Wisconsin
Pest Management Center

Research Report
2006

COLLEGE OF
AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN-MADISON

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2006 Arlington Wisconsin Weather Observations

	April			May			June			July			August			September		
Day	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain
1	52	34	T	62	49	0.2	82	57	0	88	63	0	94	72	T	76	51	0
2	45	35	1	72	48	0	80	51	0	85	64	0	90	62	T	75	50	0
3	50	31	0	70	41	0.12	77	49	0	85	61	0	84	59	0	77	48	0.97
4	54	29	0	65	40	0	78	53	0	79	50	0	88	58	0	68	55	0.19
5	59	36	0	52	30	0	82	57	0.12	79	54	0	81	64	0.63	79	55	0
6	60	39	1.88	64	39	0	76	58	0	81	56	0	82	61	0.15	82	52	0
7	48	23	0	70	43	0	84	57	0	84	54	0	80	57	0	82	57	T
8	50	28	0	71	52	T	84	55	0	85	61	T	79	52	0	81	48	T
9	58	35	0	61	52	0.48	68	47	0.27	88	55	0	83	56	0.17	59	49	0
10	72	39	0	70	48	T	67	46	0	77	56	T	79	62	T	59	49	0.5
11	71	47	0.15	52	31	1.12	67	41	0	67	58	1.87	75	53	0	59	51	1.32
12	72	45	T	46	33	0.13	73	48	0	84	59	0	80	54	0	60	52	1.72
13	74	52	0	52	39	0.1	80	54	0	85	65	T	81	62	T	64	44	0
14	83	40	0	53	45	0.1	76	52	0.27	87	65	0	78	54	0	73	47	0
15	72	44	0.11	61	47	0.2	80	59	0	93	69	0	80	50	0	77	50	0
16	54	34	0.31	68	46	T	89	71	0	92	70	0	84	55	0	78	62	0
17	64	34	0	67	43	0.4	89	69	0.25	93	59	0	71	58	0.07	83	44	0.15
18	66	37	0.1	60	39	0	81	59	0.11	84	53	0	77	61	0.56	66	44	0
19	68	41	T	64	33	0	77	53	0	81	62	1.07	79	52	T	53	35	T
20	71	39	0	76	31	0	76	61	T	85	61	0	78	54	0	60	35	0
21	64	41	0	74	37	0	81	60	0.11	72	55	0	80	56	0	66	43	0.25
22	63	38	0	68	41	0	80	47	0	79	53	0.1	82	56	0	69	48	T
23	65	42	0	76	47	T	77	52	0	83	64	0	82	59	3.05	64	49	0.28
24	74	32	0.22	81	54	0.62	77	54	T	87	66	T	75	64	0.9	64	42	0
25	51	32	0	76	60	0.4	76	54	3.35	89	67	0.52	75	65	0.4	68	37	0
26	66	38	0	84	49	0	72	53	T	86	67	0	76	63	0	70	44	T
27	71	33	0	82	62	0	77	52	0	86	64	0.52	78	58	0	60	37	0
28	70	42	0	90	67	0	74	50	T	91	67	0	70	56	0.1	58	34	T
29	56	42	1.35	90	66	0.28	80	56	0	91	72	0	78	57	0	59	38	0
30	57	48	T	78	63	0.17	85	62	0	88	67	T	77	51	0	66	37	0
31				78	54	0				96	74	0	75	52	0			
Total			5.12			4.32			4.48			4.08			6.03			5.38
Average	63	38		69	46		78	55		85	62		80	58		69	46	

Temperatures are recoreded in ^{0}F, Rainfall amounts are recoreded in inches.

2006 Hancock Wisconsin Weather Observations

	April			May			June			July			August			September		
Day	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain
1	54	37	1.8	55	52	0.05	81	53	0	83	65	0	95	75	0	74	51	0
2	50	34	0	59	51	0.07	83	53	0	90	65	0	88	71	0.12	76	53	0
3	42	36	0.42	72	52	T	81	56	0	90	62	0	88	60	0	75	47	0
4	51	31	0	75	45	0	76	46	0	86	56	0	85	63	0	77	57	0
5	54	25	0	75	45	0	79	54	0	79	49	0	83	65	0	69	53	0
6	61	37	0.02	50	28	0	82	58	0.17	79	51	0	82	67	0.36	82	53	0
7	64	42	0.44	66	40	0	72	59	0.04	84	58	0	80	58	0	83	55	0
8	50	20	0	72	54	0	84	55	0	83	60	0	81	60	0	81	61	0.27
9	51	26	0	64	54	0.13	83	56	0	93	62	0	78	58	0	78	47	0.11
10	58	41	0	39	53	0.26	63	47	0.11	90	56	0	79	58	0	57	48	0
11	72	43	0	68	46	0.01	66	46	0	79	56	0	81	58	0	57	50	1.02
12	73	52	0.16	46	34	1.45	65	45	0	73	62	0	81	53	0	57	52	1.42
13	72	43	0	46	38	0.9	74	52	0	79	63	0	79	58	0	57	51	0.05
14	71	49	0	49	43	0.17	78	60	0	87	68	0.3	79	65	0.39	68	46	0
15	80	36	0	55	48	0.03	78	55	0	90	64	0	79	53	0	71	50	0
16	71	47	0	60	49	0.2	81	64	T	94	71	0	81	54	0	75	50	0
17	58	38	0	71	51	T	88	71	0	92	76	0	83	63	0	77	62	0
18	64	40	0	69	44	0.04	89	69	0.05	97	59	T	68	60	0.03	79	46	0
19	65	44	0.05	62	36	0	83	59	0	85	59	0	76	64	0	65	44	0
20	67	45	0.04	67	38	0.00	78	49	0	78	67	0.44	77	50	0.00	52	36	0
21	69	42	0	73	33	0	76	64	0	87	64	0	81	53	0	58	35	0
22	60	44	0.01	61	37	0	85	58	0.09	72	55	0	83	59	0	63	48	0.17
23	60	39	0.17	69	42	0	81	50	0	80	57	0.39	84	54	T	66	53	0.33
24	64	39	0	78	55	0	76	55	0.24	81	65	0.04	78	55	1.42	69	48	0.14
25	76	34	0	82	58	0.82	77	56	0.73	90	67	0.4	69	62	0.6	64	50	0
26	56	31	0	80	55	0.93	65	58	0.02	88	70	0.18	77	63	0	67	40	0
27	69	37	0	84	60	0	75	54	0	87	67	0	77	59	0	68	46	0.3
28	64	39	0	84	61	0.11	78	53	0	87	66	0.05	79	57	0	58	38	0.02
29	69	44	0	89	69	0	74	51	0.01	92	68	0	79	57	0	58	38	0
30	57	47	1.9	89	67	0	81	57	0	86	67	0.7	79	57	0	52	38	0.02
31				78	63	0				86	67	0.19	75	51	0			
Total			5.01			5.17			1.46			2.69			2.92			3.85
Average	62	39		67	48		78	55		85	63		80	59		68	48	

Temperatures are recoreded in ^{0}F, Rainfall amounts are recoreded in inches.

Wisconsin's IR-4 Center

For over forty years, the IR-4 Project has been the major resource for supplying pest management tools for specialty crops by developing research data to support registration clearances. Traditionally, pesticide registrants have conducted only limited research on specialty crops due to the lack of financial incentive from marketing a product on often very limited acreage. In 1963 the Land Grant Universities recognized this need and established the IR-4 Project to provide a means for U.S. growers to have specialty crops included on chemical labels. In fact, IR-4 generated pesticide clearances now account for over half of all EPA granted food use clearances annually.

The Wisconsin IR-4 Center has been, and remains a strong partner in conducting needed IR-4 residue trials in the North Central Region. The Wisconsin IR-4 Center (Scott Chapman and Dan Heider) conduct 25 -30 IR-4 sponsored residue trials each year. Although it will be several years before many of these pesticide uses will be submitted to EPA for a tolerance, we have listed the 2006 field trials below to better acquaint you with the scope of projects being worked on. For more information on the IR-4 program you can access the IR-4 website at http://ir4.rutgers.edu/. You can also contact the Wisconsin co-liaison Dan Heider for more information.

Pesticide	Commodity
CYAZOFAMID	CABBAGE – 2 trials
CYAZOFAMID	GREENS (MUSTARD) – 2 trials
FLUMIOXAZIN	CABBAGE
FLUTOLANIL	GREENS (MUSTARD)
FOMESAFEN	POTATO
GLYPHOSATE	CARROT
METALDEHYDE	MINT – 2 trials
OXYFLUORFEN	TOMATO
S-METOLACHLOR	TOMATO
TRIFLUMIZOLE	CABBAGE
NOVALURON	BEAN (SNAP)
ANTHRAQUINONE	CORN (SWEET) – 3 trials
E2Y45	MINT - 2 trials
ETOXAZOLE	MINT
INDOXACARB	BEAN (DRY) – 2 trials
METALDEHYDE	CORN (FIELD) – 3 trials
NOVALURON	CANTALOUPE
NOVALURON	SQUASH (SUMMER)

Weed Control Research Methods

Weed Ratings:

Weed ratings refer to % weed control. The ratings were made on the weeds most prevalent. The rating scale is as follows (unless noted on plots):

0 = No Control: 100 = Complete Control.

Crop Injury Ratings:

Crop injury ratings reflect stand reduction and the reduction of plant vigor due to herbicidal effects unless noted otherwise in the table.

The rating scale is as follows (unless noted).

0 = No Injury Control. 100 = Dead.

Vine Desiccation Ratings:

Vine desiccation ratings reflect percent leaves or stems desiccated.

The rating scale is as follows: 0 = No injury: 100 = Complete desiccation.

Application and Weed Abbreviations

Application Abbreviations:

TRT = Treatments
AI = Active Ingredients
FORM CONC = Product Formulation
RATE = Application Rate
RATE UNIT = Product Rate
GROWTH STAGE = Application Timing
PPI = Preplant Incorporated
PRE = Preemergence to weed free soil after seeding
PRT = Prior to tranplanting (number of days will be indicated)
POT = Applied after transplanting (number of days will be indicated)
EPOST = Postemergence date of application
LPOST = Postemergence date of application
POI, 2, 3 = Postemergence date of application (numbered sequentially)

PODIR = Post directed
SH = Spray/Hill = Plot sprayed, then hilled
HS = Hill/Spray = Plot hilled, then sprayed
VK1, 2, 3 = Vine desiccation application (numbered sequentially)

Statistical Analysis:

All data was subjected to a two-way analysis of variance unless otherwise indicated. Mean separation was by least significant difference at the 5% level. Means in a column followed by the same letter are not significantly different.

Weed Abbreviations:

BYGR - Barnyardgrass	PESW - Pennsylvania Smartweed
CAWE - Carpetweed	MATA - Marestail
COLQ - Common Lambsquarters	PRPW - Prostrate Pigweed
COPU - Common Purslane	RRPW - Redroot Pigweed
CORW - Common Ragweed	SHPU - Sheperdspurse
DAND - Dandelion	SMCG - Small Crabgrass
EBNS - Eastern Black Nightshade	STGR - Stinkgrass
FAPA - Fall Panicum	TUPW - Tumble Pigweed
FIBW - Field Bindweed	VELE - Velvetleaf
FOXTAIL SP. - Foxtail species	WIBW - Wild Buckwheat
GIFT - Giant Foxtail	WIGR - Witchgrass
GRFT - Green Foxtail	WIPM - Wild Proso Millet
HANS - Hairy Nightshade	WOCG - Woolly Cupgrass
LACG - Large Crabgrass	YEFT - Yellow Foxtail
LTSW - Ladysthumb Smartweed	YETO - Yellow Toadflax

Irrigation Summary:

Potato plots at the Hancock Ag Research Station were grown under irrigation. The following summarizes irrigation dates and amounts for the field R2 irrigation pivot. Other sites that were irrigated, will list irrigation dates and amounts on the first treatment summary page for that trial.

date	amount (in)	date	amount (in)
31-May	0.4	22-Jul	0.5
2-Jun	0.4	24-Jul	0.5
4-Jun	0.4	26-Jul	0.5
6-Jun	0.21	1-Aug	0.5
8-Jun	0.4	3-Aug	0.5
10-Jun	0.4	5-Aug	0.5
12-Jun	0.5	7-Aug	0.5
14-Jun	0.5	9-Aug	0.5
16-Jun	0.5	11-Aug	0.5
18-Jun	0.55	13-Aug	0.5
20-Jun	0.45	15-Aug	0.5
22-Jun	0.45	17-Aug	0.4
28-Jun	0.4	19-Aug	0.5
30-Jun	0.5	21-Aug	0.5
2-Jul	0.5	29-Aug	0.25
4-Jul	0.5	31-Aug	0.5
6-Jul	0.5	6-Sep	0.5
8-Jul	0.5		
10-Jul	0.5		
12-Jul	0.55		
14-Jul	0.5		
16-Jul	0.6		
18-Jul	0.75		
20-Jul	0.3		

CABBAGE HERBICIDE EVALUATION - ARLINGTON - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:

Location: Arlington Ag Research Station - Horticulture Farm Field 607
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Variety: 'Megaton'
Date Planted: 6/5/06
Row Spacing: 36 Inches, 4 rows/plot
Plant Spacing: 18 inches
Date Harvested: 8/23/06
Plot Size-Design: 12' x 20', 4 Reps
Rating Dates: 6/13, 6/20, 6/30

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: Incorporated 2-3" with a Kelley S-tine field cultivator with rolling baskets, one pass through plot and one pass perpendicular to plot .

Herbicide Application Data: PRT = Pre Transplant
POT = Post Transplant

Date	5/30/06	6/1/06	6/4/06	6/5/06	6/12/06	7/13/06
Time	11:00 am	3:30 pm	6:30 am	5:30 am	2:00 pm	10:00 am
Treatment	7 day PRT	3 day PRT	1 day PRT	PRT	7 day POT	POST
Soil Moisture						
SF	moist	dry	dry	dry	dry	moist
1"	moist	moist	moist	moist	moist	moist
3"	moist	moist	moist	moist	moist	moist
Soil Temp (F^o)						
SF	75.4	85.2	64.8	60.1	105.6	88.7
3"	73.0	78.4	62.6	61.0	80.6	75.0
Air Temp (F^o)	76.5	81.3	61.2	59.2	82.5	76.8
Wind	0-1.5 NE	2-3 NE	4-6 E	1-3 E	6-8 N	1.7-3.6 SE
%RH	67.2%	60.2%	47.4%	54.3%	33.8%	81.2%
Sky Condition	cloudy	sunny	sunny	sunny	sunny	sunny
Crop Stage	-----	-----	-----	-----	transplant	8-12"
Weed & Size	-----	-----	-----	-----	-----	8" COLQ
	-----	-----	-----	-----	-----	8" RRPW
	-----	-----	-----	-----	-----	8" VELE

Fertilization and other pesticides: Fall 2005 - dairy replacement pack manure, 160 lb N/A. Capture 4 oz/a - 7/13/06 (Cabbage Looper control)

Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	Moderate	YEFT = Yellow Foxtail	Moderate

Summary: Research was conducted to evaluate experimental applications of Chateau (flumioxazin) applied 1, 3, and 7 days pre-transplant and 7 days post-transplant. Rates included 1.0 and 2.0 ounces of product per acre. Slight cabbage injury was observed when Chateau was applied at the higher rate 1 or 3 days prior to transplanting. Common lambsquarters, redroot pigweed, velvetleaf, and giant foxtail control were greatest when Chateau was applied 7 days after transplanting and least when the herbicide was applied 7 days prior to transplanting. Weed control was greater than 90% when Chateau was applied at either rate 1 or 3 days pre-transplant or 7 days post-transplant. Cabbage yield was greatest when Chateau was applied 7 days after transplanting.

CABBAGE HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/13/06	% Injury 6/20/06	% Weed Control 6/20/06 COLQ	RRPW	VELE	GIFT
1	UWEEDED CHECK						0 c	0 a	0 f	0 c	0 d	0 d
2	HANDWEEDED CHECK						0 c	0 a	100 a	100 a	100 a	100 a
3	CHATEAU	51	WG	1	OZ/A	7 dayPRT	0 c	0 a	93.8 cd	90 a	96.3 ab	89.5 c
4	CHATEAU	51	WG	2	OZ/A	7 dayPRT	0 c	0 a	95 bcd	96.3 a	95 b	90 bc
5	CHATEAU	51	WG	1	OZ/A	3 dayPRT	0 c	0 a	97.5 abc	96.3 a	100 a	97.5 ab
6	CHATEAU	51	WG	2	OZ/A	3 dayPRT	12.5 a	2.5 a	98.3 abc	100 a	100 a	99.5 a
7	CHATEAU	51	WG	1	OZ/A	1 dayPRT	0 c	0 a	96.3 a-d	93.3 a	97.5 ab	93.8 abc
8	CHATEAU	51	WG	2	OZ/A	1 dayPRT	0 c	1.3 a	99 ab	100 a	100 a	96.5 abc
9	CHATEAU	51	WG	1	OZ/A	7 dayPOT	0 c	0 a	100 a	100 a	100 a	100 a
10	CHATEAU	51	WG	2	OZ/A	7 dayPOT	0 c	0 a	100 a	100 a	100 a	100 a
11	SPARTAN	4	F	4	OZ/A	1 dayPRT	0 c	0 a	100 a	99.5 a	100 a	97.5 ab
12	SPARTAN	4	F	4	OZ/A	7 dayPOT	2.5 b	0 a	100 a	100 a	100 a	97 abc
13	TREFLAN	4	EC	1.5	PT/A	PPI	0 c	0 a	99.5 ab	100 a	100 a	97.5 ab
	GOAL XL	2	EC	1.5	PT/A	PRT						
14	COMMAND 3 ME	3	ME	1	PT/A	PRT	0 c	1.3 a	87.5 e	62.5 b	96.3 ab	98.8 a
	STINGER	3	EC	0.375	PT/A	POST						
15	COMMAND 3 ME	3	ME	1	PT/A	PRT	0 c	0 a	100 a	99.5 a	100 a	100 a
	SPARTAN	4	F	4	OZ/A	PRT						
16	TREFLAN	4	EC	1	PT/A	PPI	0 c	0 a	91.6 de	65.6 b	88.6 c	93.3 abc
	STINGER	3	EC	0.375	PT/A	POST						
17	PROWL H20	3.8	EC	1	LB A/A	PRT	0 c	0 a	100 a	98.9 a	99.6 ab	100 a
	GOAL XL	2	EC	1.5	PT/A	PRT						
18	COMMAND 3 ME	3	ME	1	PT/A	PRT	0 c	0 a	99.3 ab	97.2 a	100 a	95 abc
	GOAL XL	2	EC	1.5	PT/A	PRT						
LSD (P=.05)							1.95	1.59	4.89	12.24	4.6	7.63

Means followed by same letter do not significantly differ (P=.05, LSD)

CABBAGE HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/30/06	% Weed Control 6/30/06 COLQ	% Weed Control 6/30/06 RRPW	% Weed Control 6/30/06 VELE	% Weed Control 6/30/06 GIFT	Yield tons/A 8/23/06
1	UWEEDED CHECK						1.3 a	49.5 a	48.8 a	50 a	50 a	7.7 g
2	HANDWEEDED CHECK						0 a	71.3 a	57.5 a	75 a	75 a	36.6 ab
3	CHATEAU	51	WG	1	OZ/A	7 dayPRT	0 a	95 a	88.8 a	97.5 a	91 a	16.6 ef
4	CHATEAU	51	WG	2	OZ/A	7 dayPRT	0 a	95.8 a	97.7 a	97.4 a	94.9 a	21.4 def
5	CHATEAU	51	WG	1	OZ/A	3 dayPRT	0 a	90 a	75 a	100 a	90 a	21.4 def
6	CHATEAU	51	WG	2	OZ/A	3 dayPRT	2.5 a	98.3 a	98.8 a	99.5 a	99.5 a	25.1 cde
7	CHATEAU	51	WG	1	OZ/A	1 dayPRT	0 a	98.8 a	98.3 a	100 a	97 a	18.4 ef
8	CHATEAU	51	WG	2	OZ/A	1 dayPRT	1.3 a	99 a	100 a	100 a	99 a	28.3 bcd
9	CHATEAU	51	WG	1	OZ/A	7 dayPOT	0 a	69.5 a	55 a	75 a	74.5 a	34.2 ab
10	CHATEAU	51	WG	2	OZ/A	7 dayPOT	0 a	100 a	100 a	100 a	100 a	38.2 a
11	SPARTAN	4	F	4	OZ/A	1 dayPRT	0 a	100 a	99.5 a	99.5 a	100 a	33.7 ab
12	SPARTAN	4	F	4	OZ/A	7 dayPOT	0 a	100 a	100 a	100 a	94 a	32.1 abc
13	TREFLAN	4	EC	1.5	PT/A	PPI	0 a	99.5 a	100 a	100 a	100 a	28.2 bcd
	GOAL XL	2	EC	1.5	PT/A	PRT						
14	COMMAND 3 ME	3	ME	1	PT/A	PRT	0 a	87.5 a	67.5 a	95.8 a	96.3 a	18.4 ef
	STINGER	3	EC	0.375	PT/A	POST						
15	COMMAND 3 ME	3	ME	1	PT/A	PRT	0 a	100 a	99.5 a	100 a	99 a	29.2 bcd
	SPARTAN	4	F	4	OZ/A	PRT						
16	TREFLAN	4	EC	1	PT/A	PPI	0 a	93.5 a	79.9 a	99.3 a	99.1 a	14.5 fg
	STINGER	3	EC	0.375	PT/A	POST						
17	PROWL H20	3.8	EC	1	LB A/A	PRT	0 a	99.5 a	95.9 a	97.7 a	97.4 a	28.3 bcd
	GOAL XL	2	EC	1.5	PT/A	PRT						
18	COMMAND 3 ME	3	ME	1	PT/A	PRT	0 a	98.8 a	96.6 a	98.3 a	99.8 a	19.5 ef
	GOAL XL	2	EC	1.5	PT/A	PRT						
LSD (P=.05)							1.68	32	38.57	32.93	34.56	8.47

Means followed by same letter do not significantly differ (P=.05, LSD)

CANNING PEA HERBICIDE EVALUATION - ARLINGTON - 2006

Daniel J. Heider

Plot Information:

Location: Arlington Ag Research Station - Horticulture Farm Field 607
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Variety: 'June'
Date Planted: 5/7/06
Row Spacing: 7.5 Inches
Plant Spacing: 2 inches
Date Harvested: 7/3/06 (non Halosulfuron trts), 7/7/06 (Halosulfuron trts)
Plot Size-Design: 10' x 20', 4 Reps
Rating Dates: 6/1, 6/13, 6/15, 6/30

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: Incorporated 2-3" with a Kelley S-tine field cultivator with rolling baskets, one pass through plot and one pass perpendicular to plot .

Herbicide Application Data:

Date	5/7/06	5/8/06	6/16/06
Time	3:30 pm	6:30 am	7:00 am
Treatment	PPI	PRE	POST
Soil Moisture			
SF	dry	dry	dry
1"	moist	moist	dry
3"	moist	moist	moist
Soil Temp (F^o)			
SF	90.3	50.5	72.4
3"	68.1	61.0	71.8
Air Temp (F^o)	72.5	44.4	74.3
Wind	5-8 S	2-4 SE	4-6 SW
%RH	32.4%	51.2	64.2%
Sky Condition	sunny	sunny	cloudy
Crop Stage	-----	pre	8-10 nodes
Weed & Size	-----	-----	VELE 3-4"
	-----	-----	GIFT 6-8"
	-----	-----	
	-----	-----	

Fertilization and other pesticides: Fall 2005 - dairy replacement pack manure, 160 lb N/A.

Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	Moderate	GIFT = Giant Foxtail	High

Summary: Several treatments containing Sandea (halosulfuron) were compared to currently labeled treatments to evaluate for weed control and crop safety. Sandea was applied PRE at either 0.5, 0.75 or 1.0 oz product/A. Although weed control in the Sandea treatments was acceptable, injury in the form of stand loss and stunting was substantial, with affected pea plants lagging several nodes behind the standard treatments. This stunting resulted in a later and reduced flower set. To compensate, the Sandea treatments were harvested 4 days later, but still yielded well below the standard treatments.

