicum, however gave poor control of common lamb's-quarters.

Tolerance of Sweet Corn to Accent
Visual injury was observed at 7DAT in all varieties tested, but by 14DAT the injury was no longer present. Height, marketable cob size and yield were not reduced by Accent. **The Accent URMULE has been re-written so individual varieties no longer have to be continually added to the label.**

Tolerance of Sweet Corn to Postemergence Applications of Impact
Impact did not cause significant or commercially unacceptable visual injury (<6%) to the four sweet corn varieties tested. There were no reductions in corn height, cob weight or marketable yield, when compared to the untreated check. Season long control of velvetleaf, common lambsquarters and green foxtail was poor in this study, while pigweed control was good. The applications were made at the 2-leaf stage of corn, and many flushes of weeds emerged after application, indicating that Impact does not possess enough residual activity to control these

weeds. A second trial was conducted at a later stage, and resulted in acceptable control for these weed species, indicating that Impact is best applied later in the season.

Tolerance of Pumpkins and Squash to Herbicides
This trial was kept weed-free to test for the effect of preemergence applications of Command, Sandea and Outlook on visual injury, height, dry weight and yields of pumpkin. Slight and temporary visual injury was noted in the Sandea treatments in pumpkin – this included some chlorosis. Though some initial injury was observed in the Sandea treatments, the number of pumpkins per plot and yield were not less than the untreated check. Command and Outlook did not hurt pumpkin or squash. **Data will be submitted to the PMRA to support the current URMULE for Command in vine crops. As well, Gowan has indicated that it will be looking to register Sandea in vine crops – our data will be used to support the URMULE submission.**

Tolerance of Eight Tomato Varieties to Rimsulfuron (Prism)
The purpose of this experiment is to provide data to support an URMULE for an increased rate of Prism (ie. from 24 to 40 g/ac), to provide better control of triazine-resistant lamb's-quarters. 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. Sunchief, Florida 47, Mountain Fresh and Sunoma tomatoes were not injured and showed no reductions in plant dry weight or yield, when treated with either rate of Prism.

Tolerance of Fresh Market Tomato Varieties to Pinnacle
Pinnacle injured Sunchief and Sunoma and reduced yield of these two varieties. Though Florida 47 and Mountain Fresh showed some temporary chlorosis, the yield of these two varieties was not reduced by POST applications of Pinnacle.

3. Research Results & Conclusions

Trial 1: Effect of Timing on Tolerance of Carrot to Dual II Magnum

Objective: Determine the effect of applying Dual II Magnum preemergence, early postemergence or late postemergence on crop injury, carrot size and carrot yield.

Materials & Methods:

Crop: Carrot
Variety: Fontana Planting date: Apr 19/07
Planting rate: 260000 seeds/ha Depth: 1 cm
Row spacing: 38cm

Design: Randomized Complete Block Design
Plot width: 1.5m Plot length: 10m
Reps: 4

Field Preparation: Applied 250 kg/ha of 27-0-0 + 250 kg/ha of 18-19-19 on April 17.

Soil Description:
Sand: 81% OM: 4.9% Texture: Loamy Fine Sand
Silt:12% pH: 6.7 Soil: Normandale
Clay: 7% CEC 7

Application Information:

	A	B	C
APPLICATION DATE	APR 28/07	MAY 17/07	JUN 5/07
TIME OF DAY	15:00 PM	11:00AM	10:00AM
TIMING	PRE	POST1	POST2
AIR TEMP (c)	14	21	22
RH (%)	26	26	35
WIND SPEED (KPH)	8	0	1
SOIL TEMP (c)	22	22	20
CLOUD COVER (%)	0	10	0
CROP STAGE	PRE	2-4 LEAF	5-8 LEAF

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 1.1. Carrot visual injury 7, 14 and 28 days after application, carrot dry weight and yield.

HERBICIDE	RATE (L/AC)	CARROT GROWTH STAGE	CARROT VISUAL INJURY 7D	14D	28D	AVERAGE WEIGHT G/M2	YIELD T/AC
1. Check (WEED-FREE)			0A	0A	0A	74A-D	17.6C
2. DUAL II MAG	0.5	PRE	0A	0A	0A	73A-D	20.5BC
3. DUAL II MAG	0.7	PRE	0A	0A	0A	82A-D	20.8AB
4. DUAL II MAG	1.4	PRE	0A	0A	0A	89A	21.0AB
5. DUAL II MAG	0.5	2-4 LF	0A	0A	0A	83ABC	24.7A
6. DUAL II MAG	0.7	2-4 LF	0A	0A	0A	86AB	23.4AB
7. DUAL II MAG	1.4	2-4 LF	0A	0A	0A	80A-D	20.9AB
8. DUAL II MAG	0.5	5-8 LF	0A	0A	0A	63CD	17.0C
9. DUAL II MAG	0.7	5-8 LF	0A	0A	0A	66BCD	18.3C
10. DUAL II MAG	1.4	5-8 LF	0A	0A	0A	61D	17.3C
LSD (P <0.05)			NS	NS	NS	22	4.2

Note: Means followed by the same letter are not significantly different (P=0.05, LSD).
NS – No significant differences among treatments.

Conclusions:

This trial was kept weed-free to test for the effect of preemergence and postemergence applications of Dual II Magnum on carrot visual injury, dry weight, carrot length and yield of ‘Fontana’ carrot.

Visual injury was not observed in any of the treatments. Though there was no injury observed in the trial, and no reduction in carrot length (data not shown), carrots weighed less in the three late postemergence (5-8 lf stage of carrot) Dual II Magnum applications, which resulted in a reduction in yield.

Dual II Magnum has been submitted as an URMULE (2003-3426) to the PMRA. Data from this and previous years’ trials were submitted to support the minor use for preemergence applications of Dual II Magnum in carrot.

Trial 2: Herbicide Tolerance in Carrots

Objective: Determine the tolerance of carrots to preemergence applications of Command, and postemergence applications of Command and Impact.

Materials & Methods:

Crop: Carrot
Variety: Fontana Planting date: May 9/07
Planting rate: 260000 seeds/ha Depth: 2 cm
Row spacing: 75cm

Design: Randomized Complete Block Design
Plot width: 1.5m Plot length: 10m
Reps: 4

Field Preparation: Fertilized with 300 hg/ha of 6-27-27 and 300 kg/ha of 27-0-0. Back half of plots were kept weed-free by hand.

Soil Description:
Sand: 73% OM: 6.1% Texture: V. Fine Sand Loam
Silt:15% pH: 7.2 Soil: Normandale
Clay: 12% CEC 11

Application Information:

	A	B
APPLICATION DATE	MAY 9	JUN 6
TIME OF DAY	2:00PM	9:00AM
TIMING	PRE	POST
AIR TEMP (c)	24	19
RH (%)	53	90
WIND SPEED (KPH)	0	3
SOIL TEMP (c)	24	19
CLOUD COVER (%)	100	10
CROP STAGE	PRE	2 LF

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 2.1. Effect of herbicide treatment on 'Fontana' carrot visual injury 7, 14 and 28 days after application, stand count, carrot length and yield.

HERBICIDE	RATE	VISUAL INJURY 7D	VISUAL INJURY 14D	VISUAL INJURY 28D	STAND #/PLOT	LENGTH CM	YIELD T/AC
1. Check (WEEDFREE)		0C	0C	0B	40AB	21A	16.1AB
2. COMMAND- PRE	450 ML/AC	0C	0C	0B	48A	20A	18.9AB
3. COMMAND- PRE	900 ML/AC	9B	3B	0B	45A	20A	21.2A
4. COMMAND- POST	450 ML/A	10B	8B	3B	59A	21A	24.2A
5. COMMAND- POST	900 ML/A	20A	18A	14A	47A	21A	20.8BC
6. IMPACT – POST	18.75 ML/AC	0C	0C	0B	30B	21A	14.0B
7. IMPACT – POST	37.5 ML/AC	0C	0C	0B	41B	20A	18.6AB
LSD (P <0.05)		4	16	22	12	3	4.2

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

Conclusions:

This trial was kept weed-free to test for the effect of preemergence and applications of Command and postemergent applications of Command and Impact on carrot visual injury, dry weight, carrot length and yield of 'Fontana' carrot.

Preemergence applications of Command caused some temporary bleaching of carrot at the 900 ml/ac rate, however carrot stand, length and yield were not reduced compared to the untreated check. The carrots outgrew the visual injury by 28 days after emergence.

