

WEED CONTROL IN SWEET CORN

RESEARCH RESULTS – 2006

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RIDGETOWN CAMPUS**

**FOR THE ONTARIO PROCESSING
VEGETABLE GROWERS**

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ACKNOWLEDGEMENTS

Purpose Of This Booklet

This booklet is provided as a guide to the 2006 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, agextension personnel, and other research scientists for their ideas, plant material and herbicide samples that were used in these trials. Funding for the 2006 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: Tolerance of Sweet Corn to KIH-485

Objective: Determine the tolerance of eight sweet corn varieties to KIH-485.

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 and Primextra was applied at 1.6 L/ac. A maintenance spray of Pardner+Atrazine was applied on June 12.

Soil Description:

Sand: 51%

Silt: 32%

Clay: 16%

OM: 5.5%

pH: 7.2

CEC 19

Texture: Loam

Soil: Watford/Brady Series

Application Information:

APPLICATION DATE	A JUN 1
TIME OF DAY	10:00 AM
TIMING	PRE
AIR TEMP (c)	18
RH (%)	96
WIND SPEED (KPH)	6
SOIL TEMP (c)	23
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 1.1. Effect of KIH-485 on sweet corn visual injury 7, 14 and 28 days after application.

VARIETY	KIH-485 RATE (g/ac)	VISUAL INJURY		
		7 DAT	14 DAT	28 DAT
1. GG446	140	2B	0A	0A
	280	2B	0A	0A
2. GG214	140	2B	0A	0A
	280	2B	0A	0A
3. HARVEST GOLD	140	3B	1AB	1A
	280	3B	2A	5B
4. GH2041	140	1AB	1A	0A
	280	2B	1A	3A
5. GH9589	140	1A	0A	0A
	280	1A	1A	0A
6. GG763	140	8A	8B	0A
	280	7B	9B	6B
7. GG447	140	0A	0A	0A
	280	2A	2A	0A
8. GSS9299	140	4B	1A	0A
	280	1A	1A	0A
LSD (P <0.05)		2	2	2

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

Table 1.2. Effect of KIH-485 on sweet corn height (cm) at 28 DAT, cob weight (g/cob) at harvest and marketable yield (T/ac).

VARIETY	KIH-285 RATE (g/ac)	HEIGHT cm	COB WT g/cob	YIELD T/ac
1. GG446	0	63	404	7.9
	140	64	394	8.3
	280	65	363	8.2
2. GG214	0	58	334	6.7
	140	58	298	6.3
	280	59	300	7.1
3. HARVEST GOLD	0	59	330	5.1
	140	53	276	4.4
	280	54	231	4.1
4. GH2041	0	58	285	5.9
	140	63	304	6.7
	280	67	300	5.9
5. GH9589	0	62	336	8.3
	140	63	318	6.7
	280	64	335	7.0
6. GG763	0	49	323	5.3
	140	51	305	5.3
	280	46	297	4.6
7. GG447	0	57	383	8.6
	140	58	378	7.8
	280	61	399	8.2
8. GSS9299	0	49	256	4.7
	140	54	275	5.0
	280	52	256	4.9
LSD (P <0.05)		NS	NS	NS

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

Conclusions:

KIH-485 applied preemergence at 140 and 280 g/ac, to eight processing sweet corn cultivars (GG446, GG214, Harvest Gold, GH2041, GH9589, GG763, GG447 and GSS9299) did not cause visual injury and did not reduce height, marketable cob weight or marketable yield.

Trial 2: Tolerance of Sweet Corn to Accent

Objective: Determine the tolerance of eight sweet corn varieties to Accent.

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 and Primextra was applied at 1.6 L/ac. A maintenance spray of Pardner+Atrazine was applied on June 12.

Soil Description:

Sand: 51%

Silt: 32%

Clay: 16%

OM: 5.5%

pH: 7.2

CEC 19

Texture: Loam

Soil: Watford/Brady Series

Application Information:

APPLICATION DATE	A JUN 6
TIME OF DAY	7:00 PM
TIMING	POST
AIR TEMP (c)	22
RH (%)	55
WIND SPEED (KPH)	4
SOIL TEMP (c)	27
CLOUD COVER (%)	85
CROP STAGE	4-5 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 Accent on sweet corn visual injury 7, 14 and 28 days after application.

VARIETY	ACCENT RATE (g/ac)	VISUAL INJURY		
		7 DAT	14 DAT	28 DAT
1. GH2042	13	8B	1B	0A
	26	9B	1B	1A
2. GH6631	13	12B	0A	0A
	26	12B	1B	0A
3. HARVEST GOLD	13	13B	1B	0A
	26	16C	0A	1A
4. GG228	13	10B	0A	0A
	26	11B	0A	0A
5. GH9589	13	10B	0A	0A
	26	13C	0A	0A
6. GG763	13	13C	5C	4B
	26	10B	4B	3B
7. GG447	13	4B	0A	0A
	26	6B	2A	0A
8. GG236	13	9B	0A	0A
	26	11B	0A	0A
LSD (P <0.05)		3	1	2

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

Table 2.2. Effect of Accent on sweet corn height (cm) at 28 DAT, cob weight (g/cob) at harvest and marketable yield (T/ac).