CANNING PEA HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/1/06 % Injury	6/13/06 Stand Count
1	UNTREATED CHECK						0 c	258248.8 a
2	TREFLAN HFP	4	EC	1	PT/A	PPI	0 c	270694.3 a
	RAPTOR	1	EC	3	OZ/A	POST		
	ACTIVATOR 90		EC	0.125	% V/V	POST		
3	DUAL II MAGNUM	7.62	EC	1	PT/A	PRE	0 c	280028.3 a
	BASAGRAN	4	EC	1.5	PT/A	POST		
4	PURSUIT PLUS		EC	30	OZ/A	PPI	0 c	280028.3 a
5	SANDEA	75	WG	0.5	OZ/A	PRE	35 b	264471.8 a
	TARGA		EC	8	OZ/A	POST		
	ACTIVATOR 90		EC	0.25	% V/V	POST		
6	SANDEA	75	WG	0.75	OZ/A	PRE	47.5 a	220911.3 a
	TARGA		EC	8	OZ/A	POST		
	ACTIVATOR 90		EC	0.25	% V/V	POST		
7	SANDEA	75	WG	1	OZ/A	PRE	47.5 a	211577.3 a
	TARGA		EC	10	OZ/A	POST		
	ACTIVATOR 90		EC	0.25	% V/V	POST		
8	TREFLAN HFP	4	EC	1	PT/A	PPI	42.5 ab	230245.5 a
	SANDEA	75	WG	1	OZ/A	PRE		
LSD (P=.05)							10.1	52425.06

Means followed by same letter do not significantly differ (P=.05, LSD)

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% injury 6/15/06	% Weed Control (6/15/06) COLQ	RRPW	VELE	GIFT
1	UNTREATED CHECK						0 c	0 b	0 b	0 c	0 e
2	TREFLAN HFP	4	EC	1	PT/A	PPI	0 c	100 a	100 a	58 b	90 ab
	RAPTOR	1	EC	3	OZ/A	POST					
	ACTIVATOR 90		EC	0.125	% V/V	POST					
3	DUAL II MAGNUM	7.62	EC	1	PT/A	PRE	0 c	93 a	98 a	73 ab	100 a
	BASAGRAN	4	EC	1.5	PT/A	POST					
4	PURSUIT PLUS		EC	30	OZ/A	PPI	0 c	100 a	100 a	100 a	96 a
5	SANDEA	75	WG	0.5	OZ/A	PRE	48 b	100 a	100 a	100 a	38 d
	TARGA		EC	8	OZ/A	POST					
	ACTIVATOR 90		EC	0.25	% V/V	POST					
6	SANDEA	75	WG	0.75	OZ/A	PRE	68 a	100 a	99 a	100 a	70 c
	TARGA		EC	8	OZ/A	POST					
	ACTIVATOR 90		EC	0.25	% V/V	POST					
7	SANDEA	75	WG	1	OZ/A	PRE	73 a	100 a	100 a	100 a	76 bc
	TARGA		EC	10	OZ/A	POST					
	ACTIVATOR 90		EC	0.25	% V/V	POST					
8	TREFLAN HFP	4	EC	1	PT/A	PPI	71 a	93 a	100 a	100 a	100 a
	SANDEA	75	WG	1	OZ/A	PRE					
LSD (P=.05)							9	8.7	3	29.1	16.7

Means followed by same letter do not significantly differ (P=.05, LSD)

CANNING PEA HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% injury 6/30/06	% Weed Control (6/30/06) COLQ	RRPW	VELE	GIFT
1	UNTREATED CHECK						0 c	0 b	0 c	0 c	0 c
2	TREFLAN HFP	4	EC	1	PT/A	PPI	0 c	100 a	100 a	98 a	98 a
	RAPTOR	1	EC	3	OZ/A	POST					
	ACTIVATOR 90		EC	0.125	% V/V	POST					
3	DUAL II MAGNUM	7.62	EC	1	PT/A	PRE	0 c	100 a	98 b	94 b	94 ab
	BASAGRAN	4	EC	1.5	PT/A	POST					
4	PURSUIT PLUS		EC	30	OZ/A	PPI	0 c	100 a	100 a	100 a	91 b
5	SANDEA	75	WG	0.5	OZ/A	PRE	19 b	100 a	100 a	100 a	100 a
	TARGA		EC	8	OZ/A	POST					
	ACTIVATOR 90		EC	0.25	% V/V	POST					
6	SANDEA	75	WG	0.75	OZ/A	PRE	44 a	100 a	100 a	100 a	100 a
	TARGA		EC	8	OZ/A	POST					
	ACTIVATOR 90		EC	0.25	% V/V	POST					
7	SANDEA	75	WG	1	OZ/A	PRE	55 a	100 a	100 a	100 a	100 a
	TARGA		EC	10	OZ/A	POST					
	ACTIVATOR 90		EC	0.25	% V/V	POST					
8	TREFLAN HFP	4	EC	1	PT/A	PPI	53 a	100 a	100 a	100 a	90 b
	SANDEA	75	WG	1	OZ/A	PRE					
LSD (P=.05)							12.9	0	1.5	2.7	6.7

Means followed by same letter do not significantly differ (P=.05, LSD)

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Yield (7/3/06-7/7/06) tons/A
1	UNTREATED CHECK						1.678 c
2	TREFLAN HFP	4	EC	1	PT/A	PPI	2.571 b
	RAPTOR	1	EC	3	OZ/A	POST	
	ACTIVATOR 90		EC	0.125	% V/V	POST	
3	DUAL II MAGNUM	7.62	EC	1	PT/A	PRE	2.931 ab
	BASAGRAN	4	EC	1.5	PT/A	POST	
4	PURSUIT PLUS		EC	30	OZ/A	PPI	3.293 a
5	SANDEA	75	WG	0.5	OZ/A	PRE	1.420 c
	TARGA		EC	8	OZ/A	POST	
	ACTIVATOR 90		EC	0.25	% V/V	POST	
6	SANDEA	75	WG	0.75	OZ/A	PRE	0.681 d
	TARGA		EC	8	OZ/A	POST	
	ACTIVATOR 90		EC	0.25	% V/V	POST	
7	SANDEA	75	WG	1	OZ/A	PRE	0.546 d
	TARGA		EC	10	OZ/A	POST	
	ACTIVATOR 90		EC	0.25	% V/V	POST	
8	TREFLAN HFP	4	EC	1	PT/A	PPI	0.372 d
	SANDEA	75	WG	1	OZ/A	PRE	
LSD (P=.05)							0.428

Means followed by same letter do not significantly differ (P=.05, LSD)

CELERY HERBICIDE EVALUATION - ARLINGTON - 2006

Daniel J. Heider

Plot Information:

Location: Arlington Ag Research Station - Horticulture Farm Field 607
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Variety: 'Green Bay'
Date Planted: 6/5/06
Row Spacing:36 Inches
Plant Spacing: 18 inches
Date Harvested: 8/22/06
Plot Size-Design: 12' x 20', 4 Reps
Rating Dates: 6/13, 6/30

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: N/A

Herbicide Application Data:

Date	6/1/06	6/5/06
Time	4:00 pm	8:00 am
Treatment	PRT	POT
Soil Moisture		
SF	dry	dry
1"	moist	moist
3"	moist	moist
Soil Temp (F^o)		
SF	85.2	72.1
3"	75.4	69.4
Air Temp (F^o)	82.3	73.6
Wind	2-3 E	3-5 W
%RH	62.4 %	69.3 %
Sky Condition	sunny	sunny
Crop Stage	pre-trans.	post-trans.
Weed & Size	-----	-----

Fertilization and other pesticides: Fall 2005 - dairy replacement pack manure, 160 lb N/A.

Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	Moderate	YEFT = Giant Foxtail	Moderate
COPU = Common Purslane	High		

Summary: This trial examined the effects of Chateau herbicide applied pre-transplant for celery injury and weed control on a mineral soil. Although fairly high stunting was observed at the 12 oz/a rate, injury at the more acceptable use rates (2-6 oz/a) was negligeable. Yield was reduced at the 2 oz/a rate primarily due to weed competition.

Celery Herbicide Evaluation - Arlington, WI - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/13/06	% Injury 6/30/06	% Weed Control 6/30/2006 COLQ	RRPW	COPU	YEFT	VELE	Yield 8/22/2006 tons/a
1	UNWEEDED CHECK						0 b	0 a	0 c	0 c	0 c	0 c	0 c	0.8 d
2	CHATEAU	51	WDG	2	OZ/A	PRT	3.8 b	0 a	97.5 ab	98.3 a	100 a	95 ab	99.5 a	3.9 c
3	CHATEAU	51	WDG	3	OZ/A	PRT	0 b	2.5 a	100 a	99.5 a	100 a	99 a	99.5 a	5.4 ab
4	CHATEAU	51	WDG	6	OZ/A	PRT	0 b	0 a	100 a	100 a	100 a	100 a	100 a	6 a
5	CHATEAU	51	WDG	12	OZ/A	PRT	11.3 a	1.3 a	100 a	100 a	100 a	100 a	100 a	5.6 ab
6	LOROX + HANDWEEDED	50	DF	2.25	LB/A	POT	0 b	0 a	81.3 b	30 b	93.8 b	90.8 b	88.8 b	5 b
LSD (P=.05)							4.96	2.48	17.43	15.27	2.94	5.36	7.82	0.73

Means followed by same letter do not significantly differ (P=.05, LSD)

CELERY HERBICIDE EVALUATION - MUCK (BERLIN, WI) - 2006

Daniel J. Heider

Plot Information:

Location: Leach Farms, Berlin WI.
Soil Type: Muck; pH 5.7; OM 26%.
Variety: Transplant Celery - 'Green Bay'
Date Planted: 6/3/06
Row Spacing:14 Inches (2 rows/bed), 3 beds/plot
Plant Spacing: 6 inches in row
Date Harvested: 8/22/06
Plot Size-Design: 10' x 20', 3 Reps
Rating Dates: 6/21

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: N/A

Herbicide Application Data:

Date	6/9/06
Time	10:00 am
Treatment	POT*
Soil Moisture	
SF	dry
1"	dry
3"	moist
Soil Temp (F°)	
SF	95.6
3"	92.3
Air Temp (F°)	84.3
Wind	3-5 N
%RH	55.8
Sky Condition	sunny
Crop Stage	transplants
Weed & Size	-----

	-----

*POT = Application made post transplant (6 days after transplanting).

Weed Abbreviations:	Plot Weed Density:
RRPW = Redroot Pigweed	Moderate
COPU = Common Purslane	High

Summary: This trial examined the effects of Chateau and Outlook herbicides applied 6 days post-transplant on a muck soil. Outlook treatments had no injury while the Chateau treatments had injury (stunting) up to 5% early, but the transplants were quick to grow out of it. Redroot pigweed control was consistent between all treatments. Common purslane control was above 90% in the 6 oz/a Chateau treatment.

Celery Herbicide Evaluation - Muck (Berlin, WI) - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/06	% Weed Control 6/21/2006 COPU	% Weed Control 6/21/2006 RRPW	Yield 8/22/06 tons/a
1	CHATEAU	51	WDG	2	OZ/A	POT	3.3 a	61.7 ab	100 a	39.1 a
2	CHATEAU	51	WDG	3	OZ/A	POT	1.7 a	81 a	100 a	35.8 a
3	CHATEAU	51	WDG	6	OZ/A	POT	5 a	92.7 a	100 a	40.4 a
4	OUTLOOK	6	EC	14	OZ/A	POT	0 a	35 b	100 a	36.5 a
5	OUTLOOK	6	EC	18	OZ/A	POT	0 a	28.3 b	100 a	39.6 a
6	DEFINE	4	FL	15	OZ/A	POT	0 a	36.7 b	100 a	37.2 a
7	LOROX	50	DF	2	LB/A	POT	0 a	100 a	100 a	40.4 a
	CAPAROL	4	L	2	QT/A	POT				
LSD (P=.05)							5.26	38.95	0	5.87

Means followed by same letter do not significantly differ (P=.05, LSD)

POTATO HALOSULFURON VARIETAL TOLERANCE EVALUATION - HANCOCK - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:
Location: Hancock Ag Research Station - R-2 Pivot
Soil Type: Plainfield Loamy Sand; pH 6.8; OM 0.8%.
Potato Cultivars: Russet Burbank, Atlantic, Bannok, Goldrush, Russet Norkotah, Red Norland, Ranger Russet, Shepody, Rodeo, Snowden, Superior, White Pearl, Yukon Gold, Villetta Rose

Date Planted: 4/17/06
Row Spacing: 36 Inches, 1row/plot
Plant Spacing: 12 inches
Date Harvested: 10/9/06
Plot Size-Design: 48' x 20', 4 Reps
Rating Dates: 6/21, 7/2, 7/13

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Herbicide Application Data:

Date	5/5/06	6/9/06
Time	11:30 am	6:15 am
Treatment	HS	PO1
Soil Moisture		
SF	dry	moist
1"	moist	moist
3"	moist	moist
Soil Temp (F^o)		
SF	52.1	62.4
3"	53.2	63.9
Air Temp (F^o)	48.7	59.8
Wind	4-8 NW	2-4 NW
%RH	42.7%	55.5%
Sky Condition	cloudy	cloudy
Crop Stage	pre	12-20"
Weed & Size	pre	
	-----	-----
	-----	-----
	-----	-----

Summary: Three rates of Sandea (0.032, 0.047 and 0.063 lb active ingredient/A) applied post-emergence (with Dual Magnum® down pre) were compared to a pre-emergence treatment of Dual Magnum + Sencor. All treatments were evaluated over 14 potato varieties including: Russet Burbank, Russet Norkotah, Ranger Russet, Atlantic, Bannock, Goldrush, Red Norland, Shepody, Rodeo, Snowden, Superior, White Pearl, Yukon Gold and Villetta Rose. A wide range of crop tolerance was expressed to Sandea herbicide with some varieties like Russet Burbank, Atlantic, Shepody and Villetta Rose experiencing only very minor injury. Red Norland, Snowden and White Pearl experienced more moderate injury, but were quick to grow out it. The remaining 7 varieties were moderately injured well into the growing season with both yield and quality compromised. Although potato crop safety can be improved considerably with pre-emergence applications of Sandea, it has a much greater utility as a post-emergence rescue treatment. Additional research is needed to determine the best fit for Sandea herbicide.

Fertilizer & Pesticide Applications:

date	product	rate	date	product	rate	date	product	rate
4/4	potash	300 lb/a	7/6	Rimon	9 oz/a	8/18	Bravo ZN	1.5 pt/a
4/17	6-24-24	550 lb/a	7/13	Bravo ZN	1.5 pt/a	8/24	Bravo ZN	1.5 pt/a
	w/ admire		7/21	Bravo ZN	1.5 pt/a	8/31	Bravo ZN	1.5pt/a
5/3	calsul	500 lb/a	7/21	Endura	2.5 oz/a	9/7	Bravo ZN	1.5 pt/a
5/4	21-0-0	350 lb/a	7/28	Bravo ZN	1.5 pt/a	9/8	Reglone	1 pt/a
5/31	34-0-0	375 lb/a	8/4	Baythroid 2	2 oz/a	9/8	Crop Oil	1 qt/a
6/29	Bravo ZN	1.5 pt/a	8/4	Headline	6 oz/a	9/13	Bravo ZN	1.5 pt/a
7/6	Bravo ZN	1.5 pt/a	8/4	Bravo ZN	1.5 pt/a	9/15	Reglone	1 pt/a
7/6	Headline	6 oz/a	8/10	Bravo ZN	1.5 pt/a	9/15	Crop Oil	1 qt/a

Potato Halosulfuron Varietal Tolerance Evalauation - Hancock, WI

Variety: 'Russet Burbank'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 a	0 a	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	7.5 a	1.3 a	0 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	2.5 a	0 a	0 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	8.8 a	1.3 a	0 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							7.08	2.31	0

Variety: 'Atlantic'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 a	0 a	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	5 a	2.5 a	2.5 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	5 a	1.3 a	2.5 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	6.3 a	3.8 a	5 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							6.56	5.16	5.33

Variety: 'Bannok'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 b	0 b
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	30 a	11.3 a	0 b
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	30 a	13.8 a	2.5 b
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	43.8 a	20 a	6.3 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							19.96	8.84	2.75

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evalauation - Hancock, WI

Variety: 'Goldrush'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 a	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	26.3 a	8.8 a	0 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	21.3 a	8.8 a	0 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	22.5 a	10 a	3.8 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							11.92	8.11	3.83

Variety: 'Russet Norkotah'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 a	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	16.3 a	7.5 a	2.5 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	20 a	7.5 a	1.3 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	22.5 a	10 a	7.5 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							10.52	7.3	6.56

Variety: 'Dark Red Norland'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 b	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	7.5 a	0 b	0 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	10 a	5 a	2.5 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	12.5 a	7.5 a	5 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							6.8	3.53	5.5

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evalauation - Hancock, WI

Variety: 'Ranger Russet'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 b	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	30 a	17.5 a	10 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	36.3 a	17.5 a	10 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	32.5 a	15 a	6.3 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							12.66	9.04	9.26

Variety: 'Shepody'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 a	0 a	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	3.8 a	0 a	0 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	5 a	2.5 a	1.3 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	6.3 a	0 a	0 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							4.62	2.31	2

Variety: 'Rodeo'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	% Injury 7/2/2006	% Injury 7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 c	0 b
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	35 a	23.8 ab	18.8 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	28.8 a	16.3 b	16.3 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	38.8 a	27.5 a	18.8 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							14.29	10.41	8.46

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evalauation - Hancock, WI

Variety: 'Snowden'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	7/2/2006	7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 b	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	10 a	5 a	3.8 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	13.8 a	6.3 a	5 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	13.8 a	7.5 a	3.8 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							8.94	4.67	5.81

Variety: 'Superior'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	7/2/2006	7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 b	0 b
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	25 a	27.5 a	31.3 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	21.3 a	20 a	26.3 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	27.5 a	27.5 a	23.8 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							14.62	11.77	11.33

Variety: 'White Pearl'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	7/2/2006	7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 c	0 a	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	13.8 ab	3.8 a	0 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	11.3 b	2.5 a	0 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	17.5 a	3.8 a	0 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							5.5	4.99	0

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evalauation - Hancock, WI

Variety: 'Yukon Gold'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	7/2/2006	7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 c	0 c	0 c
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	25 b	12.5 b	7.5 b
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	27.5 b	15 ab	11.3 ab
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	40 a	22.5 a	13.8 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							9.89	7.77	6.11

Variety: 'Villetta Rose'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/21/2006	7/2/2006	7/13/2006
1	Dual Magnum	7.62	EC	1	PT/A	HS	0 b	0 b	0 a
	Sencor	75	DF	0.5	LB A/A	HS			
2	Dual Magnum	7.62	EC	1	PT/A	HS	10 a	0 b	0 a
	Sandea	75	DF	0.032	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
3	Dual Magnum	7.62	EC	1	PT/A	HS	8.8 a	1.3 ab	0 a
	Sandea	75	DF	0.047	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
4	Dual Magnum	7.62	EC	1	PT/A	HS	13.8 a	3.8 a	0 a
	Sandea	75	DF	0.063	LB A/A	PO1			
	Activator 90		L	0.25	% V/V	PO1			
LSD (P=.05)							6.93	2.67	0

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evaluation - Hancock, WI

Variety: 'Russet Burbank'

Trt	Treatment	Form	Form		Rate	Gro.	Yield (cwt/A) 10/09/06									Specific
No.	Name	Conc	Type	Rate	Unit	Stg	B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	38.8 b	31.6 a	101.9 a	88.8 a	135.5 a	24.0 a	15.4 a	1.8 a	437.7 a	1.069 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	78.1 a	30.5 a	68.9 b	70.3 a	110.5 a	20.5 a	3.4 a	0.0 a	382.2 a	1.071 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	57.8 ab	44.7 a	58.7 bc	73.9 a	124.2 a	16.2 a	6.7 a	2.0 a	384.1 a	1.071 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	65.9 a	36.0 a	49.4 c	76.4 a	127.8 a	28.7 a	9.0 a	3.5 a	396.7 a	1.076 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							25.9	18.2	19.2	23.8	36.6	21.5	11.4	7.8	46.1	0.0166

Variety: 'Atlantic'

Trt	Treatment	Form	Form		Rate	Gro.	Yield (cwt/A) 10/09/06									Specific
No.	Name	Conc	Type	Rate	Unit	Stg	B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	12.1 a	92.3 a	80.7 a	28.0 a	158.5 a	55.2 a	42.6 a	20.2 a	489.6 a	1.084 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	12.4 a	90.4 a	62.6 a	39.9 a	133.0 a	75.6 a	51.6 a	26.9 a	492.5 a	1.080 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	8.6 a	82.6 a	96.9 a	31.6 a	163.6 a	71.6 a	40.1 a	15.0 a	510.0 a	1.082 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	10.9 a	74.5 a	77.0 a	32.5 a	184.0 a	49.0 a	39.6 a	20.0 a	487.3 a	1.086 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							8.1	40.2	33.0	11.5	46.8	36.4	36.1	26.5	101.0	0.006

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evaluation - Hancock, WI

Variety: 'Bannok'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	27.7 a	13.9 c	87.9 a	46.7 a	109.2 a	29.0 a	13.7 a	1.8 a	329.8 a	1.069 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	19.2 a	31.0 bc	48.6 b	37.8 a	77.9 a	28.7 a	18.6 a	4.5 a	266.3 a	1.065 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	18.5 a	41.9 ab	64.4 b	32.4 a	67.8 a	22.5 a	16.7 a	2.2 a	266.4 a	1.078 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	40.4 a	48.5 a	60.4 b	27.8 a	57.3 a	16.5 a	7.9 a	0.0 a	258.7 a	1.075 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							26.7	17.5	17.7	22.5	37.6	15.0	14.4	8.2	77.1	0.017

Variety: 'Goldrush'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	20.0 a	16.3 b	143.8 a	36.9 a	111.2 a	27.8 a	9.7 a	3.5 a	369.3 a	1.069 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	19.1 a	39.8 a	63.5 b	49.2 a	102.4 ab	21.7 ab	8.5 a	10.9 a	315.0 a	1.066 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	26.9 a	26.1 ab	69.2 b	58.4 a	79.1 bc	14.9 b	8.6 a	5.7 a	289.0 a	1.067 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	28.7 a	39.3 a	81.2 b	59.5 a	63.9 c	9.8 b	5.1 a	2.6 a	290.1 a	1.064 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							13.9	16.5	20.8	19.4	24.1	12.3	5.3	13.6	67.4	0.0089

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evaluation - Hancock, WI

Variety: 'Russet Norkotah'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	28.6 a	28.1 a	111.3 a	72.2 a	92.1 a	31.9 a	1.8 a	8.0 a	374.1 a	1.067 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	33.9 a	23.7 a	80.9 b	99.3 a	105.4 a	13.1 a	1.7 a	0.0 a	357.8 a	1.066 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	39.3 a	28.6 a	76.7 b	87.6 a	86.5 a	11.4 a	1.6 a	2.1 a	333.8 a	1.068 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	41.7 a	25.5 a	57.9 b	81.0 a	71.0 a	8.7 a	3.6 a	0.0 a	289.4 a	1.06 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							10.0	28.9	24.4	35.1	41.8	17.6	2.9	9.6	121.5	0.0196

Variety: 'Dark Red Norland'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	15.4 a	30.4 c	163.9 a	23.2 a	151.8 a	30.2 a	3.2 a	1.8 a	420.0 a	1.049 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	15.8 a	59.3 bc	124.7 b	38.8 a	129.5 a	29.2 a	2.5 a	1.8 a	401.7 a	1.058 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	14.4 a	90.4 a	109.2 b	33.0 a	97.1 a	14.1 a	8.4 a	0.0 a	366.5 a	1.055 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	24.1 a	86.0 ab	100.3 b	13.5 a	67.9 a	20.0 a	1.6 a	2.2 a	315.5 a	1.048 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							7.9	29.5	38.5	25.2	65.2	18.4	7.6	5.1	86.8	0.018

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evaluation - Hancock, WI

Variety: 'Ranger Russet'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	36.5 a	33.2 a	65.6 a	82.0 a	104.5 a	22.1 a	12.3 a	4.3 a	360.5 a	1.082 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	39.1 a	106.5 a	23.0 b	41.1 b	65.5 b	5.5 b	1.7 a	4.5 a	287.0 ab	1.083 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	34.6 a	72.0 a	24.0 b	37.2 b	40.4 bc	13.2 ab	1.7 a	0.0 a	223.0 b	1.086 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	28.4 a	121.5 a	19.0 b	26.1 b	26.1 c	5.8 b	3.7 a	0.0 a	230.6 b	1.082 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							16.6	74.5	18.8	16.3	34.8	12.7	15.8	8.7	98.2	0.0061

Variety: 'Shepody'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	28.9 a	77.9 a	56.8 a	58.4 a	134.4 a	54.1 a	23.0 a	25.0 a	458.4 a	1.064 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	21.8 b	95.0 a	30.9 b	35.7 ab	119.8 a	66.3 a	36.6 a	42.7 a	448.6 a	1.058 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	9.8 c	64.7 a	29.1 b	24.2 b	108.8 a	66.8 a	34.7 a	52.1 a	390.2 a	1.057 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	10.8 c	70.5 a	26.5 b	32.5 b	86.7 a	52.8 a	41.9 a	35.0 a	356.7 a	1.068 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							6.2	36.8	10.9	23.2	44.5	41.0	13.5	30.1	106.1	0.0203

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evaluation - Hancock, WI

Variety: 'Rodeo'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	104.5 a	39.1 a	182.7 a	103.6 a	72.0 a	1.3 a	0.0 a	0.0 a	503.1 a	1.075 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	60.2 a	39.2 a	85.0 b	82.8 a	42.7 a	0.0 a	1.6 a	0.0 a	311.5 b	1.079 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	74.1 a	67.8 a	67.5 bc	73.1 a	36.0 a	2.3 a	0.0 a	0.0 a	320.8 b	1.076 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	72.3 a	32.7 a	45.7 c	32.1 b	17.8 a	4.9 a	0.0 a	0.0 a	205.5 c	1.077 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							31.5	28.9	35.0	32.3	50.3	8.2	2.6	0.0	104.9	0.0059

Variety: 'Snowden'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	13.3 a	59.6 a	183.2 a	23.7 a	189.9 a	68.4 a	12.3 a	5.9 a	556.4 a	1.065 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	11.3 a	53.1 a	171.5 a	29.4 a	179.4 a	27.1 a	6.9 a	0.0 a	478.7 a	1.071 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	13.0 a	68.1 a	164.4 a	15.2 a	195.1 a	47.6 a	9.7 a	4.3 a	517.2 a	1.08 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	16.3 a	62.9 a	142.8 a	12.2 a	136.9 a	36.2 a	11.3 a	4.1 a	422.8 a	1.08 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							7.3	31.2	48.0	16.8	63.7	46.7	14.2	10.9	124.3	0.0146