The postemergence applications of Command caused significant bleaching of carrot, though stand, carrot length and yield were unaffected.

The postemergence applications of Impact did not cause visual injury to carrot, and did not reduce carrot stand, length or yield at the high rate of Impact. As a result of by sand-blasting in a portion of the trial, the 18.75 ml/ac Impact treatment had a poor stand in one of the replicates – we expect this is the reason for the reduction in stand and yield of carrot at the 18.75 ml/ac rate.

Trial 3: Tolerance of Broccoli to KIH-485 and Impact Herbicides

Objective: Determine the tolerance of broccoli to PRE-T and POST-T applications of Impact and KIH-485.

Materials & Methods:

Crop: Broccoli
Variety: Iron Man Planting date: May 11/07
Planting rate: 29167 plants/ha Depth: 5 cm
Row spacing: 45cm

Design: Randomized Complete Block Design
Plot width: 1.5m Plot length: 10m
Reps: 4

Field Preparation: May 7, 2007 applied 35 kg/ha of actual N of 6-24-24 and 135 kg//ha of actual N of 46-0-0. Fertilizer incorporated with S-tine cultivator

Soil Description:

Sand: 45%	OM: 4.5%	Texture: Loam
Silt:29%	pH: 7.3	Soil: Watford/Brady
Clay: 26%	CEC 11	

Application Information:

	A	B
APPLICATION DATE	MAY 10	MAY 18
TIME OF DAY	8:15 PM	10:00AM
TIMING	PRE-T	7 DAT
AIR TEMP (c)	12	18
RH (%)	74	65
WIND SPEED (KPH)	7	5
SOIL TEMP (c)	20	21
CLOUD COVER (%)	90	5
CROP STAGE	PRE-T	3 LEAF

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 3.1. Effect of herbicide rate and timing on 'Iron Man' broccoli visual injury 7, 14 and 28 days after application.

HERBICIDE	RATE	TIMING	VISUAL INJURY 7D	14D	28D
1. Check (WEEDFREE)			0D	0D	0D
2. IMPACT	22.5 ML/AC	PRE-T	0D	0D	1D
3. IMPACT	45 ML/AC	PRE-T	0D	0D	1D
4. IMPACT	22.5 ML/AC	7DAT	28A	17B	23B
5. IMPACT	45 ML/AC	7DAT	43A	56A	56A
6. KIH-485	100 G/AC	PRE-T	0D	0D	4D
7. KIH-485	200 G/AC	PRE-T	0D	1D	15C
8. KIH-485	100 G/AC	7DAT	6CD	3CD	6D
9. KIH-485	200 G/AC	7DAT	10C	7C	14C
LSD (P <0.05)			5	4	7

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

Table 3.2. Effect of herbicide rate and timing on 'Iron Man' broccoli head size and yield.

HERBICIDE	RATE	TIMING	HEAD SIZE G	YIELD T/AC
1. Check (WEEDFREE)			546AB	3.2BC
2. IMPACT	22.5 ML/AC	PRE-T	556AB	3.7AB
3. IMPACT	45 ML/AC	PRE-T	592A	4.1A
4. IMPACT	22.5 ML/AC	7DAT	506ABC	3.1BC
5. IMPACT	45 ML/AC	7DAT	402C	1.3D
6. KIH-485	100 G/AC	PRE-T	510ABC	3.1BC
7. KIH-485	200 G/AC	PRE-T	460BC	2.6C
8. KIH-485	100 G/AC	7DAT	460BC	3.0BC
9. KIH-485	200 G/AC	7DAT	486ABC	2.6C
LSD (P <0.05)			55	0.9

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

Conclusions:

Conclusions: This trial was kept weed-free to determine the tolerance of broccoli to pre-transplant and post-transplant (7 days after transplanting) applications of IMPACT (18.75 and 37.5 g a.i. ha^{-1}) and KIH-485 (209 and 418 g a.i. ha^{-1}).

IMPACT applied PRE-T did not injure broccoli, however when it was applied POST-T it caused bleaching, leaf necrosis and stunting. The POST-T treatment of the high rate of IMPACT reduced broccoli head size and yield.

KIH-485 applied PRE-T caused slight stunting at 418 g a.i. ha^{-1}, however when it was applied POST-T it caused significant leaf deformation and stunting at both rates tested. Despite the visual injury observed in the PRE-T KIH-485 treatment, it did not reduce broccoli head size or yield. The POST-T treatments of KIH-485 both reduced broccoli head size and yield.

Data collected from previous cole crop research were submitted to the PMRA to support the Frontier (2003-0172) and Goal (2006-4445) URMULEs in broccoli, cabbage and cauliflower. Residue data were collected in summer 2006 and again in 2007 to complete the Frontier submission, and were sent to PMRA for review this fall.

Trial 4: Tolerance of Cabbage to KIH-485 and Impact Herbicides

Objective: Determine the tolerance of cabbage to PRE-T and POST-T applications of Impact and KIH-485.

Materials & Methods:

Crop: Cabbage
Variety: Blue Dynasty
Planting date: May 14
Planting rate: 14850 plants/ha
Depth: 5 cm
Row spacing: 45cm

Design: Randomized Complete Block Design
Plot width: 1.5m
Plot length: 10m
Reps: 4

Field Preparation: Spread 20 kg/ha of actual N of 6-24-24 and 150 kg/ha of 46-0-0, and worked fertilizer in with S-tine cultivator.

Soil Description:
Sand: 51%
OM: 5.1%
Texture: Loam
Silt:28%
pH: 7.1
Soil: Watford/Brady
Clay: 21%
CEC 12

Application Information:

	A	B
APPLICATION DATE	MAY 14	MAY 21
TIME OF DAY	8:15 PM	10:00AM
TIMING	PRE-T	7 DAT
AIR TEMP (c)	12	18
RH (%)	74	65
WIND SPEED (KPH)	7	5
SOIL TEMP (c)	20	21
CLOUD COVER (%)	90	5
CROP STAGE	PRE-T	3 LEAF

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 rate and timing on 'Blue Dynasty' cabbage visual injury 7, 14 and 28 days after application.

HERBICIDE	RATE	TIMING	VISUAL INJURY 7D	14D	28D
1. Check (WEEDFREE)			0C	0C	0C
2. IMPACT	22.5 ML/AC	PRE-T	1C	4BC	2C
3. IMPACT	45 ML/AC	PRE-T	1C	5BC	4C
4. IMPACT	22.5 ML/AC	7DAT	16A	8AB	6BC
5. IMPACT	45 ML/AC	7DAT	17A	10A	10AB
6. KIH-485	100 G/AC	PRE-T	0C	5BC	8AB
7. KIH-485	200 G/AC	PRE-T	0C	7AB	18A
8. KIH-485	100 G/AC	7DAT	4BC	1C	2C
9. KIH-485	200 G/AC	7DAT	7B	6BC	5BC
LSD (P <0.05)			3	3	5

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

Table 4.2. Effect of herbicide rate and timing on 'Blue Dynasty' cabbage head size and marketable yield.

HERBICIDE	RATE	TIMING	HEAD SIZE KG	YIELD T/AC
1. Check (WEEDFREE)			2.2A	15.5A
2. IMPACT	22.5 ML/AC	PRE-T	1.9ABC	14.3AB
3. IMPACT	45 ML/AC	PRE-T	2.0ABC	14.7AB
4. IMPACT	22.5 ML/AC	7DAT	2.0ABC	14.7AB
5. IMPACT	45 ML/AC	7DAT	2.0ABC	12.1B
6. KIH-485	100 G/AC	PRE-T	2.0ABC	13.8AB
7. KIH-485	200 G/AC	PRE-T	1.7BC	12.0B
8. KIH-485	100 G/AC	7DAT	2.0ABC	14.1AB
9. KIH-485	200 G/AC	7DAT	2.0ABC	13.7AB
LSD (P <0.05)			0.4	2.8

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

Conclusions:

Conclusions: This trial was kept weed-free to determine the tolerance of cabbage to pre-transplant and post-transplant (7 days after transplanting) applications of IMPACT (18.75 and 37.5 g a.i. ha^{-1}) and KIH-485 (209 and 418 g a.i. ha^{-1}).

