

**WEED CONTROL IN PROCESSING
VEGETABLES**

RESEARCH RESULTS – 2006

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**FOR THE ONTARIO PROCESSING
VEGETABLE GROWERS**

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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 Lima Bean to KIH-485 and Impact Herbicides

Objective: Determine the tolerance of lima bean to PRE applications of Impact and KIH-485.

Materials & Methods:

Crop: Lima bean

Variety: Improved Kingston

Planting date: May 29/06

Planting rate: 137826 seeds/ha Depth: 4 cm

Row spacing: 75cm Plant spacing: 9.5 cm

Design: Randomized Complete Block Design

Plot width: 1.5m Plot length: 10m

Reps: 4

Field Preparation: Field was worked twice with an S-tine cultivator and 40 kg/ha nitrogen was applied May 29 (used 18-19-19).

Soil Description:

Sand: 54%

OM: 5.2%

Texture: Sand Clay Loam

Silt: 25%

pH: 6.7

Soil: Maplewood/Normandale

Clay: 21%

CEC 11

Application Information:

	A
APPLICATION DATE	MAY 31/06
TIME OF DAY	9:40AM
TIMING	PRE
AIR TEMP (c)	29
RH (%)	70
WIND SPEED (KPH)	3
SOIL TEMP (c)	31
CLOUD COVER (%)	5
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 1.1. Effect of herbicide treatment on lima bean visual injury 7, 14 and 28 days after application, height at 28 days and yield.

HERBICIDE	RATE	VISUAL INJURY			HEIGHT	YIELD
		7D	14D	28D	CM	T/AC
1. Check (WEEDFREE)		0B	0B	0B	36AB	0.9BC
2. IMPACT	22.5 ML/AC	2B	0B	0B	37A	1.1AB
3. IMPACT	45 ML/AC	4B	8B	8B	34B	1.0AB
4. KIH-485	100 G/AC	4B	4B	2B	29AB	1.2A
5. KIH-485	200 G/AC	14A	30A	43A	11C	0.6C
LSD (P <0.05)		5	14	23	10	0.3

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 Impact and KIH-485 on visual injury, height, dry weight and yields of lima bean. Impact is a new broadleaf corn herbicide with activity on pigweed, lambsquarters and other broadleaf weeds, while KIH-485 is a residual grass corn herbicide.

Some visual injury was noted at both rates of Impact, however the crop outgrew this injury and did not result in any reduction in height or yield of lima beans. Additional work should be conducted with Impact applied postemergence to determine its tolerance in lima beans.

Significant visual injury and reductions in height and yield were observed in both KIH-485 treatments.

Trial 2: Tolerance of Snap Bean to KIH-485 and Impact Herbicides

Objective: Determine the tolerance of snap bean to PRE applications of Impact and KIH-485.

Materials & Methods:

Crop: Snap bean

Variety: Celtic, Sonesta

Planting rate: 392250 seeds/ha

Row spacing: 75cm

Planting date: May 29/06

Depth: 4 cm

Plant spacing: 4.2 cm

Design: Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

Field Preparation: Field was worked twice with an S-tine cultivator and 40 kg/ha nitrogen was applied May 29 (used 18-19-19).

Soil Description:

Sand: 54%

Silt: 25%

Clay: 21%

OM: 5.2%

pH: 6.7

CEC 11

Texture: Sand Clay Loam

Soil: Normandale/Brookston

Application Information:

	A
APPLICATION DATE	MAY 31/06
TIME OF DAY	9:20AM
TIMING	PRE
AIR TEMP (c)	29
RH (%)	70
WIND SPEED (KPH)	3
SOIL TEMP (c)	31
CLOUD COVER (%)	5
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: 8ULD120-02

Boom Width: 1.5 m (60")

Table 2.1. Effect of herbicide treatment on ‘Hystyle’ snap bean visual injury 7, 14 and 28 days after application, height at 28 days and yield.

HERBICIDE	RATE	VISUAL INJURY			HEIGHT	YIELD
		7D	14D	28D	CM	T/AC
1. Check (WEEDFREE)		0C	0B	0C	52A	10.6A
2. IMPACT	22.5 ML/AC	9AB	10B	16BC	43AB	7.2AB
3. IMPACT	45 ML/AC	16B	38B	69A	29B	1.5C
4. KIH-485	100 G/AC	23AB	13B	17BC	45A	7.1B
5. KIH-485	200 G/AC	37A	41A	37B	40AB	5.6B
LSD (P <0.05)		17	21	23	15	3.5

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

Table 2.2. Effect of herbicide treatment on ‘Impact’ snap bean visual injury 7, 14 and 28 days after application, height at 28 days and yield.

HERBICIDE	RATE	VISUAL INJURY			HEIGHT	YIELD
		7D	14D	28D	CM	T/AC
1. Check (WEEDFREE)		0C	0B	0C	53A	7.4A
2. IMPACT	22.5 ML/AC	6BC	5B	7C	49AB	7.4A
3. IMPACT	45 ML/AC	14B	17A	76A	20C	1.5C
4. KIH-485	100 G/AC	12B	7B	8C	47AB	6.1AB
5. KIH-485	200 G/AC	36A	16A	33B	38B	4.7B
LSD (P <0.05)		12	8	23	11	2.7

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

Table 2.3. Effect of herbicide treatment on ‘Matador’ snap bean visual injury 7, 14 and 28 days after application, height at 28 days and yield.