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evaluation - Hancock, WI

Variety: 'Superior'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	7.2 a	22.0 b	90.8 bc	8.7 a	160.4 a	67.0 a	22.8 a	16.2 a	394.9 a	1.07 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	11.6 a	43.3 b	132.0 a	5.6 a	74.9 b	11.6 b	0.0 a	0.0 a	279.0 b	1.068 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	16.0 a	81.1 a	113.4 ab	7.1 a	55.3 b	5.5 b	0.0 a	0.0 a	278.4 b	1.07 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	27.0 a	83.9 a	78.0 c	11.3 a	20.7 c	1.5 b	0.5 a	0.6 a	223.5 b	1.062 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							20.2	37.2	35.2	15.9	31.7	34.7	21.6	16.2	58.6	0.0116

Variety: 'White Pearl'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	71.8 a	34.0 c	312.2 a	7.4 a	39.7 b	0.0 a	1.7 a	0.0 a	466.7 a	1.08 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	39.6 b	49.6 bc	275.2 ab	4.4 a	67.7 a	5.0 a	0.0 a	0.0 a	441.4 a	1.076 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	35.3 b	67.6 ab	251.7 bc	3.2 a	76.2 a	1.3 a	0.0 a	0.0 a	435.3 a	1.077 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	37.9 b	74.9 a	204.7 c	8.4 a	64.2 a	4.3 a	9.9 a	0.0 a	404.2 a	1.071 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							13.0	20.7	48.4	9.8	17.8	5.9	10.1	0.0	57.6	0.0082

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Halosulfuron Varietal Tolerance Evaluation - Hancock, WI

Variety: 'Yukon Gold'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	9.1 a	49.6 c	83.9 a	39.8 a	177.9 a	72.1 a	17.3 a	11.0 a	460.5 a	1.078 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	7.2 a	63.4 bc	67.8 a	40.5 a	124.5 b	26.9 b	16.2 a	1.9 b	348.4 b	1.072 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	7.3 a	112.7 ab	47.6 a	31.9 ab	108.1 b	29.1 b	15.4 a	0.0 b	352.2 b	1.07 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	8.8 a	126.7 a	31.9 a	19.6 b	109.0 b	24.4 b	4.8 a	3.9 b	329.2 b	1.072 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							6.3	50.4	39.6	14.6	35.3	34.7	11.9	6.5	77.8	0.0086

Variety: 'Villetta Rose'

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Dual Magnum	7.62	EC	1	PT/A	HS	21.1 a	22.6 b	183.6 a	44.0 a	72.5 a	12.0 a	0.0 a	0.0 a	355.7 a	1.047 a
	Sencor	75	DF	0.5	LB A/A	HS										
2	Dual Magnum	7.62	EC	1	PT/A	HS	12.2 a	35.3 ab	139.1 a	39.8 a	93.9 a	13.0 a	6.0 a	1.7 a	341.0 a	1.055 a
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
3	Dual Magnum	7.62	EC	1	PT/A	HS	21.7 a	53.4 a	133.2 a	29.0 a	80.0 a	18.5 a	4.5 a	3.4 a	343.7 a	1.052 a
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
4	Dual Magnum	7.62	EC	1	PT/A	HS	24.9 a	51.8 a	121.6 a	25.7 a	58.0 a	13.5 a	2.5 a	0.0 a	297.9 a	1.043 a
	Sandea	75	DF	0.063	LB A/A	PO1										
	Activator 90		L	0.25	% V/V	PO1										
LSD (P=.05)							14.0	22.1	68.6	15.9	32.1	12.5	6.5	4.5	90.2	0.0171

Means followed by same letter do not significantly differ (P=.05, LSD)

POTATO HERBICIDE EVALUATION - ARLINGTON - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:

Location: Arlington Ag Research Station
Soil Type: Plano Silt Loam; pH 6.7; OM 3.7%.
Variety: "Superior"
Date Planted: 4/24/06
Row Spacing: 36 Inches, 4 rows/plot
Plant Spacing: 12 inches
Date Harvested: 9/29/06 (2 rows harvested)
Plot Size-Design: 12' x 20', 4 Reps
Rating Dates:5/25, 6/13

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: n/a

Herbicide Application Data:

Date	5/20/06	6/14/06
Time	9:30 am	7:30 am
Treatment	HS*	POST
Soil Moisture		
SF	moist	dry
1"	moist	dry
3"	moist	moist
Soil Temp (F^o)		
SF	68.4	60.5
3"	51.8	71.2
Air Temp (F^o)	69.9	62.5
Wind (mph)	4-8 SW	2-4 SW
%RH	60.9 %	68.9%
Sky Condition	sunny	P. sunny
Crop Stage	pre	14-16"
Weed & Size	-----	VELE 2-4"
	-----	RRPW 1-4"
	-----	COLQ 2-3"
	-----	GIFT 2-4"
	-----	YEFT 2-4"

Fertilization and other pesticides:

Fall 2005 - dairy replacement pack manure, 160 lb N/A.
4/24/06 - 6-24-24 Starter @ 500 lb/A Impregnated with Admire
7/13/06 - Asana XL 4 oz/A + Quadris 12 oz/A

*HS = Hill Spray (PRE) application.

Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate
VELE = Velevetleaf	Moderate
RRPW = Redroot Pigweed	Moderate
GIFT = Giant Foxtail	Moderate
YEFT = Yellow Foxtail	Moderate

Potato Herbicide Evaluation - Arlington, WI

							5/25/06	6/13/2006					
Trt	Treatment	Form	Form		Rate	Grow	Phyto	Phyto	% control				
No.	Name	Conc	Type	Rate	Unit	Stg	% Injury	% Injury	COLQ	RRPW	VELE	GIFT	YEFT
1	Weedy Check						0 a	0 a	25 c	25 c	18.8 e	25 d	25 c
2	Sencor DF	75	DF	0.5	LB A/A	HS	0 a	0 a	97.5 a	100 a	97.5 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS							
3	Sencor DF	75	DF	0.5	LB A/A	HS	0 a	0 a	100 a	100 a	98.8 a	95 a	96.3 a
	Outlook	6	EC	0.656	LB A/A	HS							
4	Sencor DF	75	DF	0.5	LB A/A	HS	0 a	0 a	90 a	96.3 a	86.3 ab	97.5 a	97.5 a
	Prowl H2O	3.8	EC	1	LB A/A	HS							
5	Sencor DF	75	DF	0.5	LB A/A	HS	0 a	0 a	100 a	97.5 a	90 a	100 a	100 a
	Define SC	4	FL	15	OZ/A	HS							
6	Lorox	50	DF	0.5	LB A/A	HS	0 a	0 a	87.5 a	80 ab	92.5 a	92.5 ab	92.5 a
	Dual Magnum	7.62	EC	1	PT/A	HS							
7	Sencor DF	75	DF	0.25	LB A/A	HS	0 a	0 a	95 a	75 ab	81.3 ab	88.8 ab	83.8 ab
8	Sencor DF	75	DF	0.375	LB A/A	HS	0 a	0 a	100 a	98.8 a	93.8 a	97.5 a	100 a
9	Sencor DF	75	DF	0.5	LB A/A	HS	0 a	0 a	72.5 ab	75 ab	72.5 ab	72.5 abc	72.5 ab
10	Sencor DF	75	DF	0.25	LB A/A	PO1	0 a	0 a	25 c	22.5 c	23.8 de	25 d	25 c
11	Sencor DF	75	DF	0.375	LB A/A	PO1	0 a	0 a	25 c	25 c	25 cde	25 d	25 c
12	Sencor DF	75	DF	0.5	LB A/A	PO1	0 a	0 a	48.8 bc	48.8 bc	48.8 b-e	47.5 cd	50 bc
13	Spartan	4	F	0.094	LB A/A	HS	0 a	0 a	100 a	100 a	80 ab	73.8 abc	71.3 ab
14	Spartan	4	F	0.125	LB A/A	HS	0 a	0 a	97.5 a	97.5 a	92.5 a	91.3 ab	82.5 ab
15	Spartan	4	F	0.094	LB A/A	HS	0 a	0 a	75 ab	75 ab	63.8 abc	75 abc	75 ab
	Dual Magnum	7.62	EC	1	PT/A	HS							
16	Spartan	4	F	0.094	LB A/A	HS	0 a	0 a	100 a	100 a	97.5 a	100 a	97.5 a
	Matrix	75	DF	1	OZ/A	HS							
17	Spartan	4	F	0.094	LB A/A	HS	0 a	0 a	98.8 a	100 a	93.8 a	95 a	100 a
	Prowl H2O	3.8	EC	1	LB A/A	HS							
18	Spartan	4	F	0.094	LB A/A	HS	0 a	0 a	100 a	100 a	95 a	85 abc	76.3 ab
	Outlook	6	EC	0.656	LB A/A	HS							
19	Outlook	6	EC	0.656	LB A/A	HS	0 a	0 a	75 ab	75 ab	62.5 a-d	72.5 abc	60 abc
	Matrix	25	DF	1	OZ/A	HS							
20	Dual Magnum	7.62	EC	1	PT/A	HS	0 a	0 a	98.8 a	98.8 a	93.8 a	98.8 a	98.8 a
	Matrix	25	DF	1	OZ/A	HS							
LSD (P=.05)							1.31	0.58	36.5	38.56	39.12	40.57	42.06

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Arlington, WI

							5/25/06	6/13/2006						
Trt	Treatment	Form	Form		Rate	Grow	Phyto	Phyto	% control					
No.	Name	Conc	Type	Rate	Unit	Stg	% Injury	% Injury	COLQ	RRPW	VELE	GIFT	YEFT	
21	Dual Magnum	7.62	EC	1	PT/A	HS	0 a	0 a	95 a	100 a	96.3 a	97.5 a	93.8 a	
	Matrix	25	DF	1	OZ/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
22	Chateau	51	WG	0.047	LB A/A	HS	0 a	0 a	70 ab	65 ab	66.3 ab	73.3 abc	73.8 ab	
23	Chateau	51	WG	0.063	LB A/A	HS	0 a	0 a	98.8 a	96.3 a	97.5 a	100 a	97.5 a	
24	Chateau	51	WG	0.047	LB A/A	HS	1.3 a	1.3 a	100 a	98.8 a	97.5 a	98.8 a	100 a	
	Sencor DF	75	DF	0.5	LB A/A	HS								
25	Dual Magnum	7.62	EC	1	PT/A	HS	0 a	0 a	95 a	97.5 a	86.3 ab	96.3 a	92.5 a	
	Sandea	75	DF	0.032	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
26	Dual Magnum	7.62	EC	1	PT/A	HS	0 a	0 a	98.8 a	100 a	83.8 ab	98.8 a	96.3 a	
	Sandea	75	DF	0.047	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
27	Prowl H2O	3.8	EC	1	LB A/A	HS	0 a	0 a	98.8 a	96.3 a	90 a	93.8 ab	85 ab	
	Sandea	75	DF	0.047	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
28	Outlook	6	EC	0.656	LB A/A	HS	0 a	0 a	100 a	97.5 a	93.8 a	100 a	100 a	
	Sandea	75	DF	0.047	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
29	Envoke	75	WG	0.15	OZ/A	HS	0 a	0 a	98.8 a	93.8 a	73.8 ab	91.3 ab	91.3 ab	
30	Envoke	75	WG	0.3	OZ/A	HS	0 a	0 a	100 a	95 a	85 ab	83.8 abc	82.5 ab	
31	Envoke	75	WG	0.15	OZ/A	HS	0 a	0 a	100 a	100 a	97.5 a	100 a	100 a	
	Dual Magnum	7.62	EC	1	PT/A	HS								
32	Envoke	75	WG	0.3	OZ/A	HS	0 a	0 a	72.5 ab	75 ab	67.5 ab	75 abc	75 ab	
	Dual Magnum	7.62	EC	1	PT/A	HS								
33	Reflex	2	L	0.15	LB A/A	HS	0 a	0 a	95 a	100 a	81.3 ab	93.8 ab	91.3 ab	
34	Reflex	2	L	0.3	LB A/A	HS	0 a	0 a	94.5 a	100 a	92 a	97.5 a	95 a	
35	Reflex	2	L	0.15	LB A/A	HS	0 a	0 a	92.5 a	93.8 a	66.3 ab	53.8 bcd	50 bc	
	Dual Magnum	7.62	EC	1	PT/A	HS								
36	Reflex	2	L	0.3	LB A/A	HS	2.5 a	0 a	100 a	100 a	71.3 ab	98.8 a	100 a	
	Dual Magnum	7.62	EC	1	PT/A	HS								
LSD (P=.05)							1.31	0.58	36.5	38.56	39.12	40.57	42.06	

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Arlington, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	9/29/2006 Yield (cwt/A) B's	Cull's	A's	Total Yield
1	Weedy Check						31 a	10.3 a	288 a	329.4 a
2	Sencor DF	75	DF	0.5	LB A/A	HS	29.4 a	7.5 a	316.7 a	353.7 a
	Dual Magnum	7.62	EC	1	PT/A	HS				
3	Sencor DF	75	DF	0.5	LB A/A	HS	31.4 a	9 a	318.5 a	358.9 a
	Outlook	6	EC	0.656	LB A/A	HS				
4	Sencor DF	75	DF	0.5	LB A/A	HS	30.1 a	10.6 a	271.3 a	312.1 a
	Prowl H2O	3.8	EC	1	LB A/A	HS				
5	Sencor DF	75	DF	0.5	LB A/A	HS	29.3 a	9.6 a	322.5 a	361.5 a
	Define SC	4	FL	15	OZ/A	HS				
6	Lorox	50	DF	0.5	LB A/A	HS	31.1 a	8.1 a	266.4 a	305.6 a
	Dual Magnum	7.62	EC	1	PT/A	HS				
7	Sencor DF	75	DF	0.25	LB A/A	HS	28.6 a	5.5 a	286.5 a	320.6 a
8	Sencor DF	75	DF	0.375	LB A/A	HS	31.4 a	13.1 a	303.2 a	347.7 a
9	Sencor DF	75	DF	0.5	LB A/A	HS	21 a	7.8 a	238.9 a	267.6 a
10	Sencor DF	75	DF	0.25	LB A/A	PO1	31.1 a	6 a	302.6 a	339.7 a
11	Sencor DF	75	DF	0.375	LB A/A	PO1	31.1 a	13.1 a	308.8 a	353 a
12	Sencor DF	75	DF	0.5	LB A/A	PO1	28.7 a	7.1 a	302.5 a	338.2 a
13	Spartan	4	F	0.094	LB A/A	HS	33.5 a	11.1 a	315.3 a	359.8 a
14	Spartan	4	F	0.125	LB A/A	HS	26 a	5.2 a	266.5 a	297.7 a
15	Spartan	4	F	0.094	LB A/A	HS	28.8 a	8.5 a	248.1 a	285.4 a
	Dual Magnum	7.62	EC	1	PT/A	HS				
16	Spartan	4	F	0.094	LB A/A	HS	35.7 a	14 a	312.5 a	362.1 a
	Matrix	75	DF	1	OZ/A	HS				
17	Spartan	4	F	0.094	LB A/A	HS	33.8 a	10.4 a	310.4 a	354.6 a
	Prowl H2O	3.8	EC	1	LB A/A	HS				
18	Spartan	4	F	0.094	LB A/A	HS	29.8 a	10.3 a	257.6 a	297.8 a
	Outlook	6	EC	0.656	LB A/A	HS				
19	Outlook	6	EC	0.656	LB A/A	HS	24.1 a	7.8 a	261.5 a	293.5 a
	Matrix	25	DF	1	OZ/A	HS				
20	Dual Magnum	7.62	EC	1	PT/A	HS	29.9 a	8.9 a	296.4 a	335.2 a
	Matrix	25	DF	1	OZ/A	HS				
LSD (P=.05)							9.96	7.67	77	81.44

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Arlington, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	9/29/2006 Yield (cwt/A) B's	Cull's	A's	Total Yield
21	Dual Magnum	7.62	EC	1	PT/A	HS	30.5 a	8.1 a	350.4 a	389 a
	Matrix	25	DF	1	OZ/A	PO1				
	Activator 90		L	0.125	% V/V	PO1				
22	Chateau	51	WG	0.047	LB A/A	HS	25.7 a	7.4 a	327.8 a	360.8 a
23	Chateau	51	WG	0.063	LB A/A	HS	29.3 a	8 a	349.8 a	387.1 a
24	Chateau	51	WG	0.047	LB A/A	HS	32 a	12.6 a	301.7 a	346.3 a
	Sencor DF	75	DF	0.5	LB A/A	HS				
25	Dual Magnum	7.62	EC	1	PT/A	HS	35.5 a	7.5 a	281.1 a	324.2 a
	Sandea	75	DF	0.032	LB A/A	PO1				
	Activator 90		L	0.125	% V/V	PO1				
26	Dual Magnum	7.62	EC	1	PT/A	HS	34 a	12 a	274.2 a	320.3 a
	Sandea	75	DF	0.047	LB A/A	PO1				
	Activator 90		L	0.125	% V/V	PO1				
27	Prowl H2O	3.8	EC	1	LB A/A	HS	30.5 a	10.9 a	287.4 a	328.8 a
	Sandea	75	DF	0.047	LB A/A	PO1				
	Activator 90		L	0.125	% V/V	PO1				
28	Outlook	6	EC	0.656	LB A/A	HS	36.2 a	9.1 a	268 a	313.3 a
	Sandea	75	DF	0.047	LB A/A	PO1				
	Activator 90		L	0.125	% V/V	PO1				
29	Envoke	75	WG	0.15	OZ/A	HS	31.8 a	7.2 a	258.8 a	297.8 a
30	Envoke	75	WG	0.3	OZ/A	HS	29.1 a	6.1 a	260.3 a	295.5 a
31	Envoke	75	WG	0.15	OZ/A	HS	30.4 a	6.1 a	305.6 a	342.1 a
	Dual Magnum	7.62	EC	1	PT/A	HS				
32	Envoke	75	WG	0.3	OZ/A	HS	32.9 a	11.8 a	294.1 a	338.9 a
	Dual Magnum	7.62	EC	1	PT/A	HS				
33	Reflex	2	L	0.15	LB A/A	HS	25.4 a	4.9 a	284 a	314.4 a
34	Reflex	2	L	0.3	LB A/A	HS	31 a	12.6 a	303.1 a	346.8 a
35	Reflex	2	L	0.15	LB A/A	HS	26.8 a	10.4 a	255.4 a	292.6 a
	Dual Magnum	7.62	EC	1	PT/A	HS				
36	Reflex	2	L	0.3	LB A/A	HS	31.5 a	8.4 a	309 a	348.9 a
	Dual Magnum	7.62	EC	1	PT/A	HS				
LSD (P=.05)							9.96	7.67	77	81.44

Means followed by same letter do not significantly differ (P=.05, LSD)

POTATO HERBICIDE EFFICACY EVALUATION - HANCOCK - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:
Location: Hancock Ag Research Station - R-2 Pivot
Soil Type: Plainfield Loamy Sand; pH 6.8; OM 0.8%.
Potato Cultivar: Russet Burbank
Date Planted: 4/17/06
Row Spacing: 36 Inches, 4 rows/plot
Plant Spacing: 12 inches
Date Harvested: 10/9/06
Plot Size-Design: 48' x 20', 4 Reps
Rating Dates: 5/22, 6/9, 6/21
Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Herbicide Application Data:

Date	5/5/06	6/9/06
Time	8:30 am	6:00 am
Treatment	HS	PO1
Soil Moisture		
SF	dry	moist
1"	moist	moist
3"	moist	moist
Soil Temp (F^o)		
SF	53.2	62.4
3"	53.7	63.9
Air Temp (F^o)	49.3	59.8
Wind	4-8 NW	2-3 NW
%RH	41.3%	55.5%
Sky Condition	cloudy	cloudy
Crop Stage	pre	16-18"
Weed & Size	pre	CORW 2-3"
	-----	COLQ 1-3"
	-----	WIBW 2-4"
	-----	HANS 1-2"
	-----	GRFT 1-3"

Summary: The 2006 potato herbicide efficacy trials evaluated both registered and 'experimental' herbicide options to further refine current and future weed control strategies. Weed control, plant injury and potato yield were evaluated. Sandea herbicide (halosulfuron-methyl) treatments with a pre-emergence herbicide down as a hill-spray followed by a post-emergence Sandea application resulted in excellent weed control. Potato sensitivity to Sandea is an issue and was evaluated in a separate trial. Spartan (sulfentrazone) herbicide was briefly labeled on potato in 2004 and 2005, but is not currently labeled on potato. Spartan herbicide once again appears to be an effective potato weed management tool. Minor early season injury (usually less than 8%) in the form of stunting or delayed emergence was again common in our trials, however fine tuning the rate and timing (early is better) has generally offset these issues. Reflex (fomesafen) herbicide was evaluated pre-emergence at 2 rates, both alone and in combination with a standard pre-emergence herbicide. Some minor crop tolerance issues
emergence herbicide. Minor crop tolerance issues did surface, however no effects were seen on yield.

Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate
CORW = Common Ragweed	High
HANS = Hairy Nightshade	Low

Weed Abbreviations:	Plot Weed Density:
RRPW = Redroot Pigweed	Low
WIBW = Wild Buckwheat	High
GIFT = Giant Foxtail	High
GRFT = Green Foxtail	High

Fertilizer & Pesticide Applications:

date	product	rate	date	product	rate	date	product	rate
4/4	potash	300 lb/a	7/6	Rimon	9 oz/a	8/18	Bravo ZN	1.5 pt/a
4/17	6-24-24	550 lb/a	7/13	Bravo ZN	1.5 pt/a	8/24	Bravo ZN	1.5 pt/a
	w/ admire		7/21	Bravo ZN	1.5 pt/a	8/31	Bravo ZN	1.5pt/a
5/3	calsul	500 lb/a	7/21	Endura	2.5 oz/a	9/7	Bravo ZN	1.5 pt/a
5/4	21-0-0	350 lb/a	7/28	Bravo ZN	1.5 pt/a	9/8	Reglone	1 pt/a
5/31	34-0-0	375 lb/a	8/4	Baythroid 2	2 oz/a	9/8	Crop Oil	1 qt/a
6/29	Bravo ZN	1.5 pt/a	8/4	Headline	6 oz/a	9/13	Bravo ZN	1.5 pt/a
7/6	Bravo ZN	1.5 pt/a	8/4	Bravo ZN	1.5 pt/a	9/15	Reglone	1 pt/a
7/6	Headline	6 oz/a	8/10	Bravo ZN	1.5 pt/a	9/15	Crop Oil	1 qt/a

Potato Herbicide Evaluation - Hancock, WI

							5/22/06	6/9/2006							
									% Control						
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Phyto % Injury	Phyto % Injury	CORW	WIBU	COLQ	HANS	RRPW	GRFT	GIFT
1	Weedy Check						0 f	0 e	0 h	0 e	0 c	0 e	0 d	0 f	0 f
2	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	1 e	96 abc	97 a	100 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS									
3	Sencor DF	75	DF	0.5	LB A/A	HS	1 ef	0 e	98 abc	99 a	100 a	95 abc	100 a	100 a	100 a
	Outlook	6	EC	0.656	LB A/A	HS									
4	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	0 e	99 ab	100 a	100 a	95 abc	100 a	100 a	100 a
	Prowl H2O	3.8	EC	1	LB A/A	HS									
5	Sencor DF	75	DF	0.5	LB A/A	HS	9 cd	0 e	100 a	99 a	100 a	86 bc	100 a	100 a	100 a
	Define SC	4	FL	15	OZ/A	HS									
6	Lorox	50	DF	0.5	LB A/A	HS	0 f	0 e	95 abc	98 a	99 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS									
7	Sencor DF	75	DF	0.25	LB A/A	HS	0 f	0 e	84 cde	76 c	99 a	84 c	78 b	79 d	83 d
8	Sencor DF	75	DF	0.375	LB A/A	HS	0 f	0 e	89 a-e	91 ab	99 a	93 abc	100 a	88 bcd	86 bcd
9	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	0 e	98 abc	96 a	100 a	84 c	98 a	89 a-d	89 a-d
10	Sencor DF	75	DF	0.25	LB A/A	PO1	0 f	0 e	0 h	0 e	0 c	0 e	0 d	0 f	0 f
11	Sencor DF	75	DF	0.375	LB A/A	PO1	0 f	0 e	21 g	20 d	23 b	23 d	25 c	24 e	23 e
12	Sencor DF	75	DF	0.5	LB A/A	PO1	0 f	0 e	0 h	0 e	0 c	0 e	0 d	0 f	0 f
13	Spartan	4	F	0.094	LB A/A	HS	0 f	0 e	55 f	100 a	100 a	100 a	98 a	83 d	80 d
14	Spartan	4	F	0.125	LB A/A	HS	9 cd	6 de	75 e	100 a	100 a	100 a	100 a	85 cd	85 cd
15	Spartan	4	F	0.094	LB A/A	HS	8 de	0 e	80 de	100 a	100 a	100 a	99 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS									
16	Spartan	4	F	0.094	LB A/A	HS	6 def	8 cde	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Matrix	75	DF	1	OZ/A	HS									
17	Spartan	4	F	0.094	LB A/A	HS	6 def	4 de	79 e	100 a	100 a	100 a	100 a	100 a	100 a
	Prowl H2O	3.8	EC	1	LB A/A	HS									
18	Spartan	4	F	0.094	LB A/A	HS	15 c	5 de	86 a-e	100 a	100 a	100 a	100 a	100 a	100 a
	Outlook	6	EC	0.656	LB A/A	HS									
19	Outlook	6	EC	0.656	LB A/A	HS	0 f	0 e	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Matrix	25	DF	1	OZ/A	HS									
20	Dual Magnum	7.62	EC	1	PT/A	HS	3 def	8 cde	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Matrix	25	DF	1	OZ/A	HS									
LSD (P=.05)							6.7	13.1	14.2	10.4	10.8	12.6	15.3	12.3	11.7