IMPACT applied PRE-T did not injure cabbage and did not reduce head size or yield. However when IMPACT was applied POST-T it caused bleaching, leaf necrosis and stunting, and reduced head size and yield at the 37.5 g a.i. ha^{-1} rate.

KIH-485 applied PRE-T caused commercially unacceptable visual injury at 418 g a.i. ha^{-1}, and resulted in a reduction in head size and yield. POST-T applications did not injure cabbage and did not reduce cabbage head size or yield.

Trial 5: Tolerance of Cauliflower to KIH-485 and Impact Herbicides

Objective: Determine the tolerance of cauliflower to PRE-T and POST-T applications of Impact and KIH-485.

Materials & Methods:

Crop: Cauliflower
Variety: Apex
Planting date: May 11
Planting rate: 14850 plants/ha
Depth: 5 cm
Row spacing: 45cm

Design: Randomized Complete Block Design
Plot width: 1.5m
Plot length: 10m
Reps: 4

Field Preparation: Spread 35 kg/ha of actual N of 6-24-24 and 135 kg/ha of actual N of 46-0-0, and worked fertilizer in with S-tine cultivator.

Soil Description:
Sand: 49%
OM: 5.8%
Texture: Loam
Silt: 30%
pH: 5.8
Soil: Watford/Brady
Clay: 21%
CEC 14

Application Information:

	A	B
APPLICATION DATE	MAY 10	MAY 18
TIME OF DAY	8:15 PM	10:00AM
TIMING	PRE-T	7 DAT
AIR TEMP (c)	12	18
RH (%)	74	65
WIND SPEED (KPH)	7	5
SOIL TEMP (c)	20	21
CLOUD COVER (%)	90	5
CROP STAGE	PRE-T	3 LEAF

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 5.1. Effect of herbicide rate and timing on 'Apex' cauliflower visual injury 7, 14 and 28 days after application.

HERBICIDE	RATE	TIMING	VISUAL INJURY 7D	14D	28D
1. Check (WEEDFREE)			0D	0D	0E
2. IMPACT	22.5 ML/AC	PRE-T	0D	0D	8BD
3. IMPACT	45 ML/AC	PRE-T	0D	1D	13D
4. IMPACT	22.5 ML/AC	7DAT	30B	81B	84B
5. IMPACT	45 ML/AC	7DAT	45A	94A	98A
6. KIH-485	100 G/AC	PRE-T	0D	0D	13D
7. KIH-485	200 G/AC	PRE-T	1D	3D	31CB
8. KIH-485	100 G/AC	7DAT	8C	11C	12D
9. KIH-485	200 G/AC	7DAT	11C	12C	21C
LSD (P <0.05)			6	8	7

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

Table 5.2. Effect of herbicide rate and timing on 'Apex' cauliflower head size and marketable yield.

HERBICIDE	RATE	TIMING	HEAD SIZE KG	YIELD T/AC
1. Check (WEEDFREE)			1.0A	5.7A
2. IMPACT	22.5 ML/AC	PRE-T	0.8A	3.8AB
3. IMPACT	45 ML/AC	PRE-T	0.8A	4.2AB
4. IMPACT	22.5 ML/AC	7DAT	1.0A	1.3B
5. IMPACT	45 ML/AC	7DAT	0.8A	0.3B
6. KIH-485	100 G/AC	PRE-T	0.7A	4.3AB
7. KIH-485	200 G/AC	PRE-T	0.5A	4.1AB
8. KIH-485	100 G/AC	7DAT	1.3A	6.0A
9. KIH-485	200 G/AC	7DAT	0.9A	4.3AB
LSD (P <0.05)			0.9	3.9

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

Conclusions:

Conclusions: This trial was kept weed-free to determine the tolerance of cauliflower to pre-transplant and post-transplant (7 days after transplanting) applications of IMPACT (18.75 and 37.5 g a.i. ha^{-1}) and KIH-485 (209 and 418 g a.i. ha^{-1}).

IMPACT applied PRE-T did injure cauliflower, and reduced yield when compared to the untreated check, though head size was not reduced. When IMPACT was applied POST-T it caused bleaching, leaf necrosis and stunting, and reduced plant stand, head size and yield at 18.75 and 37.5 g a.i. ha^{-1}.

KIH-485 applied PRE-T caused commercially unacceptable visual injury at both rates and resulted in a yield reduction, though head size was not affected. POST-T applications injured cauliflower, and though they did not reduce head size, marketable yield was significantly reduced, as the number of heads that formed was reduced.

Trial 6: Tolerance of Transplanted Pepper to Micro-rates of Basagran

Objective: Determine weed control and tolerance of fresh market peppers to post-transplant applications of Basagran.

Materials & Methods:

Crop: Pepper
Variety: Pageant
Planting rate: 29167 plants/ha
Row spacing: 45cm
Planting date: May 31
Depth: 5 cm

Design: Randomized Complete Block Design
Plot width: 1.5m
Reps: 4
Plot length: 10m

Field Preparation: May 7, 2007 – applied 43 kg/ha of actual N of 6-24-24 and 27 kg/ha of actual N of 46-0-0. Fertilizer incorporated with S-tine cultivator. Cover spray of s-metolachlor/benoxacor at 1200 g ai/ha applied PRE-T on May 31, 2007.

Soil Description:
Sand: 54%
Silt: 29%
Clay: 17%
OM: 4.7%
pH: 7.5
CEC 18
Texture: Fine Sandy Loam
Soil: Watford/Brady Series

Application Information:

	A	B	C
APPLICATION DATE	JUN 11	JUN 18	JUN 25
TIME OF DAY	7:00 AM	7:00AM	7:30AM
TIMING	POST1	POST2	POST3
AIR TEMP (c)	18	21	22
RH (%)	65	88	87
WIND SPEED (KPH)	2	4	3
SOIL TEMP (c)	19	24	24
CLOUD COVER (%)	10	70	100
CROP STAGE	3-7 LEAF	6-8 LF	9-13LF

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 6.1. Effect of herbicide treatment on 'Pageant' pepper visual injury 7, 14 and 28 days after treatment, and height 21 days after treatment.

HERBICIDE	RATE	VISUAL INJURY			HEIGHT
		7D	14D	28D	CM
1. Check (WEEDFREE)		0C	0C	0C	19A
2. BASAGRAN * 3	233 ML/AC	3B	6B	6B	17AB
3. BASAGRAN * 3	466 ML/AC	6A	13A	12A	16B
LSD (P <0.05)		2	3	4	3

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

Table 6.2. Effect of herbicide treatment on 'Pageant' pepper fruit size and yield.

HERBICIDE	RATE	FRUIT SIZE	YIELD
		G	T/AC
1. Check (WEEDFREE)		173A	13.9A
2. BASAGRAN * 3	233 ML/AC	168A	13.2A
3. BASAGRAN * 3	466 ML/AC	156A	15.4A
LSD (P <0.05)		18	2.9

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

Conclusions:

This trial examined tolerance of transplanted pepper to postemergence applications of Basagran. Basagran did cause visual injury to pepper at the 466 ml/ac rate; however fruit size and yield were not reduced.

Trial 7: Weed Control and Tolerance of Peppers to Sulfentrazone

Objectives: Determine the tolerance of peppers to PRE-T applications of Sulfentrazone.

Materials & Methods:

Crop: Pepper
Variety: Socrates
Planting date: May 31
Planting rate: 29167 plants/ha
Depth: 5 cm
Row spacing: 45cm

Design: Randomized Complete Block Design
Plot width: 1.5m
Plot length: 10m
Reps: 4

Field Preparation: May 7, 2007 – applied 43 kg/ha of actual N of 6-24-24 and 27 kg/ha of actual N of 46-0-0. Fertilizer incorporated with S-tine cultivator. Cover spray of s-metolachlor/benoxacor at 1200 g ai/ha applied PRE-T on May 31, 2007.

Soil Description:

Sand: 54%	OM: 4.7%	Texture: Fine Sandy Loam
Silt: 29%	pH: 7.5	Soil: Watford/Brady Series
Clay: 17%	CEC 18	

Application Information:

	A
APPLICATION DATE	MAY 31
TIME OF DAY	6:45AM
TIMING	PRE-T
AIR TEMP (c)	25
RH (%)	68
WIND SPEED (KPH)	4
SOIL TEMP (c)	24
CLOUD COVER (%)	PRE-T
CROP STAGE	6-9 LF

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 7.1. Effect of herbicide treatment on 'Socrates' pepper visual injury 7, 14 and 28 days after planting, and height 28 days after planting.