VARIETY	ACCENT RATE (g/ac)	Height (cm)	Cob wt (g/cob)	Yield (T/ac)
1. GH2042	0	66	280	6.6
	13	70	265	6.0
	26	69	279	6.2
2. GH6631	0	76	306	7.4
	13	70	299	6.8
	26	73	333	7.4
3. HARVEST GOLD	0	71	309	6.7
	13	71	316	6.4
	26	70	307	6.6
4. GG228	0	76	282	5.3
	13	73	265	5.3
	26	75	273	5.6
5. GH9589	0	77	303	7.0
	13	76	320	6.7
	26	76	325	6.7
6. GG763	0	63	299	6.1
	13	65	297	5.5
	26	69	292	6.2
7. GG447	0	70	330	7.4
	13	76	343	6.6
	26	74	241	8.0
8. GG236	0	76	275	5.5
	13	74	269	5.7
	26	74	182	5.5
LSD (P <0.05)		NS	NS	NS

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

Conclusions:

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.**

Trial 3: Tolerance of Sweet Corn to Sandea

Objective: Determine the tolerance of eight sweet corn varieties to Sandea.

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 and Primextra was applied at 1.6 L/ac. A maintenance spray of Pardner+Atrazine was applied on June 12.

Soil Description:

Sand: 51%

Silt: 32%

Clay: 16%

OM: 5.5%

pH: 7.2

CEC 19

Texture: Loam

Soil: Watford/Brady Series

Application Information:

APPLICATION DATE	A JUN 6
TIME OF DAY	7:30 PM
TIMING	POST
AIR TEMP (c)	22
RH (%)	55
WIND SPEED (KPH)	4
SOIL TEMP (c)	27
CLOUD COVER (%)	85
CROP STAGE	4-5 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 3.1. Effect of Sandea on sweet corn visual injury 7, 14 and 28 days after application.

VARIETY	SANDEA RATE (g/ac)	VISUAL INJURY		
		7 DAT	14 DAT	28 DAT
1. GG446	14	1B	0A	0A
	28	2C	0A	0A
2. GG214	14	2B	0A	0A
	28	4C	1A	0A
3. HARVEST GOLD	14	3B	1A	0A
	28	4C	1A	1A
4. GH2041	14	2B	1A	0A
	28	2B	1A	1A
5. GH9589	14	2B	0A	0A
	28	2B	0A	0A
6. GG763	14	4C	1A	0A
	28	3B	1A	3A
7. GG447	14	0A	0A	0A
	28	1B	0A	0A
8. GSS9299	14	1B	0A	0A
	28	1B	0A	1A
LSD (P <0.05)		2	2	2

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

Table 3.2. Effect of Sandea on sweet corn height (cm) at 28 DAT, cob weight (g/cob) at harvest and marketable yield (T/ac).

VARIETY	SANDEA RATE g/ac	HEIGHT cm	COB WT g/cob	YIELD T/ac
1. GG446	0	77	358	8.5
	14	73	354	8.5
	28	75	369	8.6
2. GG214	0	72	290	6.0
	14	73	291	5.1
	28	70	268	6.2
3. HARVEST GOLD	0	67	295	5.8
	14	66	283	6.1
	28	66	275	5.1
4. GH2041	0	67	287	6.3
	14	66	284	6.2
	28	63	285	6.0
5. GH9589	0	73	312	6.2
	14	70	343	7.0
	28	70	321	7.6
6. GG763	0	64	293	6.4
	14	61	343	5.8
	28	61	285	6.1
7. GG447	0	65	362	8.2
	14	68	345	7.8
	28	68	350	7.9
8. GSS9299	0	68	242	5.4
	14	67	250	5.3
	28	65	247	5.1
LSD (P <0.05)		NS	NS	NS

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

Conclusions:

Sandea applied postemergence at 14 and 28 g/ac to eight processing sweet corn cultivars (GG446, GG214, Harvest Gold, GH2041, GH9589, GG763, GG447 and GSS9299) did not cause visual injury and did not reduce height, marketable cob weight or marketable yield.

Trial 4: 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 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: 51%

Silt: 32%

Clay: 16%

OM: 5.5%

pH: 7.2

CEC 19

Texture: Loam

Soil: Watford/Brady Series

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

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 4.1. 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 4.2. 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 4.3. 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 4.4. 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 18 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 5: 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 5.1. 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 5.2. 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 5.3. 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 5.4. 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.