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Hancock, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	5/22/06 Phyto % Injury	6/9/2006 Phyto % Injury	% Control CORW	WIBU	COLQ	HANS	RRPW	GRFT	GIFT
21	Dual Magnum	7.62	EC	1	PT/A	HS	1 ef	0 e	78 e	83 bc	100 a	100 a	100 a	100 a	100 a
	Matrix	25	DF	1	OZ/A	PO1									
	Activator 90		L	0.125	% V/V	PO1									
22	Chateau	51	WG	0.047	LB A/A	HS	41 b	15 bcd	99 ab	100 a	100 a	100 a	100 a	96 abc	98 ab
23	Chateau	51	WG	0.063	LB A/A	HS	58 a	23 ab	100 a	100 a	100 a	100 a	100 a	100 a	100 a
24	Chateau	51	WG	0.047	LB A/A	HS	54 a	20 abc	100 a	100 a	100 a	100 a	100 a	100 ab	100 a
	Sencor DF	75	DF	0.5	LB A/A	HS									
25	Dual Magnum	7.62	EC	1	PT/A	HS	0 f	0 e	85 b-e	95 a	99 a	95 abc	100 a	100 a	100 a
	Sandea	75	DF	0.032	LB A/A	PO1									
	Activator 90		L	0.125	% V/V	PO1									
26	Dual Magnum	7.62	EC	1	PT/A	HS	4 def	0 e	84 cde	91 ab	100 a	94 abc	91 ab	100 a	100 a
	Sandea	75	DF	0.047	LB A/A	PO1									
	Activator 90		L	0.125	% V/V	PO1									
27	Prowl H2O	3.8	EC	1	LB A/A	HS	0 f	0 e	80 de	93 ab	100 a	100 a	100 a	100 a	100 a
	Sandea	75	DF	0.047	LB A/A	PO1									
	Activator 90		L	0.125	% V/V	PO1									
28	Outlook	6	EC	0.656	LB A/A	HS	0 f	0 e	93 a-d	93 ab	98 a	96 abc	96 a	100 a	100 a
	Sandea	75	DF	0.047	LB A/A	PO1									
	Activator 90		L	0.125	% V/V	PO1									
29	Envoke	75	WG	0.15	OZ/A	HS	1 ef	26 ab	100 a	100 a	100 a	100 a	100 a	100 a	98 ab
30	Envoke	75	WG	0.3	OZ/A	HS	4 def	30 a	100 a	100 a	100 a	100 a	100 a	100 a	100 a
31	Envoke	75	WG	0.15	OZ/A	HS	1 ef	25 ab	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS									
32	Envoke	75	WG	0.3	OZ/A	HS	3 def	26 ab	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS									
33	Reflex	2	L	0.15	LB A/A	HS	0 f	4 de	99 ab	93 a	96 a	100 a	100 a	95 abc	95 abc
34	Reflex	2	L	0.3	LB A/A	HS	0 f	5 de	100 a	98 a	96 a	100 a	100 a	99 ab	99 a
35	Reflex	2	L	0.15	LB A/A	HS	0 f	4 de	98 ab	98 a	95 a	99 ab	98 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS									
36	Reflex	2	L	0.3	LB A/A	HS	0 f	29 a	100 a	99 a	100 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS									
LSD (P=.05)							6.7	13.1	14.2	10.4	10.8	12.6	15.3	12.3	11.7

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Hancock, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/21/2006 Phyto % Injury	% Control CORW	WIBU	COLQ	HANS	RRPW	GRFT	GIFT
1	Weedy Check						0 f	0 h	0 h	0 e	0 d	0 e	0 g	0 i
2	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	89 b-e	93 c-f	100 a	98 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS								
3	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	92 a-d	93 b-f	100 a	83 bc	100 a	100 a	100 a
	Outlook	6	EC	0.656	LB A/A	HS								
4	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	96 abc	100 a	100 a	73 c	100 a	100 a	100 a
	Prowl H2O	3.8	EC	1	LB A/A	HS								
5	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	95 abc	96 a-d	100 a	83 bc	98 b	100 a	100 a
	Define SC	4	FL	15	OZ/A	HS								
6	Lorox	50	DF	0.5	LB A/A	HS	0 f	88 cde	95 a-e	100 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS								
7	Sencor DF	75	DF	0.25	LB A/A	HS	0 f	76 f	79 g	100 a	84 bc	90 d	50 f	53 h
8	Sencor DF	75	DF	0.375	LB A/A	HS	0 f	81 ef	89 f	100 a	79 c	94 c	61 e	65 g
9	Sencor DF	75	DF	0.5	LB A/A	HS	0 f	88 cde	95 a-e	100 a	93 ab	100 a	76 c	85 de
10	Sencor DF	75	DF	0.25	LB A/A	PO1	0 f	100 a	100 a	100 a	100 a	100 a	100 a	100 a
11	Sencor DF	75	DF	0.375	LB A/A	PO1	0 f	100 a	100 a	100 a	100 a	100 a	95 a	93 bc
12	Sencor DF	75	DF	0.5	LB A/A	PO1	4 e	100 a	100 a	100 a	100 a	100 a	95 a	96 abc
13	Spartan	4	F	0.094	LB A/A	HS	0 f	55 g	98 abc	100 a	100 a	100 a	74 cd	83 ef
14	Spartan	4	F	0.125	LB A/A	HS	0 f	61 g	100 a	100 a	100 a	100 a	65 de	80 ef
15	Spartan	4	F	0.094	LB A/A	HS	0 f	84 def	99 a	100 a	100 a	100 a	99 a	99 ab
	Dual Magnum	7.62	EC	1	PT/A	HS								
16	Spartan	4	F	0.094	LB A/A	HS	0 f	99 ab	98 ab	100 a	100 a	100 a	99 a	100 ab
	Matrix	75	DF	1	OZ/A	HS								
17	Spartan	4	F	0.094	LB A/A	HS	0 f	80 ef	96 a-d	100 a	100 a	100 a	95 a	100 a
	Prowl H2O	3.8	EC	1	LB A/A	HS								
18	Spartan	4	F	0.094	LB A/A	HS	0 f	93 a-d	100 a	100 a	100 a	100 a	100 a	100 a
	Outlook	6	EC	0.656	LB A/A	HS								
19	Outlook	6	EC	0.656	LB A/A	HS	0 f	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Matrix	25	DF	1	OZ/A	HS								
20	Dual Magnum	7.62	EC	1	PT/A	HS	0 f	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Matrix	25	DF	1	OZ/A	HS								
LSD (P=.05)							3.7	10.3	5.1	1.9	11.7	2.4	10.1	7.1

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Hancock, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/21/2006 Phyto % Injury	% Control CORW	WIBU	COLQ	HANS	RRPW	GRFT	GIFT
No.	Name	Conc	Type	Rate	Unit	Stg								
21	Dual Magnum	7.62	EC	1	PT/A	HS	0 f	94 a-d	98 abc	99 ab	100 a	100 a	100 a	100 a
	Matrix	25	DF	1	OZ/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
22	Chateau	51	WG	0.047	LB A/A	HS	9 bcd	100 a	100 a	100 a	100 a	100 a	93 ab	93 bc
23	Chateau	51	WG	0.063	LB A/A	HS	8 cd	100 a	100 a	100 a	100 a	100 a	99 a	98 abc
24	Chateau	51	WG	0.047	LB A/A	HS	8 cd	100 a	100 a	100 a	100 a	100 a	99 a	100 a
	Sencor DF	75	DF	0.5	LB A/A	HS								
25	Dual Magnum	7.62	EC	1	PT/A	HS	8 cd	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Sandea	75	DF	0.032	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
26	Dual Magnum	7.62	EC	1	PT/A	HS	6 de	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Sandea	75	DF	0.047	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
27	Prowl H2O	3.8	EC	1	LB A/A	HS	9 bcd	100 a	97 abc	100 a	96 a	100 a	100 a	100 a
	Sandea	75	DF	0.047	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
28	Outlook	6	EC	0.656	LB A/A	HS	10 bc	100 a	100 a	99 ab	98 a	100 a	99 a	100 a
	Sandea	75	DF	0.047	LB A/A	PO1								
	Activator 90		L	0.125	% V/V	PO1								
29	Envoke	75	WG	0.15	OZ/A	HS	10 bc	100 a	100 a	100 a	100 a	100 a	84 bc	78 f
30	Envoke	75	WG	0.3	OZ/A	HS	14 a	100 a	100 a	100 a	100 a	100 a	99 a	100 a
31	Envoke	75	WG	0.15	OZ/A	HS	6 de	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS								
32	Envoke	75	WG	0.3	OZ/A	HS	11 ab	100 a	100 a	100 a	100 a	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS								
33	Reflex	2	L	0.15	LB A/A	HS	0 f	95 abc	90 ef	91 d	96 a	100 a	94 ab	91 cd
34	Reflex	2	L	0.3	LB A/A	HS	0 f	97 abc	92 def	97 bc	96 a	100 a	98 a	98 abc
35	Reflex	2	L	0.15	LB A/A	HS	0 f	97 abc	95 a-d	96 c	100 a	99 ab	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS								
36	Reflex	2	L	0.3	LB A/A	HS	0 f	97 abc	96 a-d	99 ab	94 ab	100 a	100 a	100 a
	Dual Magnum	7.62	EC	1	PT/A	HS								
LSD (P=.05)							3.7	10.3	5.1	1.9	11.7	2.4	10.1	7.1

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Hancock, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
1	Weedy Check						61.3 a	31.3 d-i	195.8 a	56.0 a	135.6 b-h	20.6 e-h	7.1 a	0.0 a	507.7 a-h	1.075 abc
2	Sencor DF	75	DF	0.5	LB A/A	HS	76.0 a	38.8 c-i	180.7 ab	52.4 a	139.1 a-h	24.2 d-h	18.3 a	6.5 a	536.1 a-e	1.075 ab
	Dual Magnum	7.62	EC	1	PT/A	HS										
3	Sencor DF	75	DF	0.5	LB A/A	HS	76.6 a	46.6 a-h	123.0 a-g	136.1 a	145.7 a-g	35.9 b-g	11.7 a	2.1 a	577.6 ab	1.077 ab
	Outlook	6	EC	0.656	LB A/A	HS										
4	Sencor DF	75	DF	0.5	LB A/A	HS	74.2 a	51.4 a-f	125.5 a-g	125.8 a	153.9 a-f	33.5 c-h	5.1 a	4.2 a	573.5 ab	1.074 abc
	Prowl H2O	3.8	EC	1	LB A/A	HS										
5	Sencor DF	75	DF	0.5	LB A/A	HS	70.4 a	35.9 c-i	103.7 b-g	127.4 a	180.0 abc	51.9 abc	10.3 a	4.4 a	584.0 a	1.076 ab
	Define SC	4	FL	15	OZ/A	HS										
6	Lorox	50	DF	0.5	LB A/A	HS	67.2 a	42.0 b-i	116.2 a-g	82.3 a	159.5 a-e	40.3 a-f	11.9 a	2.1 a	521.4 a-g	1.074 abc
	Dual Magnum	7.62	EC	1	PT/A	HS										
7	Sencor DF	75	DF	0.25	LB A/A	HS	47.7 a	34.9 d-i	111.9 a-g	99.2 a	151.9 a-f	32.2 c-h	12.3 a	6.3 a	496.5 b-h	1.075 abc
8	Sencor DF	75	DF	0.375	LB A/A	HS	58.8 a	32.0 d-i	73.2 efg	109.3 a	156.8 a-e	38.0 a-g	18.2 a	0.0 a	486.4 c-h	1.078 a
9	Sencor DF	75	DF	0.5	LB A/A	HS	68.6 a	41.7 b-i	144.0 a-f	93.8 a	155.4 a-e	33.2 c-h	7.9 a	0.0 a	544.6 a-d	1.074 abc
10	Sencor DF	75	DF	0.25	LB A/A	PO1	63.3 a	40.4 c-i	65.3 fg	101.0 a	192.1 a	41.8 a-f	12.8 a	9.7 a	526.4 a-f	1.077 a
11	Sencor DF	75	DF	0.375	LB A/A	PO1	69.2 a	39.5 c-i	78.1 d-g	82.4 a	158.8 a-e	44.6 a-e	10.5 a	6.4 a	489.5 c-h	1.076 ab
12	Sencor DF	75	DF	0.5	LB A/A	PO1	78.5 a	46.1 a-h	88.8 c-g	88.2 a	154.0 a-f	47.4 a-d	13.9 a	7.2 a	524.1 a-f	1.075 abc
13	Spartan	4	F	0.094	LB A/A	HS	69.5 a	21.3 i	97.1 b-g	108.3 a	114.4 d-h	18.5 fgh	7.3 a	2.2 a	438.6 g-j	1.072 a-d
14	Spartan	4	F	0.125	LB A/A	HS	48.2 a	23.5 hi	141.6 a-f	21.9 a	119.0 d-h	24.4 d-h	3.1 a	1.9 a	383.5 j	1.076 ab
15	Spartan	4	F	0.094	LB A/A	HS	76.1 a	18.8 i	160.9 a-e	94.1 a	91.0 gh	21.2 e-h	1.6 a	0.0 a	463.8 d-j	1.075 ab
	Dual Magnum	7.62	EC	1	PT/A	HS										
16	Spartan	4	F	0.094	LB A/A	HS	57.4 a	52.8 a-d	122.1 a-g	83.3 a	138.0 a-h	58.8 ab	15.3 a	3.9 a	531.6 a-f	1.074 abc
	Matrix	75	DF	1	OZ/A	HS										
17	Spartan	4	F	0.094	LB A/A	HS	66.1 a	26.6 ghi	130.3 a-g	81.0 a	108.9 e-h	10.0 h	4.9 a	0.0 a	427.8 hij	1.072 a-d
	Prowl H2O	3.8	EC	1	LB A/A	HS										
18	Spartan	4	F	0.094	LB A/A	HS	65.9 a	34.9 d-i	170.3 abc	64.2 a	131.0 b-h	34.4 b-h	7.2 a	0.0 a	507.8 a-h	1.075 abc
	Outlook	6	EC	0.656	LB A/A	HS										
19	Outlook	6	EC	0.656	LB A/A	HS	65.5 a	53.8 a-d	103.6 b-g	95.7 a	157.1 a-e	27.3 c-h	10.8 a	0.0 a	513.7 a-g	1.074 abc
	Matrix	25	DF	1	OZ/A	HS										
20	Dual Magnum	7.62	EC	1	PT/A	HS	70.2 a	66.6 a	124.2 a-g	61.8 a	164.3 a-e	36.2 a-g	13.0 a	2.4 a	538.7 a-d	1.073 abc
	Matrix	25	DF	1	OZ/A	HS										
LSD (P=.05)							25.151	23.79	91.655	65.679	56.218	24.745	14.978	8.843	83.211	0.0061

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Herbicide Evaluation - Hancock, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Gro. Stg	Yield (cwt/A) 10/09/06 B's	Cull's	<4 oz	4-6 oz	6-10 oz	10-13 oz	13-16 oz	>16 oz	Total	Specific Gravity
21	Dual Magnum	7.62	EC	1	PT/A	HS	64.7 a	65.3 ab	106.1 a-g	104.4 a	146.3 a-g	21.1 e-h	11.7 a	7.1 a	526.6 a-f	1.073 abc
	Matrix	25	DF	1	OZ/A	PO1										
	Activator 90		L	0.125	% V/V	PO1										
22	Chateau	51	WG	0.047	LB A/A	HS	56.6 a	23.6 hi	115.3 a-g	85.3 a	83.9 h	14.9 gh	8.5 a	0.0 a	388.1 ij	1.076 ab
23	Chateau	51	WG	0.063	LB A/A	HS	58.5 a	26.0 ghi	184.6 ab	91.7 a	98.5 fgh	34.4 b-h	4.7 a	2.5 a	500.9 a-h	1.076 ab
24	Chateau	51	WG	0.047	LB A/A	HS	67.8 a	28.0 f-i	169.3 a-d	95.4 a	127.1 c-h	26.0 d-h	0.0 a	0.0 a	513.7 a-g	1.074 abc
	Sencor DF	75	DF	0.5	LB A/A	HS										
25	Dual Magnum	7.62	EC	1	PT/A	HS	93.5 a	38.4 c-i	150.8 a-f	61.0 a	112.6 d-h	23.1 d-h	3.4 a	0.0 a	482.8 c-h	1.073 abc
	Sandea	75	DF	0.032	LB A/A	PO1										
	Activator 90		L	0.125	% V/V	PO1										
26	Dual Magnum	7.62	EC	1	PT/A	HS	58.5 a	35.3 d-i	75.1 efg	99.2 a	145.9 a-g	28.6 c-h	7.0 a	2.3 a	451.8 f-j	1.063 e
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.125	% V/V	PO1										
27	Prowl H2O	3.8	EC	1	LB A/A	HS	89.2 a	51.9 a-e	73.9 efg	115.1 a	141.5 a-g	28.2 c-h	8.6 a	4.2 a	512.6 a-g	1.072 a-d
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.125	% V/V	PO1										
28	Outlook	6	EC	0.656	LB A/A	HS	88.5 a	28.6 e-i	63.9 fg	100.6 a	131.7 b-h	27.1 d-h	6.7 a	4.3 a	451.3 f-j	1.073 abc
	Sandea	75	DF	0.047	LB A/A	PO1										
	Activator 90		L	0.125	% V/V	PO1										
29	Envoke	75	WG	0.15	OZ/A	HS	76.2 a	68.0 a	39.5 g	86.4 a	146.6 a-g	42.0 a-f	8.7 a	0.0 a	467.4 d-i	1.071 bcd
30	Envoke	75	WG	0.3	OZ/A	HS	70.5 a	36.4 c-i	42.5 g	95.2 a	187.0 ab	41.6 a-f	6.7 a	9.4 a	489.2 c-h	1.069 cde
31	Envoke	75	WG	0.15	OZ/A	HS	74.2 a	59.7 abc	69.4 efg	57.6 a	180.8 abc	58.3 ab	19.3 a	0.0 a	519.4 a-g	1.073 abc
	Dual Magnum	7.62	EC	1	PT/A	HS										
32	Envoke	75	WG	0.3	OZ/A	HS	62.8 a	46.2 a-h	41.0 g	80.2 a	150.1 a-f	47.6 a-d	15.2 a	11.5 a	454.7 e-j	1.067 de
	Dual Magnum	7.62	EC	1	PT/A	HS										
33	Reflex	2	L	0.15	LB A/A	HS	43.2 a	47.6 a-g	117.1 a-g	69.7 a	177.9 abc	60.9 a	24.9 a	4.1 a	545.3 a-d	1.075 abc
34	Reflex	2	L	0.3	LB A/A	HS	57.6 a	41.2 c-i	124.2 a-g	116.5 a	133.4 b-h	37.3 a-g	10.8 a	8.8 a	529.9 a-f	1.075 abc
35	Reflex	2	L	0.15	LB A/A	HS	67.1 a	53.5 a-d	88.4 c-g	126.2 a	166.3 a-d	36.0 b-g	13.3 a	2.5 a	553.2 abc	1.076 ab
	Dual Magnum	7.62	EC	1	PT/A	HS										
36	Reflex	2	L	0.3	LB A/A	HS	69.0 a	39.1 c-i	80.5 c-g	131.3 a	158.5 a-e	28.1 c-h	11.9 a	8.1 a	526.5 a-f	1.073 abc
	Dual Magnum	7.62	EC	1	PT/A	HS										
LSD (P=.05)							25.151	23.79	91.655	65.679	56.218	24.745	14.978	8.843	83.211	0.0061

Means followed by same letter do not significantly differ (P=.05, LSD)

POTATO HERBICIDE EFFICACY EVALUATION - SPOONER - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:

Location: Spooner Ag Research Station
Soil Type: Mahtomedi Loamy Sand, pH 6.4, 2.0% OM
Variety: "Russet Burbank"
Date Planted: 5/2/06
Row Spacing: 36 Inches
Plot Size-Design: 12' x 20', 4 Reps
Rating Date: 6/9
Harvest Date: 9/20
Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 25, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Summary : The 2006 potato herbicide efficacy trials at Spooner, WI evaluated primarily experimental herbicide, all of which were hill spray applications. This region of the state experienced extreme drought conditions for much of the early summer resulting in many herbicide failures. Treatments which were able to provide extended weed control under the dry conditions produced significantly higher yields. Spartan and Chateau herbicides continue to produce low but consistent levels of early injury, with good weed control when combined with a pre-emergence grass herbicide. Envoke herbicide in combination with Dual Magnum provided excellent weed control and exhibited considerably less injury than at other conditions. Weed control was compromised in treatments containing Reflex herbicide, with the resulting yields generally lower than most other treatments.

Herbicide Application Data:

Date	5/19/06
Time	8:30 am
Treatment	HS
Soil Moisture	
SF	dry
1"	Moist
3"	Moist
Soil Temp (F^o)	
SF	57.4
3"	53.4
Air Temp (F^o)	57.4
Wind	1-2 NE
%RH	44.2 %
Sky Condition	Cloudy
Crop Stage	PRE
Weed Stage	PRE

Fertilization and other pesticides:

6-24-24 @550 lb/A starter impregnated with Admire
46-0-0 @250 lb/A broadcast and hilled
21-0-0-24S @250 lb/A broadcast and hilled

7-Jul	1.5 pt/A Bravo Weatherstick Zn
10-Jul	3 qt/A Raven (Bt for CPB control)
14-Jul	1 pt/A Bravo Weatherstick Zn + 6.2 oz/A Quadris
20-Jul	1 pt/A Monitor (for PLH control)
21-Jul	1.5 pt/A Bravo Weatherstick Zn
28-Jul	1 pt/A Bravo Weatherstick Zn + 2.5 oz/A Endura
4-Aug	1.5 pt/A Bravo Weatherstick Zn
11-Aug	1 pt/A Bravo Weatherstick Zn + 6.2 oz/A Quadris
14-Aug	3 qt/A Raven (Bt for CPB control)
18-Aug	1.5 pt/A Bravo Weatherstick Zn
25-Aug	2 lb/a Penncozeb

1.5 pt/A Reglone on 8/30, 9/6 and 1 pt/A Reglone on 9/13

Potato Herbicide Evaluation - Spooner, WI

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Phyto % Injury (6/9/2006)	% control COLQ (6/9/2006)	% control RRPW (6/9/2006)	% control GIFT (6/9/2006)	Yield (cwt/A) B's (9/20/2006)	Yield (cwt/A) Cull's (9/20/2006)	Yield (cwt/A) A's (9/20/2006)	Yield (cwt/A) Total Yield (9/20/2006)
1	Weedy Check						0 d	0 f	0 d	0 f	108.2 ab	42.3 e	150.5 e	300.9 f
2	Sencor DF	75	DF	0.375	LB A/A	HS	0 d	85 a	81.3 ab	80 a-d	104.5 ab	71.9 b-e	317.6 bcd	494 b-e
3	Define SC	4	FL	15	OZ/A	HS	2.5 cd	67.5 a-d	76.3 abc	92.5 ab	91.2 ab	58.8 cde	277.7 cd	427.7 def
4	Sencor DF	75	DF	0.375	LB A/A	HS	10 ab	93.8 a	93.8 a	93.8 a	103.5 ab	115.7 a	407.4 ab	626.6 a
	Define SC	4	FL	15	OZ/A	HS								
5	Spartan	4	F	0.094	LB A/A	HS	3.8 bcd	85 a	78.8 abc	76.3 a-d	102.5 ab	109.5 ab	345.3 a-d	557.4 abc
6	Spartan	4	F	0.125	LB A/A	HS	7.5 abc	90 a	90 a	80 a-d	97.7 ab	91.5 a-d	319.6 bcd	508.8 a-e
7	Spartan	4	F	0.094	LB A/A	HS	5 a-d	93.8 a	93.8 a	81.3 abc	103.5 ab	91.3 a-d	276.6 cd	471.4 cde
	Dual Magnum	7.62	EC	1	PT/A	HS								
8	Chateau	51	WG	0.047	LB A/A	HS	11.3 a	81.3 ab	90 a	78.8 a-d	106.4 ab	87.1 a-d	328.8 a-d	522.4 a-d
9	Chateau	51	WG	0.063	LB A/A	HS	3.8 bcd	90 a	96.3 a	83.8 abc	103.2 ab	90 a-d	357.3 abc	550.5 a-d
10	Chateau	51	WG	0.047	LB A/A	HS	2.5 cd	93.8 a	93.8 a	92.5 ab	119 a	106.6 ab	347.1 abc	572.7 abc
	Sencor DF	75	DF	0.375	LB A/A	HS								
11	Envoke	75	WG	0.15	OZ/A	HS	1.3 cd	71.3 abc	87.5 ab	61.3 cde	94 ab	60.4 cde	307.7 cd	462.2 cde
12	Envoke	75	WG	0.3	OZ/A	HS	5 a-d	80 ab	85 ab	76.3 a-d	98.6 ab	64.7 cde	296.6 cd	459.9 cde
13	Envoke	75	WG	0.15	OZ/A	HS	5 a-d	86.3 a	92.5 a	91.3 ab	111.5 ab	98.4 abc	402.7 ab	612.7 ab
	Dual Magnum	7.62	EC	1	PT/A	HS								
14	Envoke	75	WG	0.3	OZ/A	HS	5 a-d	92.5 a	93.8 a	91.3 ab	108.7 ab	91.7 a-d	418.3 a	618.6 ab
	Dual Magnum	7.62	EC	1	PT/A	HS								
15	Reflex	2	L	0.15	LB A/A	HS	0 d	53.8 b-e	53.8 c	51.3 de	77.6 b	51.2 de	253.3 d	382.1 ef
16	Reflex	2	L	0.3	LB A/A	HS	3.8 bcd	70 a-d	86.3 ab	77.5 a-d	86.4 ab	65.4 cde	327.6 a-d	479.4 cde
17	Reflex	2	L	0.15	LB A/A	HS	0 d	50 cde	77.5 abc	77.5 a-d	94.9 ab	65.1 cde	291.8 cd	451.8 cde
	Dual Magnum	7.62	EC	1	PT/A	HS								
18	Reflex	2	L	0.3	LB A/A	HS	0 d	71.3 abc	82.5 ab	90 abc	109.1 ab	79.5 a-e	337.8 a-d	526.4 a-d
	Dual Magnum	7.62	EC	1	PT/A	HS								
LSD (P=.05)							6.95	29.22	26.3	29.9	40.12	40.57	92.61	128.63

Means followed by same letter do not significantly differ (P=.05, LSD)

POTATO VINE DESICCATION EVALUATION - ANTIGO - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:

Location: Langlade County Airport, Antigo WI
Soil Type: Antigo Silt Loam
Variety: "Snowden"
Date Planted: 5/18/06
Row Spacing: 36 Inches
Plot Size-Design: 12' x 20', 4 Reps
Rating Date: 9/5, 9/8, 9/18
Harvest Date: 9/27
Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 25, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Herbicide Application Data:

Date	8/29/06	9/8/06
Time	8:15 am	8:00 am
Treatment	VK1	VK2
Soil Moisture		
SF	Moist	Moist
1"	Moist	Moist
3"	Moist	Moist
Soil Temp (F^o)		
SF	82.6	59
3"	68.4	56
Air Temp (F^o)	72.1	63
Wind	1-2.5 E	3-5 NW
%RH	45.8%	82%
Sky Condition	Sunny	Sunny
Crop Stage	0% Senescence	0% Senescence

Fertilization and other pesticides:

19-29-12 @500 lb/A on 5/18 w/ Admire Pro
21-0-0-24S @280 lb/A on 6/27, broadcast and hilled
6/3/06 - 0.5 lb Sencor
7/19/06 - 9 oz/A Asana
Fungicide-alternating 10 day schedule between Bravo/Quadris and Dithane/Quadris

Irrigation:

date	amt.
6/22	0.7"
7/6	0.7"
7/10	1.0"
7/15	1.0"
7/20	1.0"
7/24	1.0"

Summary: As growers expand markets and push harvests earlier, the 2006 Vine Desiccation trial was timed to treat potatoes with minimal senescence to reproduce these conditions. Reglone, Rely, Desicate II and Gramoxone continued to provide good leaf and stem desiccation alone or in sequential applications. Aim EW (a relatively new entry in the vine desiccation market) struggles when the potato vines are healthy. Single or sequential applications of Aim EW failed to produce acceptable results this year, unless combined with another vine desiccant. Defol 750 and ET 751have been in this trial for several years and do not appear to have a fit in Wisconsin potato vine desiccation.