HERBICIDE	RATE	VISUAL INJURY			HEIGHT	YIELD
		7D	14D	28D	CM	T/AC
1. Check (WEEDFREE)		0D	0C	0C	55A	7.1A
2. IMPACT	22.5 ML/AC	12CD	11BC	17BC	45AB	4.5B
3. IMPACT	45 ML/AC	23BC	48A	80A	15C	0.8C
4. KIH-485	100 G/AC	33B	25AB	30BC	36B	1.2C
5. KIH-485	200 G/AC	54A	42A	47B	34B	1.9C
LSD (P <0.05)		16	24	33	13	2.2

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

Table 2.4. Effect of herbicide treatment on ‘Slender Pack’ snap bean visual injury 7, 14 and 28 days after application, height at 28 days and yield.

HERBICIDE	RATE	VISUAL INJURY			HEIGHT	YIELD
		7D	14D	28D	CM	T/AC
1. Check (WEEDFREE)		0C	0D	0C	57A	10.6A
2. IMPACT	22.5 ML/AC	7BC	3CD	10C	49A	9.8A
3. IMPACT	45 ML/AC	14BC	15B	55A	34B	5.1B
4. KIH-485	100 G/AC	20B	13BC	19BC	47A	6.5B
5. KIH-485	200 G/AC	43A	25A	41AB	36B	4.6B
LSD (P <0.05)		17	10	30	11	1.8

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

Conclusions:

We observed significant visual injury (stunting, burning, leaf crinkling) at both rates of KIH-485 and the high rate of Impact. The crops did not outgrow the injury and there was a significant reduction in height and yield of all four varieties tested. Since Impact will be registered for field corn, subsequent studies will be conducted to determine the potential for carryover injury onto snap beans.

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

Objective: Determine weed control and tolerance of processing pea to preemergence applications of KIH-485 and Impact.

Materials & Methods:

Crop: Pea

Variety: Spring

Planting rate: 300 kg/ha

Row spacing: 18cm

Planting date: Apr 11

Depth: 5 cm

Design: Randomized Complete Block Design

Plot width: 1.5m

Plot length: 10m

Reps: 4

Field Preparation: Soil was cultivated in the spring with an S-tine cultivator two times. No N-P-K was required based on recommendations in OMAFRA Publication 363.

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:

APPLICATION DATE	A APR 20
TIME OF DAY	7:00AM
TIMING	PRE
AIR TEMP (c)	6
RH (%)	85
WIND SPEED (KPH)	0
SOIL TEMP (c)	7
CLOUD COVER (%)	5
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 3.1. Effect of herbicide treatment on ‘Spring’ pea visual injury 7, 14 and 28 days after emergence, and stand count 14 days after emergence.

HERBICIDE	RATE	VISUAL INJURY			STAND COUNT #/1/2M OF ROW
		7D	14D	28D	
1. Check (WEEDFREE)		0B	0A	0A	72A
2. IMPACT	22.5 ML/AC	0B	0D	0A	67A
3. IMPACT	45 ML/AC	1AB	1A	0A	72A
4. KIH-485	100 G/AC	1AB	1A	0A	63A
5. KIH-485	200 G/AC	2A	2A	0A	73A
LSD (P <0.05)		2	2	0	10

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

Table 3.2. Effect of herbicide treatment on ragweed and lamb’s-quarters control 28 and 42 days after application, height and yield.

HERBICIDE	RATE	COMMON RAGWEED		LAMBSQUARTERS	
		28D	42D	28D	42D
1. Check (WEEDFREE)		0B	0C	0C	0C
2. IMPACT	22.5 ML/AC	69A	71AB	68B	71AB
3. IMPACT	45 ML/AC	80A	90A	73AB	70B
4. KIH-485	100 G/AC	58A	58B	76AB	76AB
5. KIH-485	200 G/AC	74A	72AB	84A	81A
LSD (P <0.05)		31	14	32	10

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

Table 3.3. Effect of herbicide treatment on ‘Spring’ pea tenderness and yield.

HERBICIDE	RATE	TENDEROMETER READING (PSI)	YIELD T/AC
1. Check (WEEDFREE)		107A	2.5
2. IMPACT	22.5 ML/AC	105A	3.0
3. IMPACT	45 ML/AC	111A	3.0
4. KIH-485	100 G/AC	114A	2.2
5. KIH-485	200 G/AC	115A	3.2
LSD (P <0.05)		14	1.2

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

Conclusions:

This trial was established to determine the influence of Impact and KIH-485 applied preemergence on pea visual injury, tenderness, yield, and weed control. None of the treatments caused injury to pea – emergence counts, tenderness and yield were all similar to the untreated check.

Impact gave excellent control of ragweed, good control of chickweed and fair control of lambsquarters, wild buckwheat and lady’s thumb.

KIH-485 gave excellent control of chickweed, fair control of lambsquarters and poor control of ragweed, wild buckwheat and lady’s thumb. Future work will focus on postemergence applications of Impact, as this is an excellent postemergence broadleaf herbicide.