HERBICIDE	RATE	VISUAL INJURY			HEIGHT
		7D	14D	28D	CM
1. Check (WEEDFREE)		0C	0C	0B	17A
2. SULFENTRAZONE	21 ML/AC	2BC	2BC	2AB	16A
3. SULFENTRAZONE	42 ML/AC	1C	0C	1B	18A
4. SULFENTRAZONE	84 ML/AC	1C	1C	0B	17A
5. SULFENTRAZONE	168 ML/AC	2BC	3BC	2AB	16A
6. SULFENTRAZONE	336 ML/AC	4AB	4B	2AB	18A
7. SULFENTRAZONE	672 ML/AC	6A	10A	6A	18A
LSD (P <0.05)		2	3	4	3

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

Table 7.2. 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)		0B	0B	0B	0C
2. SULFENTRAZONE	21 ML/AC	28B	25AB	39C	34B
3. SULFENTRAZONE	42 ML/AC	25B	49AB	65B	44B
4. SULFENTRAZONE	84 ML/AC	45AB	56A	89A	88A
5. SULFENTRAZONE	168 ML/AC	85A	73A	98A	90A
6. SULFENTRAZONE	336 ML/AC	82A	78A	95A	86A
7. SULFENTRAZONE	672 ML/AC	90A	71A	100A	100A
LSD (P <0.05)		46	54	17	18

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

Table 7.3. Effect of herbicide treatment on redroot pigweed and velvetleaf control 28 and 56 days after application.

HERBICIDE	RATE	REDROOT PIGWEED		VELVETLEAF	
		28D	56D	28D	56D
1. Check (WEEDFREE)		0D	0D	0D	0C
2. SULFENTRAZONE	21 ML/AC	46C	43C	3D	13C
3. SULFENTRAZONE	42 ML/AC	51BC	53BC	25CD	13C
4. SULFENTRAZONE	84 ML/AC	87AB	71ABC	31CD	13C
5. SULFENTRAZONE	168 ML/AC	93A	90AB	60BC	50B
6. SULFENTRAZONE	336 ML/AC	91A	80ABC	82AB	54B
7. SULFENTRAZONE	672 ML/AC	100A	100A	99A	91A
LSD (P <0.05)		38	17	40	29

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

Table 7.4. Effect of herbicide treatment on ‘Socrates’ pepper fruit size and yield.

HERBICIDE	RATE	FRUIT SIZE	YIELD
		G	T/AC
1. Check (WEEDFREE)		142C	5.3C
2. SULFENTRAZONE	21 ML/AC	149BC	6.3ABC
3. SULFENTRAZONE	42 ML/AC	170AB	7.1AB
4. SULFENTRAZONE	84 ML/AC	174A	6.8ABC
5. SULFENTRAZONE	168 ML/AC	167AB	5.4C
6. SULFENTRAZONE	336 ML/AC	161ABC	7.5A
7. SULFENTRAZONE	672 ML/AC	159ABC	5.6BC
LSD (P <0.05)		24	1.6

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

Conclusions:

Conclusions: This trial was established to determine tolerance of transplanted pepper to pre-transplant applications of sulfentrazone applied at rates from 21 to 672 ml/ac. One half of each plot was kept weed-free to examine the tolerance of transplanted pepper to sulfentrazone, while the back half of each plot was left weedy to determine weed control. Visual injury, percent weed control, pepper height at 28 days after transplanting, pepper fruit size and yield were determined.

The only treatment to cause commercially unacceptable visual injury to pepper was the 672 ml/ac. Injury was less than 7% at all other sulfentrazone rates – injury included stunting and leaf burning. Pepper height, dry weight and yield were not less in any of the sulfentrazone treatments than in the untreated check.

We approached FMC – the manufacturer of sulfentrazone – earlier this year to confirm that the company is interested in pursuing a registration for sulfentrazone in pepper. The rate that we intend to register in pepper is either 84 or 168 ml/ac, both of which are well below the rate that caused injury. An URMULE for this use will be submitted in the fall, along with these data.

Trial 8: Weed Control and Tolerance with Micro-rates in Red Beets

Objectives: 1. Determine weed control and tolerance of red beet to micro-rate applications of Pyramin+Upbeet+Lontrel.

2. Determine weed control and tolerance of red beet to an early postemergence application of Pyramin+Dual II Magnum.

Materials & Methods:

Crop: Red beet
Variety: Detroit Dark Red Planting date: May 31
Planting rate: 265 684 seeds/ha Depth: 2 cm
Row spacing: 38cm

Design: Randomized Complete Block Design
Plot width: 1.5m Plot length: 10m
Reps: 4

Field Preparation: Fertilized on May 23 with 18-18-18 at 300 kg/ha and 27-0-0 at 250 kg/ha. Back halves of the plot were maintained weed free.

Soil Description:
Sand: 45% OM: 4.5% Texture: Loam
Silt: 29% pH: 7.3 Soil: Watford/Brady Series
Clay: 26% CEC 11

Application Information:

	A	B	C	D	
APPLICATION DATE	JUN 7	JUN 15	JUN 26	JUL 13	
TIME OF DAY	2:00PM	8:00AM	8:00AM	9:20AM	
TIMING	POST1	POST2	POST3	POST4	
AIR TEMP (c)	29	21	23	25	
RH (%)	28	34	90	78	
WIND SPEED (KPH)	2	2	2	3	
SOIL TEMP (c)	29	34	23	24	
CLOUD COVER (%)	60	90	100	30	
CROP STAGE	PRE	COT	COT-2 LF	2-3 LF	5-6 LF
LAMBSQUARTERS STAGE	PRE	COT-2 LF	COT-2 LF	COT-2 LF	COT-2 LF
REDROOT PIGWEED STAGE	PRE	COT-2 LF	COT-2 LF	COT-2 LF	COT-2 LF
VEVETLEAF STAGE	PRE	COT-2 LF	COT-2 LF	COT-2 LF	COT-2 LF
GREEN FOXTAIL STAGE	PRE	1-3 LF	1-2 LF	1-3 LF	1-2 LF

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 8.1 Red beet visual injury 7, 14 and 28 days after application.

HERBICIDE	RATE	VISUAL INJURY		
		7D	14D	28D
1. Check (WEED-FREE)		0B	0B	0B
2. PYRAMIN UPBEET LONTREL SUPER SPREADER	500 ML/AC 3.6 G/AC 50 ML/AC 0.75% V/V	0B	3AB	3B
3. PYRAMIN UPBEET LONTREL SUPER SPREADER	1000 ML/AC 7.2 G/AC 100 ML/AC 1.5% V/V	1B	9A	10A
4. PYRAMIN DUAL II MAG	2000 ML/AC 500 ML/AC	10A	6AB	0B
LSD (P <0.05)		7	8	4

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

Table 8.2. Effect of herbicide treatment on ragweed and lamb's-quarters control 28 days after application.

HERBICIDE	RATE	LAMBSQUARTERS	REDROOT PIGWEED
1. Check (WEED-FREE)		0B	0B
2. PYRAMIN UPBEET LONTREL SUPER SPREADER	500 ML/AC 3.6 G/AC 50 ML/AC 0.75% V/V	99A	98A
3. PYRAMIN UPBEET LONTREL SUPER SPREADER	1000 ML/AC 7.2 G/AC 100 ML/AC 1.5% V/V	99A	99A
4. PYRAMIN DUAL II MAG	2000 ML/AC 500 ML/AC	96A	96A
LSD (P <0.05)		3	4

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

Table 8.3. Effect of herbicide treatment on redroot pigweed and velvetleaf control 28 days after application.

HERBICIDE	RATE	VELVETLEAF	GREEN FOXTAIL
1. Check (WEED-FREE)		0B	0B
2. PYRAMIN UPBEET LONTREL SUPER SPREADER	500 ML/AC 3.6 G/AC 50 ML/AC 0.75% V/V	98A	64A
3. PYRAMIN UPBEET LONTREL SUPER SPREADER	1000 ML/AC 7.2 G/AC 100 ML/AC 1.5% V/V	99A	80A
4. PYRAMIN DUAL II MAG	2000 ML/AC 500 ML/AC	96A	73A
LSD (P <0.05)		4	19

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

Table 8.4 Effect of herbicide treatment on red beet sugar and yield (by grade).