Potato Vine Desiccation Evaluation - Antigo, WI							9/5/2006		9/8/2006		9/18/2006		9/27/2006			
Trt	Treatment	Form	Form		Rate	Grow	% Desiccation		% Desiccation		% Desiccation		Yield (cwt/A)			
No.	Name	Conc	Type	Rate	Unit	Stg	Leaf	Stem	Leaf	Stem	Leaf	Stem	B's	Culls	A's	T. Yield
1	UNTREATED CHECK						0 i	0 e	1 k	0 f	14 i	0 j	26.2 a	25.5 a	473.2 a	524.9 a
2	REGLONE	2	EC	0.5	PT/A	VK1	43 e	0 e	45 efg	3 f	75 f	30 f-i	33.2 a	14.8 a	337.6 b-e	385.6 b-e
	ACTIVATOR 90		L	0.25	% V/V	VK1										
3	REGLONE	2	EC	1	PT/A	VK1	70 cd	4 cde	76 cd	10 ef	90 a-e	58 cde	28.8 a	14.7 a	336.3 b-e	379.8 cde
	ACTIVATOR 90		L	0.25	% V/V	VK1										
4	REGLONE	2	EC	2	PT/A	VK1	91 ab	10 ab	95 ab	43 bc	99 ab	94 a	25.8 a	12.8 a	355.9 bcd	394.5 b-e
	ACTIVATOR 90		L	0.25	% V/V	VK1										
5	REGLONE	2	EC	1	PT/A	VK1	80 bc	8 abc	85 bcd	14 def	100 a	96 a	24.6 a	20.7 a	288.5 de	333.8 de
	ACTIVATOR 90		L	0.25	% V/V	VK1										
	REGLONE	2	EC	1	PT/A	VK2										
	ACTIVATOR 90		L	0.25	% V/V	VK2										
6	DESICATE II	2	EC	2	QT/A	VK1	89 ab	9 ab	95 ab	23 de	98 abc	95 a	28.4 a	20.7 a	275.2 e	324.3 e
	AMS	100	WG	5	LB/A	VK1										
7	DESICATE II	2	EC	1	QT/A	VK1	68 cd	4 cde	84 bcd	9 ef	95 a-d	89 ab	26.0 a	17.6 a	304.0 de	347.6 de
	AMS	100	WG	5	LB/A	VK1										
	DESICATE II	2	EC	1	QT/A	VK2										
	AMS	100	WG	5	LB/A	VK2										
8	DESICATE II	2	EC	1	QT/A	VK1	65 d	3 de	81 bcd	8 ef	100 a	94 a	32.0 a	14.4 a	315.5 cde	361.9 cde
	AMS	100	WG	5	LB/A	VK1										
	REGLONE	2	EC	0.5	PT/A	VK2										
	ACTIVATOR 90		L	0.25	% V/V	VK2										
9	DESICATE II	2	EC	1	QT/A	VK1	70 cd	4 cde	75 d	8 ef	100 a	90 ab	26.6 a	15.5 a	382.7 bc	424.8 bc
	AMS	100	WG	5	LB/A	VK1										
	RELY	1	EC	1	PT/A	VK2										
	AMS	100	WG	3	LB/A	VK2										
10	RELY	1	EC	3	PT/A	VK1	87 ab	6 bcd	95 ab	29 cd	100 a	98 a	27.3 a	15.2 a	319.6 cde	362.1 cde
11	RELY	1	EC	3	PT/A	VK1	96 a	11 a	100 a	61 a	100 a	100 a	32.0 a	15.7 a	333.1 b-e	380.9 cde
	AMS	100	WG	3	LB/A	VK1										
12	GRAMOXONE MAX	3	L	1.3	PT/A	VK1	88 ab	10 ab	90 abc	55 ab	100 a	99 a	26.1 a	17.6 a	309.9 cde	353.6 cde
	ACTIVATOR 90		L	0.25	% V/V	VK1										
13	DEFOL 750		L	3.2	QT/A	VK1	25 fg	0 e	25 hij	0 f	50 g	8 ij	30.6 a	18.6 a	359.2 bcd	408.4 bcd
	ACTIVATOR 90		L	0.25	% V/V	VK1										
LSD (P=.05)							13.1	4.5	14.3	18.4	14.9	23.1	7.7	9.0	76.7	76.9

Means followed by same letter do not significantly differ (P=.05, LSD)

Potato Vine Desiccation Evaluation - Antigo, WI							9/5/2006		9/8/2006		9/18/2006		9/27/2006			
Trt	Treatment	Form	Form		Rate	Grow	% Desiccation		% Desiccation		% Desiccation		Yield (cwt/A)			
No.	Name	Conc	Type	Rate	Unit	Stg	Leaf	Stem	Leaf	Stem	Leaf	Stem	B's	Culls	A's	T. Yield
14	DEFOL 750		L	2.8	QT/A	VK1	18 gh	0 e	28 hi	0 f	85 b-f	35 e-h	30.4 a	14.3 a	353.5 bcd	398.2 b-e
	ACTIVATOR 90		L	0.25	% V/V	VK1										
	REGLONE	2	EC	0.5	PT/A	VK2										
	ACTIVATOR 90		L	0.25	% V/V	VK2										
15	DEFOL 750		L	2.8	QT/A	VK1	33 ef	0 e	35 gh	0 f	100 ab	69 bcd	30.0 a	18.6 a	351.9 b-e	400.5 b-e
	ACTIVATOR 90		L	0.25	% V/V	VK1										
	RELY	1	EC	1	PT/A	VK2										
	AMS	100	WG	3	LB/A	VK2										
16	ET-751	2.5	EC	5.5	OZ/A	VK1	5 hi	0 e	9 k	0 f	31 h	0 j	29.2 a	22.9 a	407.1 ab	459.2 ab
17	ET-751	2.5	EC	5.5	OZ/A	VK1	8 hi	0 e	11 jk	0 f	45 gh	1 j	27.7 a	17.5 a	354.8 bcd	400.0 b-e
	ET-751	2.5	EC	5.5	OZ/A	VK2										
18	ET-751	2.5	EC	5.5	OZ/A	VK1	8 hi	0 e	13 jk	0 f	79 ef	16 hij	26.8 a	15.7 a	330.8 b-e	373.3 cde
	REGLONE	2	EC	0.5	PT/A	VK2										
	ACTIVATOR 90		L	0.25	% V/V	VK2										
19	ET-751	2.5	EC	5.5	OZ/A	VK1	9 hi	0 e	14 ijk	0 f	83 def	21 g-j	31.9 a	12.8 a	331.1 b-e	375.7 cde
	RELY	1	EC	1	PT/A	VK2										
	AMS	100	WG	3	LB/A	VK2										
20	AIM EW	1.9	L	3.2	OZ/A	VK1	40 e	3 de	53 e	3 f	74 f	35 e-h	30.0 a	18.3 a	340.2 b-e	388.6 b-e
	MSO		L	1	% V/V	VK1										
21	AIM EW	1.9	L	5.8	OZ/A	VK1	43 e	6 bcd	55 e	8 ef	84 c-f	51 def	28.0 a	16.0 a	332.1 b-e	376.1 cde
	MSO		L	1	% V/V	VK1										
22	AIM EW	1.9	L	3.2	OZ/A	VK1	35 ef	1 e	50 ef	1 f	83 def	40 efg	28.0 a	14.2 a	333.9 b-e	376.0 cde
	MSO		L	1	% V/V	VK1										
	AIM EW	1.9	L	3.2	OZ/A	VK2										
	MSO		L	1	% V/V	VK2										
23	AIM EW	1.9	L	3.2	OZ/A	VK1	30 efg	0 e	38 fgh	0 f	100 ab	70 bcd	23.3 a	15.3 a	356.7 bcd	395.4 b-e
	MSO		L	1	% V/V	VK1										
	REGLONE	2	EC	0.5	PT/A	VK2										
	ACTIVATOR 90		L	0.25	% V/V	VK2										
24	AIM EW	1.9	L	3.2	OZ/A	VK1	40 e	1 e	45 efg	4 f	100 a	78 abc	31.5 a	13.1 a	324.3 cde	368.8 cde
	MSO		L	1	% V/V	VK1										
	RELY	1	EC	1	PT/A	VK2										
	AMS	100	WG	3	LB/A	VK2										
LSD (P=.05)							13.1	4.5	14.3	18.4	14.9	23.1	7.7	9.0	76.7	76.9

Means followed by same letter do not significantly differ (P=.05, LSD)

PUMPKIN HERBICIDE EVALUATION - ARLINGTON - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:
Location: Arlington Ag Research Station - Horticulture Farm Field 607
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Variety: 'HOWDEN' / 'DICKENSON' / 'GOLDEN DELICIOUS'
Date Planted: 6/3/06
Row Spacing: 60 Inches, 3 rows/plot (1 row of each pumpkin variety)
Plant Spacing: 24 inches
Date Harvested: 10/12/06
Plot Size-Design: 20' x 20', 4 Reps
Rating Dates: 6/19, 6/30, 7/15

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: N/A

Herbicide Application Data:

Date	6/3/06
Time	10:00 am
Treatment	PRE
Soil Moisture	
SF	dry
1"	moist
3"	moist
Soil Temp (F^o)	
SF	102.6
3"	78.0
Air Temp (F^o)	78.8
Wind	3-6 NE
%RH	42.3%
Sky Condition	p. sunny
Crop Stage	-----
Weed & Size	-----

Fertilization and other pesticides: Fall 2005 - dairy replacement pack manure, 160 lb N/A.
6/20/06 - Capture 6 oz/a
7/7/06 - Capture 4 oz/a + Quadris 12oz/a
7/27/06 - Quadris 12 oz/a
Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	Moderate	YEFT = Yellow Foxtail	Moderate

Summary: This trial evaluated several currently unlabeled preemergence herbicide treatments for weed control and crop safety in pumpkins. One jack-o-lantern type (Howden) and two processing type (Dickenson and Golden Delicious) pumpkins were grown. Crop safety, weed control and yield were acceptable and nearly indestinguishable between the currently labeled and unlabeled treatments. Data from this and future pumpkin trials will provide a foundation from which to work towards new herbicide registrations.

PUMPKIN HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Pumpkin Injury Ratings 6/19/06 Howden % Injury	Howden Stand Count	Dickenson % Injury	Dickenson Stand Count	G. Delicious % Injury	G. Delicious Stand Count
1	Untreated Check						0 a	5.8 a	0 a	8.8 a	0 a	7.5 a
2	Outlook	6	EC	12	OZ/A	PRE	0 a	6.8 a	0 a	8.8 a	0 a	9 a
3	Outlook	6	EC	16	OZ/A	PRE	0 a	7.5 a	0 a	8.5 a	0 a	8.3 a
4	Sandea	75	DF	0.67	OZ/A	PRE	0 a	6.3 a	0 a	8.5 a	0 a	9 a
5	Outlook	6	EC	12	OZ/A	PRE	0 a	7.3 a	0 a	8.5 a	0 a	8.8 a
	Sandea	75	DF	0.67	OZ/A	PRE						
6	Curbit	3	EC	4	PT/A	PRE	0 a	7.3 a	0 a	8.5 a	0 a	9 a
7	Strategy		L	4	PT/A	PRE	0 a	7 a	0 a	8.5 a	0 a	8.8 a
8	Reflex	2	L	0.2	LB A/A	PRE	0 a	8 a	0 a	9 a	0 a	9 a
9	Reflex	2	L	0.4	LB A/A	PRE	0 a	8.5 a	0 a	8.8 a	0 a	8.3 a
10	Spartan	4	F	0.141	LB A/A	PRE	0 a	8.5 a	0 a	8.8 a	0 a	8.8 a
LSD (P=.05)							0	3.52	0	1.11	0	1.13

Means followed by same letter do not significantly differ (P=.05, LSD)

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Injury Ratings 6/30/06 Howden % Injury	Dickenson % Injury	G. Delicious % Injury	% Weed Control 6/30/06 COLQ	RRPW	VELE	YEFT
1	Untreated Check						0 a	0 a	0 a	0 c	0 c	0 c	0 c
2	Outlook	6	EC	12	OZ/A	PRE	0 a	0 a	0 a	86.3 ab	93.8 ab	95.8 ab	95 a
3	Outlook	6	EC	16	OZ/A	PRE	0 a	0 a	0 a	89.5 ab	93.8 ab	92 ab	96.5 a
4	Sandea	75	DF	0.67	OZ/A	PRE	0 a	0 a	0 a	84.5 ab	97.8 ab	91.3 ab	61.3 b
5	Outlook	6	EC	12	OZ/A	PRE	0 a	0 a	0 a	70 b	99 a	98.1 ab	95.3 a
	Sandea	75	DF	0.67	OZ/A	PRE							
6	Curbit	3	EC	4	PT/A	PRE	0 a	0 a	0 a	97 a	95.3 ab	95.8 ab	94.5 a
7	Strategy		L	4	PT/A	PRE	0 a	0 a	0 a	94.5 ab	88.8 b	100 a	93.3 a
8	Reflex	2	L	0.2	LB A/A	PRE	0 a	0 a	0 a	94.5 ab	97.5 ab	85.3 b	87.8 a
9	Reflex	2	L	0.4	LB A/A	PRE	0 a	0 a	0 a	97.5 a	97.5 ab	95.8 ab	80.3 a
10	Spartan	4	F	0.141	LB A/A	PRE	0 a	0 a	0 a	89.5 ab	93.3 ab	99 ab	95.3 a
LSD (P=.05)							0	0	0	25.91	9.12	13.99	16.57

Means followed by same letter do not significantly differ (P=.05, LSD)

PUMPKIN HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Injury Ratings 7/15/06 Howden % Injury	Dickenson % Injury	G. Delicious % Injury	% Weed Control 7/15/06 COLQ	RRPW	VELE	YEFT
1	Untreated Check						0 a	0 a	0 a	0 c	0 c	0 c	0 c
2	Outlook	6	EC	12	OZ/A	PRE	0 a	0 a	0 a	83.8 a	92.5 a	95 ab	95 a
3	Outlook	6	EC	16	OZ/A	PRE	0 a	0 a	0 a	87.5 a	92.5 a	91.3 ab	95 a
4	Sandea	75	DF	0.67	OZ/A	PRE	0 a	0 a	0 a	83.8 a	97 a	91.3 ab	56.3 b
5	Outlook Sandea	6 75	EC DF	12 0.67	OZ/A OZ/A	PRE PRE	0 a	0 a	0 a	95.6 a	99.4 a	94.7 ab	93.5 a
6	Curbit	3	EC	4	PT/A	PRE	0 a	0 a	0 a	95 a	93.3 a	95.8 ab	93.8 a
7	Strategy		L	4	PT/A	PRE	0 a	0 a	0 a	93.8 a	90 a	100 a	94.5 a
8	Reflex	2	L	0.2	LB A/A	PRE	0 a	0 a	0 a	93.3 a	97.5 a	85 b	85.3 a
9	Reflex	2	L	0.4	LB A/A	PRE	0 a	0 a	0 a	97.5 a	97.5 a	94.5 ab	83.3 a
10	Spartan	4	F	0.141	LB A/A	PRE	0 a	0 a	0 a	87 a	90 a	98.3 a	90 a
LSD (P=.05)							0	0	0	14.75	10.48	12.14	15.95

Means followed by same letter do not significantly differ (P=.05, LSD)

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Pumpkin Yield 10/12/06 Howden tons/A	Howden fruit # / plot	Dickenson tons/A	Dickenson fruit # / plot	G. Delicious tons/A	G. Delicious fruit # / plot
1	Untreated Check						53.9 a	11.5 a	31.1 a	9.3 a	34.6 a	9 a
2	Outlook	6	EC	12	OZ/A	PRE	54.1 a	14.3 a	51.6 a	12.3 a	42.7 a	11 a
3	Outlook	6	EC	16	OZ/A	PRE	46.7 a	11.3 a	42.8 a	14.3 a	54.5 a	12.8 a
4	Sandea	75	DF	0.67	OZ/A	PRE	45.7 a	10.8 a	48.5 a	11.5 a	47.3 a	13.3 a
5	Outlook Sandea	6 75	EC DF	12 0.67	OZ/A OZ/A	PRE PRE	47.5 a	13 a	34.1 a	10.3 a	45.9 a	9 a
6	Curbit	3	EC	4	PT/A	PRE	57.9 a	14.8 a	37.3 a	9 a	61.2 a	15.8 a
7	Strategy		L	4	PT/A	PRE	32.8 a	10 a	54.8 a	11 a	52 a	13.3 a
8	Reflex	2	L	0.2	LB A/A	PRE	30.4 a	8 a	45.8 a	14.3 a	57.1 a	14.5 a
9	Reflex	2	L	0.4	LB A/A	PRE	40 a	11.5 a	69.5 a	13.5 a	47.4 a	12.5 a
10	Spartan	4	F	0.141	LB A/A	PRE	47.8 a	9.8 a	49.3 a	12.3 a	23.4 a	9.5 a
LSD (P=.05)							31.83	5.97	29.31	6.06	28.94	6.23

Means followed by same letter do not significantly differ (P=.05, LSD)

RED BEET HERBICIDE EVALUATION - ARLINGTON - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:

Location: Arlington Ag Research Station - Horticulture Farm Field 607
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Variety: 'Ruby Queen'
Date Planted:5/23/06
Row Spacing: 16 Inches, 4 rows/plot
Plant Spacing: 1.0 inches
Date Harvested: 8/22/06
Plot Size-Design: 8' x 20', 4 Reps
Rating Dates: 6/10, 6/19, 6/30

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: Incorporated 2-3" with a Kelley S-tine field cultivator with rolling baskets, one pass through plot and one pass perpendicular to plot .

Herbicide Application Data:

Date	5/23/06	5/23/06	6/12/06	6/20/06
Time	7:30 am	2:00 pm	2:00 pm	9:30 am
Treatment	PPI	PRE	2 lf	4-6 lf
Soil Moisture				
SF	dry	dry	dry	dry
1"	moist	moist	moist	dry
3"	moist	moist	moist	moist
Soil Temp (F^o)				
SF	57.7	101.1	105.6	80.2
3"	50.9	69.4	80.6	73.2
Air Temp (F^o)	57.0	77.0	82.5	77.3
Wind	5-7 SW	7-10 S	6-8 N	4-6 S
%RH	48.0%	28.0%	33.8%	78.6%
Sky Condition	sunny	sunny	sunny	cloudy
Crop Stage	-----	pre	2 leaf	4-6 leaf
Weed & Size	-----	-----	COLQ 1-2"	COLQ 2-4"
	-----	-----	VELE 1-3"	VELE 2-5"
	-----	-----	RRPW 1-2"	RRPW 2-4"
	-----	-----	YEFT 1-3"	YEFT 2-4"
	-----	-----	COPU <1"	COPU 1-3"

Fertilization and other pesticides: Fall 2005 - dairy replacement pack manure, 160 lb N/A.

Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	Moderate	YEFT = Yellow Foxtail	Moderate
		COPU = Common Purslane	Moderate

Summary: Twenty-three potential herbicide programs were evaluated. Crop injury was excessive where Define (flufenacet), Prowl H2O (pendimethalin), or Everest (flucarbazone) were applied. Early post-emergence Betanex (desmedipham) applications also injured beets up to 23%. Injury was minimal where Dual Magnum (s-metolachlor) was applied pre-emergence. Yield of beets larger than 2 inches in diameter was greatest in programs that included Roneet (cycloate) plus Pyramin (pyrazon) pre-emergence or Dual Magnum plus Pyramin. Note: Outlook (dimethenamid) is no longer registered on table beet.

GARDEN BEET HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/10/06	% Weed Control 6/10/06 COLQ	RRPW	VELE	COPU	YEFT
1	WEEDY CHECK						0 e	0 e	0 e	0 d	0 d	0 e
2	HANDWEEDED CHECK						0 e	100 a	100 a	100 a	100 a	100 a
3	RONEET	6	EC	0.5	GAL/A	PPI	0 e	100 a	100 a	100 a	100 a	100 a
	PYRAMIN	65	DF	5	LB/A	PRE						
4	RONEET	6	EC	0.5	GAL/A	PPI	2.5 e	100 a	100 a	100 a	100 a	100 a
	BETANEX	1.3	EC	0.5	LB A/A	2 LF						
5	RONEET	6	EC	0.5	GAL/A	PPI	0 e	100 a	100 a	100 a	100 a	100 a
	BETANEX	1.3	EC	0.25	LB A/A	2 LF						
	BETANEX	1.3	EC	0.25	LB A/A	4-6 LF						
6	RONEET	6	EC	0.5	GAL/A	PPI	0 e	100 a	100 a	100 a	100 a	100 a
	PYRAMIN	65	DF	5	LB/A	PRE						
	STINGER	3	EC	0.5	PT/A	4-6 LF						
7	RONEET	6	EC	0.5	GAL/A	PPI	3.8 e	97.5 ab	100 a	98.8 a	100 a	98.8 ab
	PYRAMIN	65	DF	5	LB/A	PRE						
	BETANEX	1.3	EC	0.5	LB A/A	4-6 LF						
8	OUTLOOK	6	EC	18	OZ/A	2 LF	0 e	0 e	0 e	0 d	0 d	0 e
	POAST	1.5	EC	1	PT/A	2 LF						
	COC	1		2	PT/A	2 LF						
	STINGER	3	EC	0.5	PT/A	4-6 LF						
9	OUTLOOK	6	EC	18	OZ/A	2 LF	0 e	0 e	0 e	0 d	0 d	0 e
	POAST	1.5	EC	1	PT/A	2 LF						
	COC	1		2	PT/A	2 LF						
	BETANEX	1.3	EC	0.5	LB A/A	2 LF						
10	BETANEX	1.3	EC	0.5	LB A/A	2 LF	0 e	0 e	0 e	0 d	0 d	0 e
	UPBEET	50	WG	0.032	LB A/A	2 LF						
11	BETAMIX	1.3	EC	0.5	LB A/A	2 LF	0 e	0 e	0 e	0 d	0 d	0 e
	UPBEET	50	WG	0.032	LB A/A	2 LF						

12	BETANEX	1.3	EC	0.375	LB A/A	2 LF	0	e	0	e	0	e	0	d	0	d	0	e
	UPBEET	50	WG	0.032	LB A/A	2 LF												
	BETANEX	1.3	EC	0.375	LB A/A	4-6 LF												
	UPBEET	50	WG	0.032	LB A/A	4-6 LF												
13	BETAMIX	1.3	EC	0.5	LB A/A	2 LF	0	e	0	e	0	e	0	d	0	d	0	e
	UPBEET	50	WG	0.032	LB A/A	2 LF												
	BETAMIX	1.3	EC	0.5	LB A/A	4-6 LF												
	UPBEET	50	WG	0.032	LB A/A	4-6 LF												
14	DUAL MAGNUM	7.62	EC	0.75	LB A/A	PRE	2.5	e	98.8	ab	100	a	98.8	a	97.5	ab	100	a
15	DUAL MAGNUM	7.62	EC	0.75	LB A/A	PRE	13.8	d	100	a	100	a	97.5	ab	100	a	100	a
	PYRAMIN	65	DF	5	LB/A	PRE												
16	DEFINE	4	SC	0.5	LB A/A	PRE	71.3	b	97.5	ab	100	a	96.3	ab	96.3	ab	100	a
17	DEFINE	4	SC	0.5	LB A/A	PRE	87.5	a	100	a	100	a	93.8	abc	100	a	100	a
	PYRAMIN	65	DF	5	LB/A	PRE												
18	OUTLOOK	6	EC	18	OZ/A	2 LF	0	e	0	e	0	e	0	d	0	d	0	e
19	OUTLOOK	6	EC	18	OZ/A	2 LF	0	e	92.5	cd	91.3	c	93.8	abc	97.5	ab	81.3	c
	PYRAMIN	65	DF	5	LB/A	PRE												
20	PROWL H20	3.8	EC	1	LB A/A	PRE	40	c	100	a	83.8	d	97.5	ab	93.8	b	97.5	ab
21	PROWL H20	3.8	EC	1	LB A/A	PRE	37.5	c	100	a	97.5	ab	97.5	ab	100	a	97.5	ab
	PYRAMIN	65	DF	5	LB/A	PRE												
22	EVEREST	70	WG	0.026	LB A/A	PRE	62.5	b	95	bc	92.5	bc	91.3	bc	88.8	c	56.3	d
23	EVEREST	70	WG	0.026	LB A/A	2 LF	0	e	0	e	0	e	0	d	0	d	0	e
24	UPBEET	50	WG	0.032	LB A/A	2 LF	0	e	0	e	0	e	0	d	0	d	0	e
	POAST	1.5	EC	1	PT/A	2 LF												
	COC	1	L	2	PT/A	2 LF												
25	NORTRON	4	SC	1	LB A/A	PRE	2.5	e	90	d	97.5	ab	87.5	c	95	b	85	bc
	STINGER	3	EC	0.5	PT/A	4-6 LF												
LSD (P=.05)							9.84		5		5.09		6.53		4.82		14.31	

Means followed by same letter do not significantly differ (P=.05, LSD)

GARDEN BEET HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/19/06	% Weed Control 6/19/06 COLQ	RRPW	VELE	COPU	YEFT
1	WEEDY CHECK						0 g	42.5 c	32.5 c	50 cd	7.5 e	33.8 d
2	HANDWEEDED CHECK						0 g	100 a	100 a	100 a	100 a	100 a
3	RONEET	6	EC	0.5	GAL/A	PPI	2.5 fg	100 a	100 a	100 a	100 a	100 a
	PYRAMIN	65	DF	5	LB/A	PRE						
4	RONEET	6	EC	0.5	GAL/A	PPI	22.5 e	100 a	98.8 a	100 a	100 a	99.5 a
	BETANEX	1.3	EC	0.5	LB A/A	2 LF						
5	RONEET	6	EC	0.5	GAL/A	PPI	0 g	100 a	100 a	100 a	100 a	100 a
	BETANEX	1.3	EC	0.25	LB A/A	2 LF						
	BETANEX	1.3	EC	0.25	LB A/A	4-6 LF						
6	RONEET	6	EC	0.5	GAL/A	PPI	5 fg	100 a	100 a	100 a	100 a	100 a
	PYRAMIN	65	DF	5	LB/A	PRE						
	STINGER	3	EC	0.5	PT/A	4-6 LF						
7	RONEET	6	EC	0.5	GAL/A	PPI	7.5 fg	99.5 a	100 a	99.5 a	100 a	98.8 a
	PYRAMIN	65	DF	5	LB/A	PRE						
	BETANEX	1.3	EC	0.5	LB A/A	4-6 LF						
8	OUTLOOK	6	EC	18	OZ/A	2 LF	37.5 d	77.5 ab	66.3 b	93.8 ab	40 d	100 a
	POAST	1.5	EC	1	PT/A	2 LF						
	COC	1		2	PT/A	2 LF						
	STINGER	3	EC	0.5	PT/A	4-6 LF						
9	OUTLOOK	6	EC	18	OZ/A	2 LF	12.5 ef(	100 a	100 a	73.8 bc	70 bc	98.8 a
	POAST	1.5	EC	1	PT/A	2 LF						
	COC	1		2	PT/A	2 LF						
	BETANEX	1.3	EC	0.5	LB A/A	2 LF						
10	BETANEX	1.3	EC	0.5	LB A/A	2 LF	15 ef	100 a	98.8 a	98.8 ab	99 a	70 bc
	UPBEET	50	WG	0.032	LB A/A	2 LF						
11	BETAMIX	1.3	EC	0.5	LB A/A	2 LF	5 fg	100 a	98.8 a	99.5 a	93.3 a	92 ab
	UPBEET	50	WG	0.032	LB A/A	2 LF						

12	BETANEX	1.3	EC	0.375	LB A/A	2 LF	10	ef(	100	a	97	a	96.5	ab	43.8	d	89.5	ab
	UPBEET	50	WG	0.032	LB A/A	2 LF												
	BETANEX	1.3	EC	0.375	LB A/A	4-6 LF												
	UPBEET	50	WG	0.032	LB A/A	4-6 LF												
13	BETAMIX	1.3	EC	0.5	LB A/A	2 LF	8.8	fg	100	a	98.3	a	94	ab	97	a	91.3	ab
	UPBEET	50	WG	0.032	LB A/A	2 LF												
	BETAMIX	1.3	EC	0.5	LB A/A	4-6 LF												
	UPBEET	50	WG	0.032	LB A/A	4-6 LF												
14	DUAL MAGNUM	7.62	EC	0.75	LB A/A	PRE	2.5	fg	95.3	ab	100	a	98.3	ab	98.3	a	100	a
15	DUAL MAGNUM	7.62	EC	0.75	LB A/A	PRE	7.5	fg	99.5	a	100	a	95.8	ab	100	a	98.8	a
	PYRAMIN	65	DF	5	LB/A	PRE												
16	DEFINE	4	SC	0.5	LB A/A	PRE	62.5	bc	96.3	ab	96.3	a	92	ab	90	ab	95.8	a
17	DEFINE	4	SC	0.5	LB A/A	PRE	81.3	a	100	a	98.8	a	95.8	ab	98.8	a	98.3	a
	PYRAMIN	65	DF	5	LB/A	PRE												
18	OUTLOOK	6	EC	18	OZ/A	2 LF	3.8	fg	41.3	c	28.8	c	37.5	d	5	e	30	d
19	OUTLOOK	6	EC	18	OZ/A	2 LF	11.3	ef(	97	ab	96	a	95	ab	95.8	a	88.8	ab
	PYRAMIN	65	DF	5	LB/A	PRE												
20	PROWL H20	3.8	EC	1	LB A/A	PRE	50	cd	100	a	81.3	ab	95	ab	94.5	a	96.3	a
21	PROWL H20	3.8	EC	1	LB A/A	PRE	52.5	c	100	a	96.3	a	97	ab	99	a	95	a
	PYRAMIN	65	DF	5	LB/A	PRE												
22	EVEREST	70	WG	0.026	LB A/A	PRE	71.3	ab	92.5	ab	88.8	a	77.5	ab	77.5	abc	66.3	c
23	EVEREST	70	WG	0.026	LB A/A	2 LF	70	ab	73.8	b	100	a	91.3	ab	55	cd	90	ab
24	UPBEET	50	WG	0.032	LB A/A	2 LF	7.5	fg	96.3	ab	81.3	ab	92.5	ab	60	cd	92.5	a
	POAST	1.5	EC	1	PT/A	2 LF												
	COC	1	L	2	PT/A	2 LF												
25	NORTRON	4	SC	1	LB A/A	PRE	5	fg	92.5	ab	93.8	a	87.5	ab	92.5	ab	88.8	ab
	STINGER	3	EC	0.5	PT/A	4-6 LF												
LSD (P=.05)							13.41		25.38		19.45		25.26		22.92		22.27	

Means followed by same letter do not significantly differ (P=.05, LSD)

GARDEN BEET HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/30/06	% Weed Control 6/30/06 COLQ	RRPW	VELE	COPU	YEFT
1	WEEDY CHECK						0 e	0 f	0 g	0 f	0 g	0 h
2	HANDWEEDED CHECK						0 e	100 a	100 a	100 a	100 a	100 a
3	RONEET	6	EC	0.5	GAL/A	PPI	1.3 de	100 a	100 a	99 a	100 a	100 a
	PYRAMIN	65	DF	5	LB/A	PRE						
4	RONEET	6	EC	0.5	GAL/A	PPI	0 e	100 a	100 a	100 a	100 a	98.8 a
	BETANEX	1.3	EC	0.5	LB A/A	2 LF						
5	RONEET	6	EC	0.5	GAL/A	PPI	1.3 de	100 a	100 a	100 a	100 a	100 a
	BETANEX	1.3	EC	0.25	LB A/A	2 LF						
	BETANEX	1.3	EC	0.25	LB A/A	4-6 LF						
6	RONEET	6	EC	0.5	GAL/A	PPI	0 e	100 a	100 a	100 a	100 a	100 a
	PYRAMIN	65	DF	5	LB/A	PRE						
	STINGER	3	EC	0.5	PT/A	4-6 LF						
7	RONEET	6	EC	0.5	GAL/A	PPI	1.3 de	100 a	100 a	99.5 a	99.5 a	97.5 ab
	PYRAMIN	65	DF	5	LB/A	PRE						
	BETANEX	1.3	EC	0.5	LB A/A	4-6 LF						
8	OUTLOOK	6	EC	18	OZ/A	2 LF	13.8 de	75 cd	75 de	86.3 a-d	40 ef	100 a
	POAST	1.5	EC	1	PT/A	2 LF						
	COC	1		2	PT/A	2 LF						
	STINGER	3	EC	0.5	PT/A	4-6 LF						
9	OUTLOOK	6	EC	18	OZ/A	2 LF	7.5 de	97 ab	99.5 ab	78.3 b-e	52.5 de	100 a
	POAST	1.5	EC	1	PT/A	2 LF						
	COC	1		2	PT/A	2 LF						
	BETANEX	1.3	EC	0.5	LB A/A	2 LF						
10	BETANEX	1.3	EC	0.5	LB A/A	2 LF	6.3 de	94.5 ab	89.5 a-d	97.5 ab	83.8 abc	62.5 ef
	UPBEET	50	WG	0.032	LB A/A	2 LF						
11	BETAMIX	1.3	EC	0.5	LB A/A	2 LF	0 e	98.8 ab	95.8 ab	97.5 ab	72.5 bcd	80 b-e
	UPBEET	50	WG	0.032	LB A/A	2 LF						

12	BETANEX	1.3	EC	0.375	LB A/A	2 LF	3.8 de	100 a	100 a	100 a	42.5 ef	86.3 a-d
	UPBEET	50	WG	0.032	LB A/A	2 LF						
	BETANEX	1.3	EC	0.375	LB A/A	4-6 LF						
	UPBEET	50	WG	0.032	LB A/A	4-6 LF						
13	BETAMIX	1.3	EC	0.5	LB A/A	2 LF	2.5 de	100 a	99.5 ab	100 a	98.8 a	95.8 ab
	UPBEET	50	WG	0.032	LB A/A	2 LF						
	BETAMIX	1.3	EC	0.5	LB A/A	4-6 LF						
	UPBEET	50	WG	0.032	LB A/A	4-6 LF						
14	DUAL MAGNUM	7.62	EC	0.75	LB A/A	PRE	0 e	91.3 ab	100 a	94.5 abc	93.8 ab	99.5 a
15	DUAL MAGNUM	7.62	EC	0.75	LB A/A	PRE	2.5 de	98.8 ab	100 a	96.3 abc	100 a	99.5 a
	PYRAMIN	65	DF	5	LB/A	PRE						
16	DEFINE	4	SC	0.5	LB A/A	PRE	33.8 c	92.5 ab	90 a-d	85 a-d	86.3 abc	91.3 a-d
17	DEFINE	4	SC	0.5	LB A/A	PRE	55 b	98.8 ab	95 ab	88.3 a-d	96.3 a	95 ab
	PYRAMIN	65	DF	5	LB/A	PRE						
18	OUTLOOK	6	EC	18	OZ/A	2 LF	11.3 de	72.5 d	27.5 f	60 e	37.5 ef	36.3 g
19	OUTLOOK	6	EC	18	OZ/A	2 LF	6.3 de	94.5 ab	96.3 ab	92.5 abc	93.8 ab	88.8 a-d
	PYRAMIN	65	DF	5	LB/A	PRE						
20	PROWL H20	3.8	EC	1	LB A/A	PRE	50 b	99.5 ab	66.3 e	92.5 abc	82.5 abc	92.5 abc
21	PROWL H20	3.8	EC	1	LB A/A	PRE	45 bc	100 a	92 abc	95 abc	95 a	90 a-d
	PYRAMIN	65	DF	5	LB/A	PRE						
22	EVEREST	70	WG	0.026	LB A/A	PRE	45 bc	83.8 bcd	83.8 bcd	76.3 cde	65 cd	46.3 fg
23	EVEREST	70	WG	0.026	LB A/A	2 LF	75 a	52.5 e	97.5 ab	80 a-e	42.5 ef	73.8 de
24	UPBEET	50	WG	0.032	LB A/A	2 LF	15 d	72.5 d	76.3 cde	92 a-d	30 f	99.5 a
	POAST	1.5	EC	1	PT/A	2 LF						
	COC	1	L	2	PT/A	2 LF						
25	NORTRON	4	SC	1	LB A/A	PRE	3.8 de	88.8 abc	92.5 ab	72 de	90 ab	75 cde
	STINGER	3	EC	0.5	PT/A	4-6 LF						
LSD (P=.05)							14.19	15.99	15.81	20.15	21.65	17.91

Means followed by same letter do not significantly differ (P=.05, LSD)

GARDEN BEET HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Yield tons/A (8/22/2006) <2" Diameter Beets	>2" Diameter Beets	Total Yield
1	WEEDY CHECK						2.7 ij	0.5 h	3.2 h
2	HANDWEEDED CHECK						9.4 ab	11.9 abc	21.3 abc
3	RONEET	6	EC	0.5	GAL/A	PPI	8.1 a-e	14.7 ab	22.8 a
	PYRAMIN	65	DF	5	LB/A	PRE			
4	RONEET	6	EC	0.5	GAL/A	PPI	9.7 ab	9.8 b-e	19.5 a-d
	BETANEX	1.3	EC	0.5	LB A/A	2 LF			
5	RONEET	6	EC	0.5	GAL/A	PPI	9.8 a	11.1 a-d	20.9 abc
	BETANEX	1.3	EC	0.25	LB A/A	2 LF			
	BETANEX	1.3	EC	0.25	LB A/A	4-6 LF			
6	RONEET	6	EC	0.5	GAL/A	PPI	8.1 a-e	14.9 a	23 a
	PYRAMIN	65	DF	5	LB/A	PRE			
	STINGER	3	EC	0.5	PT/A	4-6 LF			
7	RONEET	6	EC	0.5	GAL/A	PPI	8 a-f	13.7 ab	21.7 ab
	PYRAMIN	65	DF	5	LB/A	PRE			
	BETANEX	1.3	EC	0.5	LB A/A	4-6 LF			
8	OUTLOOK	6	EC	18	OZ/A	2 LF	6.6 b-h	4.2 fgh	10.8 fg
	POAST	1.5	EC	1	PT/A	2 LF			
	COC	1		2	PT/A	2 LF			
	STINGER	3	EC	0.5	PT/A	4-6 LF			
9	OUTLOOK	6	EC	18	OZ/A	2 LF	8.7 abc	5.2 e-h	13.9 d-g
	POAST	1.5	EC	1	PT/A	2 LF			
	COC	1		2	PT/A	2 LF			
	BETANEX	1.3	EC	0.5	LB A/A	2 LF			
10	BETANEX	1.3	EC	0.5	LB A/A	2 LF	5.6 d-i	2.4 gh	7.9 gh
	UPBEET	50	WG	0.032	LB A/A	2 LF			
11	BETAMIX	1.3	EC	0.5	LB A/A	2 LF	7.2 a-g	4.3 fgh	11.5 efg
	UPBEET	50	WG	0.032	LB A/A	2 LF			

12	BETANEX	1.3 EC	0.375 LB A/A	2 LF	7.8 a-f	3.3 fgh	11.1 fg
	UPBEET	50 WG	0.032 LB A/A	2 LF			
	BETANEX	1.3 EC	0.375 LB A/A	4-6 LF			
	UPBEET	50 WG	0.032 LB A/A	4-6 LF			
13	BETAMIX	1.3 EC	0.5 LB A/A	2 LF	8 a-f	6.1 efg	14.1 d-g
	UPBEET	50 WG	0.032 LB A/A	2 LF			
	BETAMIX	1.3 EC	0.5 LB A/A	4-6 LF			
	UPBEET	50 WG	0.032 LB A/A	4-6 LF			
14	DUAL MAGNUM	7.62 EC	0.75 LB A/A	PRE	8.4 a-d	9.7 b-e	18.1 a-e
15	DUAL MAGNUM	7.62 EC	0.75 LB A/A	PRE	6.1 c-h	14.3 ab	20.5 a-d
	PYRAMIN	65 DF	5 LB/A	PRE			
16	DEFINE	4 SC	0.5 LB A/A	PRE	4.1 g-j	11.3 abc	15.4 b-f
17	DEFINE	4 SC	0.5 LB A/A	PRE	2.1 j	16 a	18.1 a-e
	PYRAMIN	65 DF	5 LB/A	PRE			
18	OUTLOOK	6 EC	18 OZ/A	2 LF	2.9 ij	0.8 h	3.7 h
19	OUTLOOK	6 EC	18 OZ/A	2 LF	7.5 a-f	7.5 c-f	15 c-f
	PYRAMIN	65 DF	5 LB/A	PRE			
20	PROWL H20	3.8 EC	1 LB A/A	PRE	4 hij	8.2 c-f	12.2 efg
21	PROWL H20	3.8 EC	1 LB A/A	PRE	3.8 hij	11.5 abc	15.4 b-f
	PYRAMIN	65 DF	5 LB/A	PRE			
22	EVEREST	70 WG	0.026 LB A/A	PRE	2.8 ij	1 h	3.8 h
23	EVEREST	70 WG	0.026 LB A/A	2 LF	2.3 j	0.8 h	3.1 h
24	UPBEET	50 WG	0.032 LB A/A	2 LF	5.2 e-j	3.7 fgh	8.9 fgh
	POAST	1.5 EC	1 PT/A	2 LF			
	COC	1 L	2 PT/A	2 LF			
25	NORTRON	4 SC	1 LB A/A	PRE	5 f-j	6.3 d-g	11.3 fg
	STINGER	3 EC	0.5 PT/A	4-6 LF			
LSD (P=.05)					3.12	5.02	6.64

Means followed by same letter do not significantly differ (P=.05, LSD)

SNAP BEAN HERBICIDE EVALUATION - ARLINGTON - 2006

Daniel J. Heider / Jed B. Colquhoun

Plot Information:
Location: Arlington Ag Research Station - Horticulture Farm Field 607
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Variety: 'HyStyle'
Date Planted: 6/2/06
Row Spacing: 30 Inches, 4 rows/plot
Plant Spacing: 1.5 inches
Date Harvested: 7/25/06 (Harvested center 2 - 20' rows)
Plot Size-Design: 10' x 20', 4 Reps
Rating Dates:

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: Incorporated 2-3" with a Kelley S-tine field cultivator with rolling baskets, one pass through plot and one pass perpendicular to plot .

Herbicide Application Data:

Date	6/2/06	6/2/06	6/20/06	6/29/06
Time	7:00 am	1:00 pm	11:00 am	8:00 am
Treatment	PPI	PRE	EPOST	POST
Soil Moisture				
SF	dry	dry	dry	moist
1"	moist	moist	dry	moist
3"	moist	moist	moist	moist
Soil Temp (F^o)				
SF	68.9	99.0	88.6	77.5
3"	65.8	83.9	76.0	63.8
Air Temp (F^o)	66.2	84.0	76.3	67.5
Wind	3-6 NE	1-4 NE	2-5 S	2-4 NW
%RH	70.9%	31.4%	50.7%	80.5%
Sky Condition	sunny	p. sunny	cloudy	sunny
Crop Stage	-----	pre	1 trifoliate	3-4 trifoliates
Weed & Size	-----	-----	COLQ 1"	COLQ 3-4"
	-----	-----	VELE 1-2"	VELE 2-4"
	-----	-----	RRPW 1-2"	RRPW 2-4"
	-----	-----	YEFT 2-3"	YEFT 4-6"

Fertilization and other pesticides: Fall 2005 - dairy replacement pack manure, 160 lb N/A.
Capture @ 4 fl oz/a (leafhopper control)

Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	Moderate	YEFT = Yellow Foxtail	Moderate
COPU = Common Purslane	Moderate		

Summary: Thirty potential herbicide programs were evaluated in 2006 primarily for crop safety and yield. Visual evaluations of crop injury were less than 10% in all treatments. Sandea (halosulfuron) applied to 1-trifoliate snap beans 18 days after planting slightly injured the crop, however, Sandea applied pre-emergence caused no visual injury. Post-emergence applications of Raptor (imazamox) + Basagran (bentazon) and non-ionic surfactant were compared with and without ammonium sulfate (AMS; 8.7 lb/100 gal). Dual II Magnum (s-metolachlor) was applied pre-emergence in these treatments. While crop injury was similar when Raptor + Basagran were applied both with and without AMS, crop yield tended to be lower when AMS was added.