HERBICIDE	RATE	% SUGAR	YIELD (T/AC)			
			NO1	NO2	NO3	NO4
1. Check (WEED-FREE)		7.2A	3.0BC	7.3B	21.7A	2.8AB
2. PYRAMIN UPBEET LONTREL SUPER SPREADER	500 ML/AC 3.6 G/AC 50 ML/AC 0.75% V/V	7.0A	5.0A	9.8A	19.1A	2.9AB
3. PYRAMIN UPBEET LONTREL SUPER SPREADER	1000 ML/AC 7.2 G/AC 100 ML/AC 1.5% V/V	6.5A	4.6AB	7.6B	17.6A	1.5B
4. PYRAMIN DUAL II MAG	2000 ML/AC 500 ML/AC	7.3A	2.2C	3.9C	20.2A	5.2A
LSD (P <0.05)		1.3	2.0	1.9	4.8	3.2

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

Conclusions:

This experiment was conducted to determine the effectiveness of Pyramin micro-rates or a preemergence tank-mix of Pyramin+Dual II Magnum, and the potential for injury from each herbicide treatment in red beets.

Pyramin micro-rates caused some visual injury (leaf burning around the margins and chlorosis) to red beet at the 2X rate – plants were stunted and there was a decrease in plant dry weight. The yield of #1 and #2 red beets were no different than the untreated check, but there were fewer #3, #4 and #5 (oversized) beets at the 2X rate. Total yield was not significantly less than the untreated check.

Visual injury – stunting and reduced plant dry weight was observed in the Pyramin+Dual II Magnum treatment. Pyramin+Dual II Magnum applied early POST did reduce yield of #1 and #2 beets, while #3, #4 and #5 beet yields were significantly greater than the untreated check. Total yield was not less than the untreated check.

The Pyramin micro-rates did not reduce the quality of red beets, however, the Pyramin+Dual II Magnum treatment did increase the number of larger and oversized beets (#3, #4 and #5), which is undesirable for processing red beets.

TRIAL 9: Tolerance of Red Beets to Betamix and Upbeet

Objective: Determine the tolerance of red beet to Betamix and Upbeet.

Materials & Methods:

Crop: Red beet
Variety: Detroit Dark Red Planting date: May 31
Planting rate: 265 684 seeds/ha Depth: 2 cm
Row spacing: 38cm

Design: Randomized Complete Block Design
Plot width: 1.5m Plot length: 10m
Reps: 4

Field Preparation: Fertilized on May 23 with 18-18-18 at 300 kg/ha and 27-0-0 at 250 kg/ha. Back halves of the plot were maintained weed free.

Soil Description:

Sand: 45%	OM: 4.5%	Texture: Loam
Silt: 29%	pH: 7.3	Soil: Watford/Brady Series
Clay: 26%	CEC 11	

Application Information:

	A
APPLICATION DATE	JUN 11
TIME OF DAY	11:00AM
TIMING	POST
AIR TEMP (c)	26
RH (%)	40
WIND SPEED (KPH)	2
SOIL TEMP (c)	22
CLOUD COVER (%)	10
CROP STAGE	2-5 LF

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 9.1 Red beet visual injury 7, 14 and 28 days after application.

HERBICIDE	RATE	VISUAL INJURY		
		7D	14D	28D
1. Check (WEED-FREE)		0B	0A	0A
2. BETAMIX	1.1 L/AC	0B	0A	0A
3. BETAMIX	2.2 L/AC	5A	0A	0A
4. UPBEET	14 G/AC	0B	1A	0A
5. UPBEET	28 G/AC	0B	0A	0A
6. PYRAMIN	2.0 L/AC	0B	0A	0A
LSD (P <0.05)		3	NS	NS

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

Table 9.2 Effect of herbicide treatment on red beet sugar and yield (by grade).

HERBICIDE	RATE	% SUGAR	YIELD (T/AC)		
			NO1	NO2	NO3
1. Check (WEED-FREE)		7.2A	3.0A	11.2A	11.1A
2. BETAMIX	1.1 L/AC	7.7A	3.5A	9.4A	15.2A
3. BETAMIX	2.2 L/AC	7.5A	4.1A	10.8A	14.0A
4. UPBEET	14 G/AC	8.1A	3.3A	8.4A	14.1A
5. UPBEET	28 G/AC	7.5A	4.7A	9.9A	12.2A
6. PYRAMIN	2.0 L/AC	7.3A	4.1A	10.3A	10.6A
LSD (P <0.05)		1.5	2.5	3.6	8.8

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

Conclusions:

This experiment was conducted to determine the tolerance of red beet to Betamix and Upbeet – Pyramin was included for comparison to the industry standard. Betamix and Upbeet did not cause significant visual injury to red beets, nor did they reduce plant dry weight, sugars or yield.

Trial 10: Effect of Timing on Tolerance of Red Beet to Dual II Magnum

Objective: Determine the tolerance of red beet to Betamix and Upbeet.

Materials & Methods:

Crop: Red beet
Variety: Detroit Dark Red Planting date: May 31
Planting rate: 265 684 seeds/ha Depth: 2 cm
Row spacing: 75cm

Design: Randomized Complete Block Design
Plot width: 1.5m Plot length: 10m
Reps: 4

Field Preparation: Fertilized on May 23 with 18-18-18 at 300 kg/ha and 27-0-0 at 250 kg/ha. The entire trial was maintained weed free.

Soil Description:

Sand: 45%	OM: 4.5%	Texture: Loam
Silt: 29%	pH: 7.3	Soil: Watford/Brady Series
Clay: 26%	CEC 11	

Application Information:

	A	B	C
APPLICATION DATE	MAY 23	MAY 26	JUN 11
TIME OF DAY	4:00PM	9:00AM	11:00AM
TIMING	PPI	PRE	POST
AIR TEMP (c)	26	14	26
RH (%)	43	100	40
WIND SPEED (KPH)	4	2	2
SOIL TEMP (c)	26	14	22
CLOUD COVER (%)	0	100	10
CROP STAGE	PPI	PRE	COT-2 LF

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 10.1 Red beet visual injury 7, 14 and 28 days after application.

HERBICIDE	TIMING	RATE	VISUAL INJURY		
			7D	14D	28D
1. Check (WEED-FREE)			0A	0A	0A
2. DUALII MAG	PPI	0.5 L/AC	0A	0A	0A
3. DUALII MAG	PPI	1.0 L/AC	0A	0A	0A
4. DUALII MAG	PRE	0.5 L/AC	0A	0A	0A
5. DUALII MAG	PRE	1.0 L/AC	2A	2A	0A
6. DUALII MAG	POST	0.5 L/AC	0A	0A	0A
7. DUALII MAG	POST	1.0 L/AC	0A	0A	0A
LSD (P <0.05)			0	0	0

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

Table 10.2 Effect of herbicide treatment on red beet sugar and yield (by grade).

HERBICIDE	RATE		% SUGAR	YIELD (T/AC)		
				NO1	NO2	NO3
1. Check (WEED-FREE)			7.4A	8.3A	9.5ABC	7.8A
2. DUAL II MAG	PPI	0.5 L/AC	7.9A	9.2A	6.2C	11.5A
3. DUAL II MAG	PPI	1.0 L/AC	7.3A	7.5A	10.4AB	8.6A
4. DUAL II MAG	PRE	0.5 L/AC	7.6A	8.5A	11.1A	6.8A
5. DUAL II MAG	PRE	1.0 L/AC	7.7A	8.0A	8.2ABC	11.7A
6. DUAL II MAG	POST	0.5 L/AC	7.4A	8.5A	7.5BC	8.4A
7. DUAL II MAG	POST	1.0 L/AC	7.4A	7.5A	8.3ABC	7.0A
LSD (P <0.05)			1.6	3.4	3.5	9.3

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

Conclusions:

This experiment was conducted to determine the tolerance of red beet to Dual II Magnum applied pre-plant incorporated, preemergence or postemergence. Dual II Magnum did not cause visual injury to red beet. Sugar content and yield were not less than the untreated check at any of the herbicide timings or rates. **These data were submitted, along with data from 2005 and 2006, as part of an URMULE this fall.**

Trial 11: Biologically Effective Rate of KIH-485 in Sweet Corn

Objective: Determine weed control and the tolerance of sweet corn to 8 rates of KIH-485.