SNAP BEAN HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/20/06	% Weed Control 6/20/06 COLQ	RRPW	VELE	COPU	YEFT
1	HANDWEEDED CHECK						0 a	100 a	100 a	100 a	100 a	100 a
2	UNTREATED CHECK						0 a	0 g	0 g	0 e	0 g	0 h
3	EPTAM	7	E	4	PT/A	PPI	0 a	100 a	100 a	100 a	100 a	100 a
	SANDEA	75	DF	0.5	OZ/A	E POST						
	NIS		L	0.25	% V/V	E POST						
4	EPTAM	7	E	4	PT/A	PPI	0 a	100 a	100 a	100 a	100 a	98.8 ab
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
5	PROWL H20	3.8	EC	2	PT/A	PPI	0 a	98.3 ab	98.3 ab	87.5 a-d	98.8 ab	97 abc
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
6	PURSUIT PLUS		EC	30	OZ/A	PPI	0 a	99.5 a	100 a	100 a	100 a	97.5 ab
7	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	75 b-f	80 a-e	100 a	90 b-f	75 d-g
	SELECT MAX		EC	12	OZ/A	POST						
8	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	73.8 c-f	80 a-e	86.3 a-d	93.8 a-f	63.3 g
	SELECT	2	EC	8	OZ/A	POST						
	COC		L	1	% V/V	POST						
9	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	73.8 c-f	85 a-d	95 a-d	90 b-f	82.5 a-g
	LI 6190		EC	6	OZ/A	POST						
10	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	76.3 a-f	88.8 abc	91.3 a-d	97 a-d	66.3 fg
	LI 6190		EC	8	OZ/A	POST						
11	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	72.5 c-f	78.8 a-f	96.3 a-d	88.3 def	70 efg
	LI 6190		EC	12	OZ/A	POST						
12	OUTLOOK	6	EC	8	OZ/A	PRE	0 a	67.5 def	76.3 b-f	86.3 a-d	91.3 a-f	95.8 a-d
13	OUTLOOK	6	EC	12	OZ/A	PRE	0 a	71.3 c-f	72.5 c-f	93.8 a-d	95 a-f	93.3 a-d
14	OUTLOOK	6	EC	16	OZ/A	PRE	0 a	67.5 def	75 b-f	97.5 abc	88.8 c-f	92.5 a-d
15	OUTLOOK	6	EC	24	OZ/A	PRE	0 a	75 b-f	82.5 a-d	86.3 a-d	100 a	93.8 a-d
16	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	60 f	80 a-e	86.3 a-d	100 a	93.3 a-d
17	DUAL II MAGNUM	7.64	EC	32	OZ/A	PRE	0 a	76.3 a-f	81.3 a-e	92.5 a-d	97.5 abc	95 a-d
18	PURSUIT	2	EC	1.5	OZ/A	PRE	0 a	71.3 c-f	56.3 f	82.5 bcd	93.8 a-f	67.5 fg
19	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	87.5 a-e	76.3 b-f	86.3 a-d	96.3 a-e	96.3 abc
	PURSUIT	2	EC	1.5	OZ/A	PRE						
20	OUTLOOK	6	EC	12	OZ/A	PRE	0 a	82.5 a-f	90 abc	90 a-d	98.8 ab	90 a-e
	PURSUIT	2	EC	1.5	OZ/A	PRE						
21	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	81.3 a-f	78.8 a-f	92.5 a-d	93.8 a-f	93.3 a-d
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	8	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						

22	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	66.3 def	65 def	90 a-d	87.5 ef	85 a-f
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	16	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
23	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	80 a-f	58.8 ef	95 a-d	86.3 f	93.8 a-d
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	8	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
	AMS		G	8.7	LB/100 GAL	E POST						
24	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	77.5 a-f	78.8 a-f	90 a-d	93.8 a-f	93.3 a-d
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	16	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
	AMS		G	8.7	LB/100 GAL	E POST						
25	DEFINE	4	FL	16	OZ/A	PRE	0 a	68.8 def	73.8 c-f	92.5 a-d	100 a	82.5 a-g
26	DEFINE	4	FL	16	OZ/A	PRE	0 a	65 ef	81.3 a-e	81.3 cd	93.8 a-f	84.5 a-f
	BASAGRAN	4	EC	16	OZ/A	E POST						
	COC		L	1	QT/A	E POST						
27	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	82.5 a-f	93.8 abc	80 d	95 a-f	88.8 a-e
	SANDEA	75	DF	0.5	OZ/A	PRE						
28	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	90 a-d	100 a	98.3 ab	93.8 a-f	95.8 a-d
	SANDEA	75	DF	0.75	OZ/A	PRE						
29	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	78.8 a-f	78.8 a-f	88.8 a-d	88.8 c-f	76.3 c-g
	SANDEA	75	DF	0.5	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
30	OUTLOOK	6	EC	14	OZ/A	PRE	0 a	88.3 a-e	97.5 ab	93.8 a-d	91.3 a-f	90 a-e
	SANDEA	75	DF	0.75	OZ/A	PRE						
31	SPARTAN	4	FL	3	OZ/A	PRE	0 a	93.3 abc	91.3 abc	97.5 abc	96.3 a-e	78.3 b-g
32	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	100 a	100 a	80 d	100 a	85 a-f
	SPARTAN	4	FL	3	OZ/A	PRE						
LSD (P=.05)							0	24.03	23.46	16.48	8.88	21.09

Means followed by same letter do not significantly differ (P=.05, LSD)

SNAP BEAN HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 6/27/06	% Weed Control 6/27/06 COLQ	RRPW	VELE	COPU	YEFT
1	HANDWEEDED CHECK						0 d	100 a	100 a	100 a	100 a	100 a
2	UNTREATED CHECK						0 d	0 k	0 i	0 f	0 d	0 f
3	EPTAM	7	E	4	PT/A	PPI	7.5 ab	100 a	100 a	100 a	100 a	100 a
	SANDEA	75	DF	0.5	OZ/A	E POST						
	NIS		L	0.25	% V/V	E POST						
4	EPTAM	7	E	4	PT/A	PPI	0 d	100 a	100 a	100 a	100 a	97.5 a
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
5	PROWL H20	3.8	EC	2	PT/A	PPI	0 d	100 a	100 a	100 a	100 a	98.8 a
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
6	PURSUIT PLUS		EC	30	OZ/A	PPI	0 d	98.8 ab	100 a	100 a	100 a	95 ab
7	SANDEA	75	DF	0.75	OZ/A	PRE	0 d	70 d-i	78.8 a-h	97.5 a	68.8 c	70 b-e
	SELECT MAX		EC	12	OZ/A	POST						
8	SANDEA	75	DF	0.75	OZ/A	PRE	0 d	67.5 d-i	81.3 a-g	100 a	77.5 bc	53.8 e
	SELECT	2	EC	8	OZ/A	POST						
	COC		L	1	% V/V	POST						
9	SANDEA	75	DF	0.75	OZ/A	PRE	0 d	51.3 hi	81.3 a-g	92.5 abc	97.5 a	60 de
	LI 6190		EC	6	OZ/A	POST						
10	SANDEA	75	DF	0.75	OZ/A	PRE	0 d	71.3 d-h	91.3 abc	96.3 ab	96.3 a	62.5 de
	LI 6190		EC	8	OZ/A	POST						
11	SANDEA	75	DF	0.75	OZ/A	PRE	1.3 d	68.8 d-i	87.5 a-e	100 a	92.5 a	76.3 a-e
	LI 6190		EC	12	OZ/A	POST						
12	OUTLOOK	6	EC	8	OZ/A	PRE	0 d	57.5 f-i	52.5 gh	72.5 de	92.5 a	81.3 a-d
13	OUTLOOK	6	EC	12	OZ/A	PRE	0 d	55 ghi	58.8 e-h	70 e	95 a	88.8 abc
14	OUTLOOK	6	EC	16	OZ/A	PRE	0 d	52.5 hi	66.3 c-h	91.3 a-d	93.8 a	93.8 abc
15	OUTLOOK	6	EC	24	OZ/A	PRE	0 d	61.3 e-i	68.8 b-h	82.5 a-e	100 a	90.8 abc
16	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 d	25 j	50 h	92.5 abc	100 a	89.5 abc
17	DUAL II MAGNUM	7.64	EC	32	OZ/A	PRE	0 d	65 d-i	66.3 c-h	75 cde	95 a	97.5 a
18	PURSUIT	2	EC	1.5	OZ/A	PRE	0 d	67.5 d-i	55 fgh	82.5 a-e	92.5 a	68.8 cde
19	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 d	80 a-e	61.3 d-h	90 a-d	92.5 a	90 abc
	PURSUIT	2	EC	1.5	OZ/A	PRE						
20	OUTLOOK	6	EC	12	OZ/A	PRE	0 d	70 d-i	88.8 a-d	95 ab	96.3 a	82 a-d
	PURSUIT	2	EC	1.5	OZ/A	PRE						
21	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	5 c	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	8	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						

22	DUAL II MAGNUM	7.64 EC	12 OZ/A	PRE	5 c	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1 EC	4 OZ/A	E POST						
	BASAGRAN	4 EC	16 OZ/A	E POST						
	NIS	L	1 QT/100 GAL	E POST						
23	DUAL II MAGNUM	7.64 EC	12 OZ/A	PRE	6.3 bc	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1 EC	4 OZ/A	E POST						
	BASAGRAN	4 EC	8 OZ/A	E POST						
	NIS	L	1 QT/100 GAL	E POST						
	AMS	G	8.7 LB/100 GAL	E POST						
24	DUAL II MAGNUM	7.64 EC	12 OZ/A	PRE	5 c	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1 EC	4 OZ/A	E POST						
	BASAGRAN	4 EC	16 OZ/A	E POST						
	NIS	L	1 QT/100 GAL	E POST						
	AMS	G	8.7 LB/100 GAL	E POST						
25	DEFINE	4 FL	16 OZ/A	PRE	0 d	48.8 i	58.8 e-h	88.8 a-e	98.8 a	78.8 a-e
26	DEFINE	4 FL	16 OZ/A	PRE	0 d	100 a	100 a	100 a	100 a	85 a-d
	BASAGRAN	4 EC	16 OZ/A	E POST						
	COC	L	1 QT/A	E POST						
27	DUAL II MAGNUM	7.64 EC	16 OZ/A	PRE	0 d	75 c-g	96.3 ab	83.8 a-e	97.5 a	76.3 a-e
	SANDEA	75 DF	0.5 OZ/A	PRE						
28	DUAL II MAGNUM	7.64 EC	16 OZ/A	PRE	0 d	85 a-d	100 a	98.8 a	88.8 ab	95 ab
	SANDEA	75 DF	0.75 OZ/A	PRE						
29	DUAL II MAGNUM	7.64 EC	16 OZ/A	PRE	8.8 a	86.3 a-d	100 a	100 a	95 a	91.3 abc
	SANDEA	75 DF	0.5 OZ/A	E POST						
	NIS	L	1 QT/100 GAL	E POST						
30	OUTLOOK	6 EC	14 OZ/A	PRE	0 d	77.5 b-f	97.5 ab	92.5 abc	92.5 a	81.3 a-d
	SANDEA	75 DF	0.75 OZ/A	PRE						
31	SPARTAN	4 FL	3 OZ/A	PRE	0 d	97 abc	82.5 a-f	100 a	95 a	61.3 de
32	DUAL II MAGNUM	7.64 EC	16 OZ/A	PRE	0 d	99.5 ab	98.8 a	77.5 b-e	100 a	75 a-e
	SPARTAN	4 FL	3 OZ/A	PRE						
LSD (P=.05)					1.63	22.08	28.99	18.8	13.61	25.7

Means followed by same letter do not significantly differ (P=.05, LSD)

SNAP BEAN HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 7/10/06	% Weed Control 7/10/06 COLQ	RRPW	VELE	COPU	YEFT
1	HANDWEEDED CHECK						0 b	100 a	100 a	100 a	100 a	100 a
2	UNTREATED CHECK						0 b	0 h	0 g	0 g	0 d	0 h
3	EPTAM	7	E	4	PT/A	PPI	3.8 a	100 a	100 a	100 a	100 a	100 a
	SANDEA	75	DF	0.5	OZ/A	E POST						
	NIS		L	0.25	% V/V	E POST						
4	EPTAM	7	E	4	PT/A	PPI	0 b	100 a	100 a	100 a	100 a	97.5 abc
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
5	PROWL H20	3.8	EC	2	PT/A	PPI	0 b	100 a	100 a	100 a	100 a	98.8 ab
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
6	PURSUIT PLUS		EC	30	OZ/A	PPI	0 b	98.8 a	100 a	100 a	100 a	95 abc
7	SANDEA	75	DF	0.75	OZ/A	PRE	0 b	67.5 b-f	76.3 a-f	97.5 ab	63.8 c	97.5 abc
	SELECT MAX		EC	12	OZ/A	POST						
8	SANDEA	75	DF	0.75	OZ/A	PRE	0 b	67.5 b-f	83.8 a-d	100 a	75 bc	95 abc
	SELECT	2	EC	8	OZ/A	POST						
	COC		L	1	% V/V	POST						
9	SANDEA	75	DF	0.75	OZ/A	PRE	0 b	50 ef	77.5 a-f	92.5 abc	97.5 a	95 abc
	LI 6190		EC	6	OZ/A	POST						
10	SANDEA	75	DF	0.75	OZ/A	PRE	0 b	68.8 b-f	91.3 ab	96.3 abc	96.3 a	95 abc
	LI 6190		EC	8	OZ/A	POST						
11	SANDEA	75	DF	0.75	OZ/A	PRE	0 b	66.3 b-f	85 abc	100 a	92.5 a	96.3 abc
	LI 6190		EC	12	OZ/A	POST						
12	OUTLOOK	6	EC	8	OZ/A	PRE	0 b	57.5 def	50 f	68.8 f	87.5 ab	80 b-f
13	OUTLOOK	6	EC	12	OZ/A	PRE	0 b	52.5 ef	58.8 c-f	70 ef	95 a	87.5 a-f
14	OUTLOOK	6	EC	16	OZ/A	PRE	0 b	52.5 ef	62.5 c-f	87.5 a-f	93.8 a	93.8 a-d
15	OUTLOOK	6	EC	24	OZ/A	PRE	0 b	58.8 def	67.5 b-f	80 b-f	100 a	89.5 a-e
16	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 b	25 g	50 f	92.5 abc	100 a	88.8 a-e
17	DUAL II MAGNUM	7.64	EC	32	OZ/A	PRE	0 b	63.8 b-f	63.8 b-f	72.5 def	95 a	96.3 abc
18	PURSUIT	2	EC	1.5	OZ/A	PRE	0 b	62.5 c-f	55 ef	82.5 a-f	92.5 a	68.8 fg
19	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 b	77.5 a-d	61.3 c-f	90 a-d	95 a	88.8 a-e
	PURSUIT	2	EC	1.5	OZ/A	PRE						
20	OUTLOOK	6	EC	12	OZ/A	PRE	0 b	70 b-f	83.8 a-d	95 abc	96.3 a	82 a-f
	PURSUIT	2	EC	1.5	OZ/A	PRE						
21	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.3 b	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	8	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						

22	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.3	b	100	a	100	a	100	a	100	a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST											
	BASAGRAN	4	EC	16	OZ/A	E POST											
	NIS		L	1	QT/100 GAL	E POST											
23	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.3	b	100	a	100	a	100	a	100	a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST											
	BASAGRAN	4	EC	8	OZ/A	E POST											
	NIS		L	1	QT/100 GAL	E POST											
	AMS		G	8.7	LB/100 GAL	E POST											
24	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.3	b	100	a	100	a	100	a	100	a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST											
	BASAGRAN	4	EC	16	OZ/A	E POST											
	NIS		L	1	QT/100 GAL	E POST											
	AMS		G	8.7	LB/100 GAL	E POST											
25	DEFINE	4	FL	16	OZ/A	PRE	0	b	48.8	f	56.3	def	88.8	a-e	98.8	a	78.8 c-f
26	DEFINE	4	FL	16	OZ/A	PRE	0	b	100	a	100	a	100	a	100	a	85 a-f
	BASAGRAN	4	EC	16	OZ/A	E POST											
	COC		L	1	QT/A	E POST											
27	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0	b	72.5	b-e	96.3	a	82.5	a-f	97.5	a	73.8 efg
	SANDEA	75	DF	0.5	OZ/A	PRE											
28	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0	b	85	abc	100	a	98.8	ab	88.8	a	93.8 a-d
	SANDEA	75	DF	0.75	OZ/A	PRE											
29	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	3.8	a	86.3	ab	100	a	100	a	95	a	92.5 a-e
	SANDEA	75	DF	0.5	OZ/A	E POST											
	NIS		L	1	QT/100 GAL	E POST											
30	OUTLOOK	6	EC	14	OZ/A	PRE	0	b	77.5	a-d	97.5	a	91.3	a-d	92.5	a	82.5 a-f
	SANDEA	75	DF	0.75	OZ/A	PRE											
31	SPARTAN	4	FL	3	OZ/A	PRE	0	b	97	a	78.8	a-e	100	a	95	a	58.8 g
32	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0	b	99.5	a	98.8	a	77.5	c-f	100	a	75 d-g
	SPARTAN	4	FL	3	OZ/A	PRE											
LSD (P=.05)							1.48		22.8		28.56		19.73		13.48		19.3

Means followed by same letter do not significantly differ (P=.05, LSD)

SNAP BEAN HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Injury 7/17/06	% Weed Control 7/17/06 COLQ	RRPW	VELE	COPU	YEFT
1	HANDWEEDED CHECK						0 a	100 a	100 a	100 a	100 a	100 a
2	UNTREATED CHECK						0 a	0 g	0 h	0 e	0 d	0 f
3	EPTAM	7	E	4	PT/A	PPI	0 a	100 a	100 a	100 a	100 a	100 a
	SANDEA	75	DF	0.5	OZ/A	E POST						
	NIS		L	0.25	% V/V	E POST						
4	EPTAM	7	E	4	PT/A	PPI	0 a	100 a	100 a	100 a	100 a	97.5 a
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
5	PROWL H20	3.8	EC	2	PT/A	PPI	0 a	100 a	100 a	100 a	100 a	98.8 a
	BASAGRAN	4	EC	1	PT/A	E POST						
	COC		L	1	QT/A	E POST						
6	PURSUIT PLUS		EC	30	OZ/A	PPI	0 a	98.8 a	100 a	100 a	100 a	95 ab
7	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	67.5 b-e	76.3 a-g	97.5 ab	63.8 c	100 a
	SELECT MAX		EC	12	OZ/A	POST						
8	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	63.8 b-e	81.3 a-e	100 a	75 bc	100 a
	SELECT	2	EC	8	OZ/A	POST						
	COC		L	1	% V/V	POST						
9	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	50 de	77.5 a-f	92.5 abc	97.5 a	97.5 a
	LI 6190		EC	6	OZ/A	POST						
10	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	66.3 b-e	88.8 abc	96.3 ab	96.3 a	100 a
	LI 6190		EC	8	OZ/A	POST						
11	SANDEA	75	DF	0.75	OZ/A	PRE	0 a	66.3 b-e	85 a-d	100 a	92.5 a	100 a
	LI 6190		EC	12	OZ/A	POST						
12	OUTLOOK	6	EC	8	OZ/A	PRE	0 a	57.5 cde	50 fg	71.3 cd	87.5 ab	81.3 a-d
13	OUTLOOK	6	EC	12	OZ/A	PRE	0 a	52.5 de	58.8 d-g	65 d	95 a	87.5 abc
14	OUTLOOK	6	EC	16	OZ/A	PRE	0 a	51.3 de	62.5 c-g	85 a-d	93.8 a	93.8 abc
15	OUTLOOK	6	EC	24	OZ/A	PRE	0 a	58.8 cde	67.5 b-g	77.5 bcd	100 a	89.5 abc
16	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	25 f	47.5 g	90 abc	100 a	87.5 abc
17	DUAL II MAGNUM	7.64	EC	32	OZ/A	PRE	0 a	63.8 b-e	62.5 c-g	71.3 cd	95 a	95 ab
18	PURSUIT	2	EC	1.5	OZ/A	PRE	0 a	62.5 b-e	50 fg	82.5 a-d	92.5 a	61.3 de
19	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	77.5 abc	61.3 c-g	90 abc	93.8 a	86.3 abc
	PURSUIT	2	EC	1.5	OZ/A	PRE						
20	OUTLOOK	6	EC	12	OZ/A	PRE	0 a	70 b-e	83.8 a-e	95 ab	96.3 a	82 abc
	PURSUIT	2	EC	1.5	OZ/A	PRE						
21	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	8	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						

22	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	16	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
23	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	8	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
	AMS		G	8.7	LB/100 GAL	E POST						
24	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	0 a	100 a	100 a	100 a	100 a	100 a
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	16	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
	AMS		G	8.7	LB/100 GAL	E POST						
25	DEFINE	4	FL	16	OZ/A	PRE	0 a	48.8 e	55 efg	88.8 abc	98.8 a	80 a-d
26	DEFINE	4	FL	16	OZ/A	PRE	0 a	100 a	100 a	100 a	100 a	85 abc
	BASAGRAN	4	EC	16	OZ/A	E POST						
	COC		L	1	QT/A	E POST						
27	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	72.5 bcd	96.3 ab	80 a-d	97.5 a	73.8 cde
	SANDEA	75	DF	0.5	OZ/A	PRE						
28	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	85 ab	100 a	98.8 ab	89.5 a	94.5 ab
	SANDEA	75	DF	0.75	OZ/A	PRE						
29	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	1.3 a	83.8 ab	100 a	100 a	95 a	92.5 abc
	SANDEA	75	DF	0.5	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
30	OUTLOOK	6	EC	14	OZ/A	PRE	0 a	77.5 abc	95 ab	91.3 abc	91.3 a	82.5 abc
	SANDEA	75	DF	0.75	OZ/A	PRE						
31	SPARTAN	4	FL	3	OZ/A	PRE	0 a	97 a	76.3 a-g	100 a	95 a	56.3 e
32	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	0 a	99.5 a	98.8 a	77.5 bcd	100 a	75 b-e
	SPARTAN	4	FL	3	OZ/A	PRE						
LSD (P=.05)							0.62	22.98	29	21.47	13.54	20.19

Means followed by same letter do not significantly differ (P=.05, LSD)

SNAP BEAN HERBICIDE EVALUATION - ARLINGTON - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Yield (tons/A) 7/25/06 Sieve Size 1-3	Sieve Size 4-5	Total Yield
1	HANDWEEDED CHECK						1.7 a	2.8 a-d	4.5 a-d
2	UNTREATED CHECK						1.5 a	1.2 k	2.7 no
3	EPTAM	7	E	4	PT/A	PPI	1.5 a	2.4 c-g	4 c-h
	SANDEA	75	DF	0.5	OZ/A	E POST			
	NIS		L	0.25	% V/V	E POST			
4	EPTAM	7	E	4	PT/A	PPI	1.6 a	3 ab	4.6 abc
	BASAGRAN	4	EC	1	PT/A	E POST			
	COC		L	1	QT/A	E POST			
5	PROWL H20	3.8	EC	2	PT/A	PPI	1.6 a	2.6 a-e	4.2 a-f
	BASAGRAN	4	EC	1	PT/A	E POST			
	COC		L	1	QT/A	E POST			
6	PURSUIT PLUS		EC	30	OZ/A	PPI	1.7 a	3 a	4.7 ab
7	SANDEA	75	DF	0.75	OZ/A	PRE	1.4 a	2.5 b-g	3.8 d-j
	SELECT MAX		EC	12	OZ/A	POST			
8	SANDEA	75	DF	0.75	OZ/A	PRE	1.8 a	2.4 b-g	4.3 a-e
	SELECT	2	EC	8	OZ/A	POST			
	COC		L	1	% V/V	POST			
9	SANDEA	75	DF	0.75	OZ/A	PRE	1.7 a	2.2 e-h	3.9 c-i
	LI 6190		EC	6	OZ/A	POST			
10	SANDEA	75	DF	0.75	OZ/A	PRE	1.7 a	2.2 e-h	4 c-h
	LI 6190		EC	8	OZ/A	POST			
11	SANDEA	75	DF	0.75	OZ/A	PRE	1.4 a	2.3 d-g	3.8 e-l
	LI 6190		EC	12	OZ/A	POST			
12	OUTLOOK	6	EC	8	OZ/A	PRE	1.5 a	1.6 ijk	3.1 l-o
13	OUTLOOK	6	EC	12	OZ/A	PRE	1.4 a	1.5 ijk	3 mno
14	OUTLOOK	6	EC	16	OZ/A	PRE	1.6 a	1.6 ijk	3.2 j-o
15	OUTLOOK	6	EC	24	OZ/A	PRE	1.6 a	1.6 ijk	3.2 i-o
16	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	1.5 a	1.1 k	2.6 o
17	DUAL II MAGNUM	7.64	EC	32	OZ/A	PRE	1.5 a	1.8 hij	3.3 h-n
18	PURSUIT	2	EC	1.5	OZ/A	PRE	1.6 a	2.3 d-g	4 c-h
19	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	1.5 a	2.3 c-g	3.8 d-j
	PURSUIT	2	EC	1.5	OZ/A	PRE			
20	OUTLOOK	6	EC	12	OZ/A	PRE	1.7 a	2.6 a-e	4.3 a-e
	PURSUIT	2	EC	1.5	OZ/A	PRE			
21	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.5 a	2.8 abc	4.4 a-e
	RAPTOR	1	EC	4	OZ/A	E POST			
	BASAGRAN	4	EC	8	OZ/A	E POST			
	NIS		L	1	QT/100 GAL	E POST			

22	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.8	a	2.9	ab	4.8	a
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	16	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
23	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.6	a	2.5	a-f	4	b-g
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	8	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
	AMS		G	8.7	LB/100 GAL	E POST						
24	DUAL II MAGNUM	7.64	EC	12	OZ/A	PRE	1.4	a	2.3	d-g	3.7	e-l
	RAPTOR	1	EC	4	OZ/A	E POST						
	BASAGRAN	4	EC	16	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
	AMS		G	8.7	LB/100 GAL	E POST						
25	DEFINE	4	FL	16	OZ/A	PRE	1.6	a	1.5	jk	3.1	k-o
26	DEFINE	4	FL	16	OZ/A	PRE	1.7	a	2.4	c-g	4.1	a-f
	BASAGRAN	4	EC	16	OZ/A	E POST						
	COC		L	1	QT/A	E POST						
27	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	1.7	a	2.2	e-h	3.9	c-i
	SANDEA	75	DF	0.5	OZ/A	PRE						
28	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	1.6	a	2.2	e-h	3.8	e-k
	SANDEA	75	DF	0.75	OZ/A	PRE						
29	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	1.6	a	2.4	c-g	4	b-g
	SANDEA	75	DF	0.5	OZ/A	E POST						
	NIS		L	1	QT/100 GAL	E POST						
30	OUTLOOK	6	EC	14	OZ/A	PRE	1.6	a	2.2	e-h	3.8	e-j
	SANDEA	75	DF	0.75	OZ/A	PRE						
31	SPARTAN	4	FL	3	OZ/A	PRE	1.6	a	1.9	g-j	3.5	f-m
32	DUAL II MAGNUM	7.64	EC	16	OZ/A	PRE	1.4	a	2	f-i	3.4	g-n
	SPARTAN	4	FL	3	OZ/A	PRE						
LSD (P=.05)							0.33		0.51		0.69	

Means followed by same letter do not significantly differ (P=.05, LSD)

AE 0172747 Grass Tank Mix Partners Field Corn Herbicide Evaluation - Arlington - 2006

Daniel J. Heider

Plot Information:
Location: Arlington Ag Research Station - Horticulture Farm Field 640
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Hybrid: Pioneer 38H65 (LL, RR2, Herculex I, Poncho 250)
Date Planted: 5/21/06
Row Spacing: 30 Inches, 5 rows/plot
Plant Population: 30,000 / acre
Date Harvested: Not Harvested
Plot Size-Design: 12.5' x 20', 3 Reps
Rating Dates: 6/1, 6/12, 6/19, 6/27, 7/14

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: N/A

Herbicide Application Data:

Date	6/13/06
Time	7:00 am
Treatment	MIPOWE
Soil Moisture	
SF	dry
1"	dry
3"	moist
Soil Temp (F^o)	
SF	63.5
3"	65.6
Air Temp (F^o)	66.7
Wind	1-4 SW
%RH	45.0 %
Sky Condition	sunny
Crop Stage	V4-V5
Weed & Size	ABUTH 3-4"
	CHEAL 2-3"
	AMARE 3-4"
	ERIVI 3-4"

Fertilization and other pesticides: Spring 2006 - Urea 180 lb N/A, incorporated

Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	light	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	light	WOCG = Woolly Cupgrass	High