Materials & Methods:

Crop: Sweet corn
Variety: various
Planting date: May 28
Planting rate: 50000 plants/ha
Depth: 4 cm
Row spacing: 45cm

Design: Randomized Complete Block Design
Plot width: 6m
Plot length: 10m
Reps: 4

Field Preparation: On May 7, 2007, applied 77 kg/ha of actual N of 24-2.5-4.1. Fertilizer was incorporated with an S-tine cultivator. An untreated weedy and weed-free check (hand-weeded) were included for comparison.

Soil Description:
Sand: 49%
OM: 9.2%
Texture: Loam
Silt:34%
pH: 7.2
Soil: Watford/Brady Series
Clay: 17%
CEC 20

Application Information:

	A
APPLICATION DATE	MAY 24
TIME OF DAY	2:20 PM
TIMING	PRE
AIR TEMP (c)	31
RH (%)	33
WIND SPEED (KPH)	10
SOIL TEMP (c)	35
CLOUD COVER (%)	0
CROP STAGE	PRE

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 11.1. Effect of KIH-485 on sweet corn visual injury 7, 14 and 28 days after application.

	KIH-485 RATE (g/ac)	VISUAL INJURY 7 DAT	14 DAT	28 DAT
1.	weedy check	0A	0C	0D
2	weed-free check	0A	0C	0D
3.	31.25 G/HA	0A	0C	9AB
4.	62.5 G/HA	0A	0C	6ABC
5.	125 G/HA	0A	0C	6ABC
6.	166 G/HA	2A	1ABC	2CD
7.	209 G/HA	1A	1ABC	2CD
8.	250 G/HA	0A	1ABC	1CD
9.	500 G/HA	2A	3A	4BCD
10.	1000 G/HA	1A	2AB	1CD
LSD (P <0.05)		2	2	6

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

Table 11.2. Effect of KIH-485 on control of common lamb's-quarters and fall panicum.

	KIH-285 RATE (g/ac)	Lamb's-quarters %	Fall panicum %
1.	weedy check	0E	0E
2	weed-free check	100A	100A
3.	31.25 G/HA	1E	73C
4.	62.5 G/HA	13DE	84ABC
5.	125 G/HA	31CD	73C
6.	166 G/HA	45BC	75C
7.	209 G/HA	39C	78BC
8.	250 G/HA	54BC	93AB
9.	500 G/HA	44C	97A
10.	1000 G/HA	68B	98A
LSD (P <0.05)		23	16

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

Table 11.3. Effect of KIH-485 on sweet corn cob weight (g/cob) at harvest and marketable yield (T/ac).

	KIH-285 RATE (g/ac)	COB WT g/cob	YIELD T/ac
1.	weedy check	220BC	1.1E
2	weed-free check	319A	5.9A
3.	31.25 G/HA	174C	0.9E
4.	62.5 G/HA	267AB	1.7DE
5.	125 G/HA	286AB	2.1DE
6.	166 G/HA	233BC	3.1CD
7.	209 G/HA	267AB	3.4BCD
8.	250 G/HA	264AB	4.1ABC
9.	500 G/HA	265AB	4.8AB
10.	1000 G/HA	285AB	5.1AB
LSD (P <0.05)		NS	NS

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

Conclusions:

KIH-485 applied preemergence from 31.25 to 1000 g/ha did not cause significant visual injury to sweet corn.

Since weeds were left in the herbicide treated plots, cob size and yields in all KIH-485 treatments reflect the effect of weed competition. Common lamb's-quarters were at the highest densities and escaped all KIH-485 treatments, including the 1000 g/ha rate in which control was only 68%. The 250 g/ha rate of KIH-485 gave excellent control of fall panicum, however gave poor control of common lamb's-quarters.

Trial 12: Weed Control and Tolerance of Sweet Corn to Impact – I

Objective: Determine weed control and tolerance of four sweet corn varieties to Impact applied at the two leaf stage.

Materials & Methods:

Crop: Sweet corn
Variety: various
Planting date: May 24
Planting rate: 50000 plants/ha
Depth: 4 cm
Row spacing: 45cm

Design: Randomized Complete Block Design
Plot width: 6m
Plot length: 10m
Reps: 4

Field Preparation: Worked field 1X with S-tine cultivator and spread 421 kg/ha of 18-19-19 and 98 kg/ha of 46-0-0 was applied at 90 kg/ha on May 4. Field worked an additional time with S-tine cultivator on May 11. Outlook was sprayed over the entire trial at a rate of 305 ml/ac prior to emergence, and all Impact treatments included 420 ml/ac Atrazine 480 with 1.25% Assist and UAN.

Soil Description:
Sand: 51%
OM: 5.5%
Texture: Loam
Silt:32%
pH: 7.2
Soil: Watford/Brady Series
Clay: 16%
CEC 19

Application Information:

	A	B
APPLICATION DATE	MAY 26	JUN 1
TIME OF DAY	2:50PM	9:00 PM
TIMING	PRE	POST
AIR TEMP (c)	23	19
RH (%)	70	95
WIND SPEED (KPH)	8	6
SOIL TEMP (c)	26	24
CLOUD COVER (%)	90	85
CROP STAGE	PRE	2 LF

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 12.1. Effect of Impact rate on sweet corn visual injury 7, 14 and 28 days after application.

VARIETY	IMPACT RATE	VISUAL INJURY 7 DAT	14 DAT	28 DAT
1. HARVEST GOLD	15 ML/AC	1B	0B	0A
	22.5 ML/AC	1B	0B	0A
	45 ML/AC	3AB	1AB	0A
2. GH2042	15 ML/AC	1B	0B	0A
	22.5 ML/AC	2B	0B	0A
	45 ML/AC	6A	1AB	0A
3. DELMONTE2038	15 ML/AC	1B	1AB	0A
	22.5 ML/AC	1B	1AB	0A
	45 ML/AC	5A	2A	0A
4. GH6631	15 ML/AC	0B	0B	0A
	22.5 ML/AC	0B	0B	0A
	45 ML/AC	1B	0B	0A
LSD (P <0.05)		2	1	0

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

Table 12.2. Effect of Impact rate on velvetleaf and redroot pigweed control 28 and 56 days after application.

IMPACT RATE	VELVETLEAF		REDROOT PIGWEED	
	28D	56D	28D	56D
0 ML/AC	0C	0B	0B	0C
15 ML/AC	49B	6AB	78A	76B
22.5 ML/AC	62AB	19AB	80A	84A
45 ML/AC	69A	28A	78A	84A
LSD (P <0.05)	14	26	18	19

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

Table 12.3. Effect of Impact rate on lambsquarters and green foxtail control 28 and 56 days after application.

IMPACT RATE	LAMBSQUARTERS		GREEN FOXTAIL	
	28D	56D	28D	56D
0 ML/AC	0B	0B	0B	0B
15 ML/AC	58A	35A	56A	33A
22.5 ML/AC	61A	43A	60A	29A
45 ML/AC	66A	51A	64A	33A
LSD (P <0.05)	11	18	21	20

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

Table 12.4. Effect of Impact rate on sweet corn height 28 days after application, cob size and marketable yield.

VARIETY	IMPACT RATE	HEIGHT cm	COB WT g/cob	YIELD T/ac
1. HARVEST GOLD	0 ML/AC	53B	294A	5.7A
	15 ML/AC	55AB	273A	5.6A
	22.5 ML/AC	55AB	270A	5.3A
	45 ML/AC	57AB	271A	5.4A
2. GH2042	0 ML/AC	55AB	309A	6.8A
	15 ML/AC	60A	293A	6.7A
	22.5 ML/AC	56AB	283A	6.1A
	45 ML/AC	55AB	286A	6.1A
3. DELMONTE2038	0 ML/AC	57AB	274A	6.0A
	15 ML/AC	66A	318A	7.2A
	22.5 ML/AC	64A	302A	6.2A
	45 ML/AC	62A	339A	7.3A
4. GH6631	0 ML/AC	56AB	322A	6.8A
	15 ML/AC	61A	302A	5.4A
	22.5 ML/AC	59AB	287A	5.4A
	45 ML/AC	57AB	314A	6.5A
LSD (P <0.05)		6	110	2.4

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

Conclusions:

Impact did not cause significant or commercially unacceptable visual injury (<6%) to the four sweet corn varieties tested. There were no reductions in corn height, cob weight or marketable yield, when compared to the untreated check. Season long control of velvetleaf, common lambsquarters and green foxtail was poor in this study, while pigweed control was good. The applications were made at the 2-leaf stage of corn, and many flushes of weeds emerged after application, indicating that Impact does not possess enough residual activity to control these weeds. Trial 17 was conducted at a later stage, and resulted in acceptable control for these weed species, indicating that Impact is best applied later in the season.

Trial 13: Weed Control and Tolerance of Sweet Corn to Impact – II

Objective: Determine weed control and tolerance of four sweet corn varieties to Impact applied at the four leaf stage.

Materials & Methods:

Crop: Sweet corn
Variety: various
Planting rate: 50000 plants/ha
Row spacing: 45cm
Planting date: May 24
Depth: 4 cm

Design: Randomized Complete Block Design
Plot width: 6m
Plot length: 10m
Reps: 4

Field Preparation: Worked field 1X with S-tine cultivator and spread 421 kg/ha of 18-19-19 and 98 kg/ha of 46-0-0 was applied at 90 kg/ha on May 4. Field worked an additional time with S-tine cultivator on May 11. Outlook was sprayed over the entire trial at a rate of 305 ml/ac prior to emergence, and all Impact treatments included 420 ml/ac Atrazine 480 with 1.25% Assist and UAN.

Soil Description:
Sand: 54%
Silt: 25%
Clay: 21%
OM: 5.2%
pH: 6.7
CEC 11
Texture: Sandy Clay Loam
Soil: Maplewood/Normandale

Application Information:

	A	B
APPLICATION DATE	MAY 26	JUN 13
TIME OF DAY	4:15PM	6:45AM
TIMING	PRE	POST
AIR TEMP (c)	24	11
RH (%)	66	72
WIND SPEED (KPH)	7	2
SOIL TEMP (c)	26	14
CLOUD COVER (%)	80	0
CROP STAGE	PRE	3-4 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 13.1. Effect of Impact rate on sweet corn visual injury 7, 14 and 28 days after application.

VARIETY	IMPACT RATE	VISUAL INJURY 7 DAT	14 DAT	28 DAT
1. HARVEST GOLD	15 ML/AC	1C	1CD	0A
	22.5 ML/AC	4B	3BC	0A
	45 ML/AC	8A	7A	0A
2. GH2042	15 ML/AC	3C	1CD	0A
	22.5 ML/AC	5B	3BC	0A
	45 ML/AC	8A	7A	0A
3. DELMONTE2038	15 ML/AC	2C	1CD	0A
	22.5 ML/AC	3C	1CD	0A
	45 ML/AC	5B	5AB	0A
4. GH6631	15 ML/AC	1C	0D	0A
	22.5 ML/AC	2C	1CD	0A
	45 ML/AC	5B	4B	0A
LSD (P <0.05)		1	2	0

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

Table 13.2. Effect of Impact rate on velvetleaf and common ragweed control 28 and 56 days after application.

IMPACT RATE	VELVETLEAF		COMMON RAGWEED	
	28D	56D	28D	56D
0 ML/AC	0D	0C	0C	0B
15 ML/AC	83C	74B	97A	94A
22.5 ML/AC	88BC	73B	96A	98A
45 ML/AC	97A	92A	100A	100A
LSD (P <0.05)	12	13	6	19

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

Table 13.3. Effect of Impact rate on lambsquarters and green foxtail control 28 and 56 days after application.

IMPACT RATE	LAMBSQUARTERS		GREEN FOXTAIL	
	28D	56D	28D	56D
0 ML/AC	0B	0B	0C	0C
15 ML/AC	95A	91A	81B	60B
22.5 ML/AC	100A	93A	88AB	65B
45 ML/AC	100A	100A	91A	83A
LSD (P <0.05)	6	10	18	20

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

Table 13.4. Effect of Impact rate on sweet corn height 28 days after application, cob size and marketable yield.

VARIETY	IMPACT RATE	HEIGHT cm	COB WT g/cob	YIELD T/ac
1. HARVEST GOLD	0 ML/AC	99BCD	303A	6.9A
	15 ML/AC	93CD	294A	5.3AB
	22.5 ML/AC	89D	322A	5.7AB
	45 ML/AC	92CD	311A	5.0B
2. GH2042	0 ML/AC	103AB	304A	6.6A
	15 ML/AC	98BCD	277A	6.2A
	22.5 ML/AC	92CD	273A	6.2A
	45 ML/AC	97BC	267A	5.7A
3. DELMONTE2038	0 ML/AC	113A	346A	8.0A
	15 ML/AC	105AB	320A	7.0A
	22.5 ML/AC	106AB	336A	8.1A
	45 ML/AC	103AB	332A	7.4A
4. GH6631	0 ML/AC	105AB	299A	6.3A
	15 ML/AC	102BC	278A	4.7A
	22.5 ML/AC	100BC	304A	5.0A
	45 ML/AC	100BC	312A	6.0A
LSD (P <0.05)		10	96	1.6

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

Conclusions:

Impact did not cause significant or commercially unacceptable visual injury (<6%) to the four sweet corn varieties tested. There were no reductions in corn height, cob weight or marketable yield, when compared to the untreated check. Season long control of common ragweed and common lambsquarters was excellent, and velvetleaf and green foxtail were fair in this study. The applications were made at the 4-leaf stage of corn, and very few weeds emerged after application, resulting in acceptable control for these weed species, indicating that Impact is best applied later in the season.

Trial 14. Weed Management in Pumpkins

Objective: Determine the tolerance of pumpkin to preemergence applications KIH-485 and Impact.

Materials & Methods:

Crop: Pumpkin
Variety: Appalachian
Planting date: May 29
Planting rate: 5000 plants/ha
Depth: 2.5 cm
Row spacing: 3m

Design: Randomized Complete Block Design
Plot width: 2m
Plot length: 10m
Reps: 4

Field Preparation: Trial fertilized with 300 kg/ha of 10-26-26 and 300 kg/ha of 27-0-0 on May 25.

Soil Description:
Sand: 29%
OM: 6.0%
Texture: Clay Loam
Silt:36%
pH: 6.9
Soil: Watford/Brady Series
Clay: 35%
CEC 15

Application Information:

	A
APPLICATION DATE	MAY 31
TIME OF DAY	9:00AM
TIMING	PRE
AIR TEMP (c)	25
RH (%)	49
WIND SPEED (KPH)	2
SOIL TEMP (c)	25
CLOUD COVER (%)	100
CROP STAGE	PRE

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 14.1. Effect of herbicide treatment on pumpkin visual injury 7, 14 and 28 days after application, pumpkin number per plot and yield.

HERBICIDE	RATE	VISUAL INJURY			#/PLOT	YIELD
		7D	14D	28D		T/AC
1. Check (WEEDFREE)		0A	0A	0A	12A	15.2A
2. DUAL II MAGNUM	0.5L/AC	0A	0A	0A	13A	14.7A
3. COMMAND	0.45 L/AC	0A	0A	0A	11A	13.0A
4. COMMAND	0.9 L/AC	0A	0A	0A	12A	13.8A
5. SANDEA	25 G/AC	0A	4A	4A	11A	13.3A
6. SANDEA	50 G/AC	0A	4A	4A	12A	15.9A
7. OUTLOOK	0.39 L/AC	0A	0A	0A	12A	14.7A
8. OUTLOOK	0.78 L/AC	0A	0A	0A	10A	13.1A
LSD (P <0.05)		0	3	3	4	4.6

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

Conclusions:

This trial was kept weed-free to test for the effect of preemergence applications of Command, Sandea and Outlook on visual injury, height, dry weight and yields of pumpkin.

Slight and temporary visual injury was noted in the Sandea treatments – this included some chlorosis. Though some initial injury was observed in the Sandea treatments, the number of pumpkins per plot and yield were not less than the untreated check.

Data will be submitted to the PMRA to support the current URMULE for Command in vine crops. As well, Gowan has indicated that it will be looking to register Sandea in vine crops – our data will be used to support the URMULE submission.

Trial 15. Weed Management in Squash

Objective: Determine the tolerance of pumpkin to preemergence applications KIH-485 and Impact.

Materials & Methods:

Crop: Squash
Variety: Ultra Butternut
Planting rate: 5000 plants/ha
Row spacing: 3m
Planting date: May 29
Depth: 2 cm

Design: Randomized Complete Block Design
Plot width: 2m
Reps: 4
Plot length: 10m

Field Preparation: Trial fertilized with 300 kg/ha of 10-26-26 and 300 kg/ha of 27-0-0 on May 25.

Soil Description:
Sand: 29%
Silt:36%
Clay: 35%
OM: 6.0%
pH: 6.9
CEC 15
Texture: Clay Loam
Soil: Watford/Brady Series

Application Information:

	A
APPLICATION DATE	MAY 31
TIME OF DAY	9:00AM
TIMING	PRE
AIR TEMP (c)	25
RH (%)	49
WIND SPEED (KPH)	2
SOIL TEMP (c)	25
CLOUD COVER (%)	100
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 15.1. Effect of herbicide treatment on squash visual injury 7, 14 and 28 days after application, squash number per plot and yield.

HERBICIDE	RATE	VISUAL INJURY 7D	VISUAL INJURY 14D	VISUAL INJURY 28D	#/PLOT	YIELD T/AC
1. Check (WEEDFREE)		0A	0A	0A	20A	27.9A
2. DUAL II MAGNUM	0.5L/AC	0A	0A	0A	17A	21.5A
3. COMMAND	0.45 L/AC	0A	0A	0A	18A	24.9A
4. COMMAND	0.9 L/AC	0A	0A	0A	19A	28.3A
5. SANDEA	25 G/AC	0A	0A	0A	17A	23.0A
6. SANDEA	50 G/AC	0A	0A	0A	17A	25.5A
7. OUTLOOK	0.39 L/AC	0A	0A	0A	20A	25.1A
8. OUTLOOK	0.78 L/AC	0A	0A	0A	18A	24.7A
LSD (P <0.05)		0	0	0	6	9.4

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

Conclusions:

This trial was kept weed-free to test for the effect of preemergence applications of Command, Sandea and Outlook on visual injury, height, dry weight and yields of squash.

Visual injury was not observed in any of the herbicide treatments. The number of squash per plot and yield were not less than the untreated check.

Data will be submitted to the PMRA to support the current URMULE for Command in vine crops. As well, Gowan has indicated that it will be looking to register Sandea in vine crops – our data will be used to support the URMULE submission.

Trial 16: 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 date: May 23
Planting rate: 14850 plants/ha	Depth: 5 cm
Row spacing: 1.5m	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%	OM: 4.7%	Texture: V. Fine Sandy Loam
Silt: 29%	pH: 7.5	Soil: Watford/Brady
Clay: 17%	CEC 18	

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	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 16.1. 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 16.2. 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	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 17: Tolerance of Fresh Market 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 17.1. Effect of Pinnacle applications on visual injury of four fresh market tomato varieties 2, 7 and 28 days after treatment.

Variety	VISUAL INJURY (D AFTER TREATMENT)		
	2D	7D	28D
Sunchief	7A	14A	4
Florida 47	5B	7B	4
Mountain Fresh	6AB	7B	3
Sunoma	5B	14A	4
LSD (P <0.05)	1	3	NS

Table 17.2. Effect of Pinnacle application on plant dry weight and marketable yield of four fresh market tomato varieties.

Variety	Pinnacle Rate (G/AC)	PLANT DRY WT (G)	YIELD (T/AC)
Sunoma	0	50	22
	6.4	42	27
Florida 47	0	90	20
	6.4	71	20
Mountain Fresh	0	74	25
	6.4	66	23
Sunoma	0	54	28
	6.4	52	25
LSD (P <0.05)		NS	NS

Conclusions:

Pinnacle caused commercially unacceptable visual injury to Sunchief and Sunoma within 7 days of application. However, by 28 days after treatment, the tomatoes had outgrown the injury. There were no reductions in plant dry weight or marketable yield.

Trial 18: Tolerance of Fresh Market Tomato Varieties to Dual II Magnum+Sencor applied PPI

Objective: Determine the tolerance of several tomato varieties to a tank mix of Dual II Magnum+Sencor applied PPI to support the URMULE.

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
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	MAY 23
TIME OF DAY	6:20AM
TIMING	PPI
AIR TEMP (c)	16
RH (%)	78
WIND SPEED (KPH)	10
SOIL TEMP (c)	15
CLOUD COVER (%)	0
CROP STAGE	PPI

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 18.1. Effect of Dual II Magnum+Sencor applications on visual injury of four fresh market tomato varieties.

Variety	Dual II Magnum+ Sencor Rate	VISUAL INJURY (D AFTER TREATMENT)		
		7D	14D	21D
Sunchief	0.5 L/ac+ 250 g/ac	3	5	8
	1.0 L/ac+ 500 g/ac	5	7	14
Florida 47	0.5 L/ac+ 250 g/ac	2	3	7
	1.0 L/ac+ 500 g/ac	5	4	12
Mtn Fresh	0.5 L/ac+ 250 g/ac	2	3	6
	1.0 L/ac+ 500 g/ac	4	6	9
Sunoma	0.5 L/ac+ 250 g/ac	2	3	6
	1.0 L/ac+ 500 g/ac	4	5	11
LSD (P <0.05)		NS	NS	NS

Table 18.2. Effect of Dual II Magnum+Sencor applications on plant dry weight and yield of four fresh market tomato varieties.

Variety	Pinnacle Rate (G/AC)	PLANT DRY WT (G)	YIELD (T/AC)
Sunoma	0	50	22
	6.4	42	27
Florida 47	0	90	20
	6.4	71	20
Mountain Fresh	0	74	25
	6.4	66	23
Sunoma	0	54	28
	6.4	52	25
LSD (P <0.05)		NS	NS

Conclusions:

Pinnacle caused commercially unacceptable visual injury to Sunchief and Sunoma within 7 days of application. However, by 28 days after treatment, the tomatoes had outgrown the injury. There were no reductions in plant dry weight or marketable yield.

3. Project Expenditures

Project Revenue

OPVG	**$24,000**
CORD IV	**$24,000**
TOTAL	**$48,000**

Project Expenses

Wages	**$38,000**
Supplies	**$ 1,130**
Overhead	**$ 5,870**
RSSA Fees	**$ 3,000**
TOTAL	**$48,000**

4. Communication/Technology Transfer Plan:

A. Research articles:

3. Sarah R. Sikkema, Nader Soltani, Peter H. Sikkema and Darren E. Robinson. *accepted September 29, 2007*. Response of sweet maize (*Zea mays* L.) hybrids to halosulfuron. Crop Science XX: XXXX-XXXX.

2. Sarah R. Sikkema, Nader Soltani, Peter H. Sikkema and Darren E. Robinson. *accepted August 27, 2007*. Tolerance of eight sweet corn (*Zea mays* L.) hybrids to pyroxasulfone. Hort Science XX: XXXX-XXXX.

1. Soltani, N., Sikkema, P.H., O'Sullivan, J. and Robinson, D.E. 2007. Response of eight sweet corn (*Zea mays*) hybrids to topramezone. Hort Science 42: 110-112.

B. Presentations at conferences:

4. Robinson, D.E., Van Eeerd, L., and Zandstra, J. 2007. Processing vegetable research field tour. University of Guelph, Ridgetown Campus. Ridgetown, Ontario. July 31/07.

3. Robinson, D.E. 2007. Weed control in peppers and tomatoes. OMAF Pepper and Tomato IPM Training Course. Attended by approximately 40 crop scouts and agronomists. Ridgetown, Ontario. Apr 27/07.

2. Robinson, D.E. 2007. Weed control in sweet corn and vine crops: research update. Ontario Fruit and Vegetable Convention, St. Catherine's ON, February 22/07. ***(invited presentation)***

1. Robinson, D.E. 2007. Zeroing in on weed escapes and herbicide tolerance in tomatoes. Annual Tomato Day Conference. Leamington, ON, February 14/07.

C. Future conferences:

4. OF&VGA conference – St. Catherine's – February 2008

3. OPVG conference – London – January 2008

2. NCWSS conference – St. Louis – December 2007

1. CWSS conference – Mont Tremblant – November 2007

The AAC, OACC, CORD, AAFC and OMAFRA have been acknowledged in the various papers and presentations given on this research. The priorities of these funding organizations formed the basis for the various committee meetings held to plan and disseminate this research. These organizations will be further recognized through various research meetings (planning and extension) being held later in the year and in 2008.