AE 0172747 Grass Tank Mix Partners Herbicide Evaluation - Arlington - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/19/06 % Injury	% Control 6/19/06 COLQ	RRPW	VELE	WOCG
1	Untreated Check						0 a	0 c	0 c	0 d	0 d
2	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	92.7 ab	91.7 a
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
3	AE 0172747		SC	3	OZ/A	MIPOWE	1.7 a	100 a	100 a	98.3 a	80 ab
	OPTION	35	WG	0.75	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
4	AE 0172747		SC	3	OZ/A	MIPOWE	5 a	100 a	100 a	96.7 a	85 ab
	OPTION	35	WG	1	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
5	AE 0172747		SC	3	OZ/A	MIPOWE	5 a	100 a	100 a	97.7 a	68.3 bc
	OPTION	35	WG	1.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
6	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	90 ab	81.7 ab
	ACCENT	75	WG	0.125	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
7	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	75 c	70 abc
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
8	AE 0172747		SC	3	OZ/A	MIPOWE	1.7 a	98.3 ab	100 a	88.3 ab	76.7 abc
	ACCENT	75	WG	0.375	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
9	AE 0172747		SC	3	OZ/A	MIPOWE	3.3 a	95 b	100 a	88.3 ab	90 ab
	ACCENT	75	WG	0.5	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
10	ACCENT	75	WG	0.125	OZ/A	MIPOWE	0 a	98.3 ab	99.3 b	70 c	81.7 ab
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
11	AE 0172747		SC	3	OZ/A	MIPOWE	3.3 a	97.7 ab	100 a	81.7 bc	56.7 c
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
12	AE 0172747		SC	3	OZ/A	MIPOWE	1.7 a	100 a	100 a	73.3 c	68.3 bc
	ACCENT	75	WG	0.375	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
13	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	95 b	100 a	70 c	68.3 bc
	ACCENT	75	WG	0.5	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
14	STEADFAST	75	WG	0.75	OZ/A	MIPOWE	1.7 a	96.7 ab	100 a	97 a	76.7 abc
	CALLISTO	4	SC	2	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	2	QT/A	MIPOWE					
LSD (P=.05)							5.12	3.47	0.52	13.01	22.61

Means followed by same letter do not significantly differ (P=.05, LSD)

AE 0172747 Grass Tank Mix Partners Herbicide Evaluation - Arlington - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/27/06 % Injury	% Control 6/27/06 COLQ	RRPW	VELE	WOCG
1	Untreated Check						0 a	0 c	0 b	0 c	0 e
2	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	98.7 a
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
3	AE 0172747		SC	3	OZ/A	MIPOWE	1.7 a	100 a	100 a	100 a	73.3 d
	OPTION	35	WG	0.75	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
4	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	90 abc
	OPTION	35	WG	1	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
5	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	85 a-d
	OPTION	35	WG	1.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
6	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	92.7 abc
	ACCENT	75	WG	0.125	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
7	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	90 abc
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
8	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	88.3 a-d
	ACCENT	75	WG	0.375	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
9	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	96 ab
	ACCENT	75	WG	0.5	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
10	ACCENT	75	WG	0.125	OZ/A	MIPOWE	0 a	83.3 b	100 a	53.3 b	90 abc
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
11	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	78.3 cd
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
12	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	85 a-d
	ACCENT	75	WG	0.375	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
13	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	81.7 bcd
	ACCENT	75	WG	0.5	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
14	STEADFAST	75	WG	0.75	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	95 ab
	CALLISTO	4	SC	2	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	2	QT/A	MIPOWE					
LSD (P=.05)							1.3	6.85	0	6.85	15.01

Means followed by same letter do not significantly differ (P=.05, LSD)

AE 0172747 Grass Tank Mix Partners Herbicide Evaluation - Arlington - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	% Control 6/27/06 COLQ	RRPW	VELE	WOCG
1	Untreated Check						0 c	0 b	0 c	0 d
2	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	94.3 abc
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
3	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	87.7 bc
	OPTION	35	WG	0.75	OZ/A	MIPOWE				
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
4	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	88.3 bc
	OPTION	35	WG	1	OZ/A	MIPOWE				
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
5	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	86 bc
	OPTION	35	WG	1.25	OZ/A	MIPOWE				
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
6	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	95.3 ab
	ACCENT	75	WG	0.125	OZ/A	MIPOWE				
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
7	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	99.3 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE				
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
8	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	99.3 a
	ACCENT	75	WG	0.375	OZ/A	MIPOWE				
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
9	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.5	OZ/A	MIPOWE				
	MSO	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
10	ACCENT	75	WG	0.125	OZ/A	MIPOWE	90 b	100 a	75 b	85 c
	COC	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
11	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	85 c
	ACCENT	75	WG	0.25	OZ/A	MIPOWE				
	COC	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
12	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	92.7 abc
	ACCENT	75	WG	0.375	OZ/A	MIPOWE				
	COC	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
13	AE 0172747		SC	3	OZ/A	MIPOWE	100 a	100 a	100 a	91.7 abc
	ACCENT	75	WG	0.5	OZ/A	MIPOWE				
	COC	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	1.5	QT/A	MIPOWE				
14	STEADFAST	75	WG	0.75	OZ/A	MIPOWE	100 a	100 a	100 a	94.3 abc
	CALLISTO	4	SC	2	OZ/A	MIPOWE				
	COC	1	EC	1	% V/V	MIPOWE				
	UAN 28%	1	SL	2	QT/A	MIPOWE				
LSD (P=.05)							0	0	5.94	9.76

Means followed by same letter do not significantly differ (P=.05, LSD)

Woolly Cupgrass Field Corn Herbicide Evaluation - Arlington - 2006

Daniel J. Heider

Plot Information:
Location: Arlington Ag Research Station - Horticulture Farm Field 640
Soil Type: Plano Silt Loam; pH 6.7; OM 4.0%.
Hybrid: Pioneer 38H65 (LL, RR2, Herculex I, Poncho 250)
Date Planted: 5/21/06
Row Spacing: 30 Inches, 5 rows/plot
Plant Population: 30,000 / acre
Date Harvested: Not Harvested
Plot Size-Design: 12.5' x 20', 3 Reps
Rating Dates: 6/1, 6/12, 6/19, 6/27, 7/14

Application Equipment: Tractor mounted air pressure sprayer. GPA 20, PSI 27, MPH 3.3, Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: N/A

Herbicide Application Data:

Date	5/24/06	6/13/06
Time	8:00 am	6:00 am
Treatment	PRE	MIPOWE
Soil Moisture		
SF	dry	dry
1"	moist	dry
3"	moist	moist
Soil Temp (F^o)		
SF	65.7	63.5
3"	58.5	65.0
Air Temp (F^o)	63.7	65.0
Wind	4-6 SW	1-4 SW
%RH	63.6 %	48.0 %
Sky Condition	cloudy	sunny
Crop Stage	pre	V4-V5
Weed & Size	pre	ABUTH 3-4"
	-----	CHEAL 2-3"
	-----	AMARE 3-4"
	-----	ERIVI 3-4"

Fertilization and other pesticides: Spring 2006 - Urea 180 lb N/A, incorporated

Irrigation: None

Weed Abbreviations:	Plot Weed Density:	Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	light	VELE = Velvetleaf	Moderate
RRPW = Redroot Pigweed	light	WOCG = Woolly Cupgrass	High

Woolly Cupgrass Field Corn Herbicide Evaluation - Arlington - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/12/06 % Injury	% Control 6/12/06 COLQ	RRPW	VELE	WOCG
1	UNTREATED CHECK						0 a	0 b	0 b	0 c	0 c
2	ATRAZINE	4	SL	1	PT/A	PREPRE	0 a	100 a	100 a	46.7 b	13.3 b
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
3	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	99.3 a	94.3 a
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
4	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	96 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
5	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	96.7 a	91 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
6	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	95 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
7	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	0 b	0 b	0 c	0 c
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
8	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	0 b	0 b	0 c	0 c
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
9	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	0 b	0 b	0 c	0 c
	OPTION	35	WG	1	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
10	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	0 b	0 b	0 c	0 c
	OPTION	35	WG	1	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
11	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	0 b	0 b	0 c	0 c
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
12	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	0 b	0 b	0 c	0 c
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
13	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	0 b	0 b	0 c	0 c
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
14	Untreated Check						0 a	0 b	0 b	0 c	0 c
LSD (P=.05)							0	0	0	3.59	6.51

Means followed by same letter do not significantly differ (P=.05, LSD)

Woolly Cupgrass Field Corn Herbicide Evaluation - Arlington - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/19/06 % Injury	% Control 6/19/06 COLQ	RRPW	VELE	WOCG
1	UNTREATED CHECK						0 c	0 c	0 b	0 c	0 e
2	ATRAZINE	4	SL	1	PT/A	PREPRE	0 c	100 a	100 a	98.7 a	95 ab
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
3	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 c	100 a	100 a	100 a	100 a
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
4	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	5 ab	100 a	100 a	100 a	100 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
5	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 c	100 a	100 a	100 a	99.3 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
6	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 c	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
7	AE 0172747		SC	3	OZ/A	MIPOWE	0 c	100 a	100 a	90 b	92.7 abc
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
8	AE 0172747		SC	3	OZ/A	MIPOWE	3.3 bc	100 a	100 a	100 a	97.7 a
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
9	AE 0172747		SC	3	OZ/A	MIPOWE	8.3 a	100 a	100 a	98.7 a	85 c
	OPTION	35	WG	1	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
10	AE 0172747		SC	3	OZ/A	MIPOWE	0 c	100 a	100 a	100 a	88.3 bc
	OPTION	35	WG	1	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
11	AE 0172747		SC	3	OZ/A	MIPOWE	0 c	98.7 b	100 a	91.7 b	73.3 d
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
12	AE 0172747		SC	3	OZ/A	MIPOWE	0 c	100 a	100 a	100 a	97.7 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
13	AE 0172747		SC	3	OZ/A	MIPOWE	0 c	100 a	100 a	100 a	99.3 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
14	Untreated Check						0 c	0 c	0 b	0 c	0 e
LSD (P=.05)							3.52	0.52	0	2.71	7.67

Means followed by same letter do not significantly differ (P=.05, LSD)

Woolly Cupgrass Field Corn Herbicide Evaluation - Arlington - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	6/27/06 % Injury	% Control 6/27/06 COLQ	RRPW	VELE	WOCG
1	UNTREATED CHECK						0 a	0 c	0 c	0 c	0 c
2	ATRAZINE	4	SL	1	PT/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
3	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
4	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
5	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
6	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
7	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	98 a
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
8	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	100 a
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
9	AE 0172747		SC	3	OZ/A	MIPOWE	1.7 a	100 a	100 a	100 a	95 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
10	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	98.7 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
11	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	93.3 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
12	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
13	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
14	Untreated Check						0 a	33.3 b	33.3 b	33.3 b	33.3 b
LSD (P=.05)							1.3	25.9	25.9	25.9	25.79

Means followed by same letter do not significantly differ (P=.05, LSD)

Woolly Cupgrass Field Corn Herbicide Evaluation - Arlington - 2006

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	7/14/06 % Injury	% Control 7/14/06 COLQ	RRPW	VELE	WOCG
1	UNTREATED CHECK						0 a	0 c	0 c	0 c	0 c
2	ATRAZINE	4	SL	1	PT/A	PREPRE	0 a	100 a	100 a	100 a	98.7 a
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
3	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
4	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
5	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
6	BALANCE PRO	4	SC	1.5	OZ/A	PREPRE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	AE 0172747		SC	3	OZ/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
7	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	98.7 a
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
8	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	99.3 a
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
9	AE 0172747		SC	3	OZ/A	MIPOWE	1.7 a	100 a	100 a	100 a	95.3 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
10	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	96 a
	OPTION	35	WG	1	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
11	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	98 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
12	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	MSO	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
13	AE 0172747		SC	3	OZ/A	MIPOWE	0 a	100 a	100 a	100 a	100 a
	ACCENT	75	WG	0.25	OZ/A	MIPOWE					
	ATRAZINE	4	SL	1	PT/A	MIPOWE					
	COC	1	EC	1	% V/V	MIPOWE					
	UAN 28%	1	SL	1.5	QT/A	MIPOWE					
14	Untreated Check						0 a	33.3 b	33.3 b	33.3 b	33.3 b
LSD (P=.05)							1.3	25.9	25.9	25.9	25.87

Means followed by same letter do not significantly differ (P=.05, LSD)

Title:	Potential herbicide evaluation for dodder control in carrots
Trial ID:	Trial 06-11
Location:	Hancock, WI

Plot information:

Exp. Design:	RCB
Plot size:	6 by 20 ft, 3 carrot rows per bed
Replications:	4
Soil type:	Plainfield loamy sand
Crop variety:	'Enterprise' planted April 25, 2006

Herbicide application:

Timing:	A	B
Application date:	4/27/2006	6/8/2006
Application timing:	pre	post, 6 inch dodder, 3-5 lf carrot
Applied by:	Colquhoun	Colquhoun
Equipment:	CO2 Backpack, 20 GPA	CO2 Backpack, 20 GPA
Air temperature (F):	56	76
% Relative humidity:	36	46
Wind velocity (mph):	2 to 4	2 mph
Wind direction	E	E
Dew presence (Y/N):	N	N
Soil temperature (F):	64	71
Soil moisture:	Dry	Moist
% cloud cover	0	0

General study notes: DAP, days after planting. Carrots emerged 5/12/06, dodder emerged 5/15/06. Carrot hand-harvested on 10/2/2006

Potential herbicide evaluatin for dodder control in carrots
Location: Hancock, WI Study Director: Jed Colquhoun

Pest Name						dodder		dodder		dodder		dodder	dodder	dodder		
Crop Name					carrot		carrot		carrot		carrot				carrot	carrot
Rating Date					6/13/2006	6/13/2006	6/21/2006	6/21/2006	7/5/2006	7/5/2006	7/19/2006	7/19/2006	6/20/2006	7/20/2006	10/2/2006	10/2/2006
Rating Data Type					phyto	control	phyto	control	phyto	control	phyto	control	attachments	attachments	number	yield
Rating Unit					%	%	%	%	%	%	%	%	#/A	#/A	#/A	lb/A
Crop Stage					4 inch		6 inch		8 inch		10 inch					
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code												
1	nontreated check				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23695	48977	129098	4901
2	Smolder	50	lb/a	A	3.8	15.0	5.0	15.0	23.8	35.0	25.0	27.5	19882	61428	176488	7624
3	Dual II Magnum	0.95	lb ai/a	A	26.3	15.0	22.5	10.0	10.0	27.5	5.0	20.0	37858	77200	190106	8006
4	Prowl H2O	1	lb ai/a	A	6.3	81.3	6.3	75.0	5.0	82.5	3.8	68.8	21516	39015	160147	9204
5	Lorox	1	lb ai/a	A	8.8	0.0	6.3	0.0	2.5	0.0	2.5	0.0	27236	99613	131821	6317
6	Chateau	0.03	lb ai/a	B	47.5	87.5	66.3	67.5	38.8	47.5	22.5	47.5	9533	72220	121472	7897
7	Goal	0.031	lb ai/a	B	10.0	30.0	11.3	15.0	0.0	30.0	6.3	2.5	16069	98783	168862	6372
	NIS	0.25	% v/v	B												
8	Nortron	0.75	lb ai/a	B	26.3	37.5	25.0	37.5	28.8	22.5	33.8	20.0	18793	125347	104041	5882
9	Define	0.3	lb ai/a	B	0.0	22.5	0.0	22.5	5.0	17.5	7.5	12.5	45211	154401	128008	5174
	NIS	0.25	% v/v	B												
10	Callisto	0.05	lb ai/a	B	35.0	36.3	53.8	56.3	45.0	42.5	38.8	48.8	25874	71390	125285	7243
	NIS	0.25	% v/v	B												
11	Sencor	0.25	lb ai/a	B	16.3	5.0	12.5	22.5	3.8	10.0	12.5	15.0	23150	69729	150342	6971
	NIS	0.25	% v/v	B												
12	Aim	0.02	lb ai/a	B	90.0	90.0	86.3	91.3	52.5	75.0	30.0	78.8	0	73050	159602	7298
	NIS	0.25	% v/v	B												
13	Matrix	0.02	lb ai/a	B	45.0	47.5	82.5	62.5	87.5	90.0	67.5	83.8	7626	6641	88789	6045
	NIS	0.25	% v/v	B												
14	Everest	0.027	lb ai/a	B	22.5	26.3	35.0	51.3	38.8	82.5	18.8	82.5	13618	30714	171041	8169
	NIS	0.25	% v/v	B												
15	Reglone	0.12	lb ai/a	B	37.5	35.0	31.3	41.3	25.0	72.5	18.8	65.0	1089	19923	158513	10184
	NIS	0.25	% v/v	B												
16	Roundup Ultramax	0.0625	lb ai/a	B	2.5	0.0	12.5	0.0	27.5	5.0	42.5	10.0	43577	122026	136179	4248
17	Lorox	1	lb ai/a	B	5.0	0.0	7.5	0.0	12.5	0.0	13.8	0.0	74626	191756	98594	3867
	NIS	0.25	% v/v	B												
18	Smolder	5	lb/a	B	0.0	26.3	0.0	28.8	5.0	37.5	8.8	25.0	10622	77200	195553	8986
LSD (P=.05)					24.5	39.1	28.2	45.3	26.9	33.9	28.1	30.7	41808	89982	53971	4042

Title:	Evaluation of potential new herbicides in peppermint on mineral soil	
Trial ID:	Trial 06-09	
Location:	Janesville, WI	

Plot information:

Exp. Design:	RCB
Plot size:	6 by 25 ft
Replications:	3
Soil type:	Mineral
Crop variety:	Peppermint

Herbicide application:

Timing:	A	B
Application date:	4/12/2006	6/2/2006
Application timing:	Dormant, pre	6 to 8 inch
Applied by:	Colquhoun	Rittmeyer
Equipment:	CO2 Backpack, 20 GPA	CO2 Backpack, 20 GPA
Air temperature (F):	74	79
% Relative humidity:	44	42
Wind velocity (mph):	3 to 6	3 to 5
Wind direction	W	N
Dew presence (Y/N):	N	N
Soil temperature (F):	62	74
Soil moisture:	Moist	Dry
% cloud cover	20	70

General study notes: Treatments 1-5 harvested and cooked for oil yield at UW-Arlington Horticulture Farm. NIS (0.25% v/v) added to all postemergent (B) treatments.

Summary comments: Peppermint in the trial area was not cultivated and preemergence applications were not applied until April 12 because of excessive moisture (the grower did not cultivate the remainder of the field for about 2 weeks). Mint had presumably broken dormancy, although re-growth was not visible. Injury from Callisto was severe and persisted until harvest. Despite visible injury, oil yield was similar to the nontreated check with the exception of the highest rate of Callisto. Starane caused the least injury of the postemergence treatments.

Evaluation of potential new herbicides in peppermint
Trial ID: 06-09
Location: Janesville, WI Investigator: Jed Colquhoun

Pest Code							ERICA	LACSE				
Pest Name							Horseweed	Lettuce, prickly				
Rating Date					5/2/2006	5/17/2006	5/17/2006	5/17/2006	6/16/2006	6/16/2006	7/19/2006	7/19/2006
Rating Data Type					phyto	phyto	control	control	phyto	phyto	fresh wt	oil
Rating Unit					%	%	%	%	%	%	lb/A	lb/A
Crop Stage					2in	4in	4in	4in	12in	18in		
Pest Stage							6in	6in				
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code								
1	nontreated check				0	0	0	0	0	0	27027	72.1
2	Chateau	0.125	lb ai/a	A	8.3	5	53	30	0	0	27104	69.1
3	Callisto	0.09375	lb ai/a	A	20	15	75	78.3	11.7	16.7	25091	69.1
4	Callisto	0.1875	lb ai/a	A	53.3	56.7	96.7	95	45	36.7	25400	66
5	Callisto	0.3	lb ai/a	A	56.7	70	96.7	96.7	48.3	36.7	22767	59.8
6	Prowl H20	2	lb ai/a	A	1.7	0	23	30	0	0		
7	Aim	0.03	lb ai/a	B					30	28.3		
8	Aim	0.045	lb ai/a	B					33.3	35		
9	Starane	0.125	lb ai/a	B					8.3	5		
10	Starane	0.25	lb ai/a	B					20	16.7		
11	ET	0.00325	lb ai/a	B					36.7	33.3		
12	ET	0.0065	lb ai/a	B					56.7	56.7		
13	Distinct	0.175	lb ai/a	B					15	50		
14	Distinct	0.096	lb ai/a	B					16.7	50		
LSD (P=.05)					15.1	14.8	36.9	58.9	19.2	17.8	7362	10.5

Title:	Evaluation of potential new herbicides in peppermint on muck
Trial ID:	Trial 06-01
Location:	Portage, WI

Plot information:

Exp. Design:	RCB
Plot size:	6 by 25 ft
Replications:	4
Soil type:	Muck
Crop variety:	Peppermint

Herbicide application:

Timing:	A	B
Application date:	4/5/2006	6/12/2006
Application timing:	Dormant, pre	14 in mint
Applied by:	Colquhoun	Colquhoun
Equipment:	CO2 Backpack, 20 GPA	CO2 Backpack, 20 GPA
Air temperature (F):	50	66
% Relative humidity:	42	66
Wind velocity (mph):	0	2
Wind direction		E
Dew presence (Y/N):	N	N
Soil temperature (F):	40	61
Soil moisture:	Moist	Moist
% cloud cover	0	0

General study notes: Mint cooked in still at UW-Arlington Horticulture Research Farm. NIS (0.25% v/v) added to all postemergence (B) treatments.

Summary comments: Minimal injury observed in all preemergence treatments. No vegetative buds were visible on roots when preemergence treatments were applied. Injury from postemergence treatments was fairly severe, with the exception of Starane at the lower rate. Mint had somewhat outgrown injury by harvest.

Evaluation of potential new herbicides in peppermint
Trial ID: 06-01
Location: Portage, WI Investigator: Jed Colquhoun

Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	5/4/2006 Injury % Em-3in	5/17/2006 Injury % Em-6in	6/16/2006 Injury % 18 in	6/28/2006 Injury % 26 in	7/5/2006 fresh wt lb/A	7/5/2006 oil lb/A
1	nontreated check				0	0	0	0	37636	43.7
2	Chateau	0.125	lb ai/a	A	0	0	0	0	36164	62.8
3	Callisto	0.09375	lb ai/a	A	1.3	0	0	0	34267	56.8
4	Callisto	0.1875	lb ai/a	A	0	0	0	0	36668	57.5
5	Callisto	0.3	lb ai/a	A	0	0	0	0	37287	60.8
6	Prowl H20	2	lb ai/a	A	0	0	0	0	34345	56.8
7	Aim	0.03	lb ai/a	B	0	0	41.3	40	28033	39.1
8	Aim	0.045	lb ai/a	B	0	0	40	38.8	26717	40.7
9	Starane	0.125	lb ai/a	B	0	0	6.3	5	33183	45.3
10	Starane	0.25	lb ai/a	B	0	0	27.5	25	28924	42.2
11	ET	0.00325	lb ai/a	B	0	0	38.8	36.3	33377	53.7
12	ET	0.0065	lb ai/a	B	0	0	47.5	55	28072	32.2
13	Distinct	0.175	lb ai/a	B	0	0	23.8	25	26136	33
14	Distinct	0.096	lb ai/a	B	0	0	22.5	21.3	26020	34.5
LSD (P=.05)					0.95	0	11.6	8.72	7676	11.9

Title:	Evaluation of potential new herbicides in spearmint on mineral soil
Trial ID:	Trial 06-10
Location:	Janesville, WI

Plot information:

Exp. Design:	RCB
Plot size:	6 by 25 ft
Replications:	3
Soil type:	Mineral
Crop variety:	Spearmint

Herbicide application:

Timing:	A
Application date:	4/12/2006
Application timing:	Dormant, pre
Applied by:	Colquhoun
Equipment:	CO2 Backpack, 20 GPA
Air temperature (F):	74
% Relative humidity:	44
Wind velocity (mph):	3 to 6
Wind direction	W
Dew presence (Y/N):	N
Soil temperature (F):	62
Soil moisture:	Moist
% cloud cover	20

General study notes: Spearmint emergence was poor in this portion of the field and the trial was abandoned by the end of May.

Summary comments: Spearmint was cultivated and herbicides were applied to dormant mint. However, injury from Callisto was severe at all rates.

Evaluation of potential new herbicides in spearmint
Trial ID: 06-10
Location: Janesville, WI Investigator: Jed Colquhoun

Pest Code						AMARE
Pest Name						Pigweed
Crop Name					Spearmint	
Rating Date					5/17/2006	5/17/2006
Rating Data Type					Injury	Control
Rating Unit					%	%
Crop Stage					Em	2lf
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code		
1	nontreated check				0	0
2	Chateau	0.125	lb ai/a	A	0	90
3	Callisto	0.09375	lb ai/a	A	20	96.7
4	Callisto	0.1875	lb ai/a	A	38.3	93.3
5	Callisto	0.3	lb ai/a	A	56.7	96.7
6	Prowl H20	2	lb ai/a	A	0	90
LSD (P=.05)					8.6	11.7

Title:	Evaluation of potential new herbicides in spearmint on muck
Trial ID:	Trial 06-08
Location:	Portage, WI

Plot information:

Exp. Design:	RCB
Plot size:	6 by 20 ft
Replications:	3
Soil type:	Muck
Crop variety:	Spearmint

Herbicide application:

Timing:	A
Application date:	4/13/2006
Application timing:	Dormant mint, post-tillage, pre-emergence
Applied by:	Colquhoun
Equipment:	CO2 Backpack, 20 GPA
Air temperature (F):	74
% Relative humidity:	36
Wind velocity (mph):	1.5
Wind direction	S
Dew presence (Y/N):	N
Soil temperature (F):	62
Soil moisture:	Moderate
% cloud cover	100

ARM abbreviations:	Fresh wt, hay fresh biomass at harvest; oil, oil yield after distillation
General study notes:	Mint cooked in still at UW-Arlington Horticulture Research Farm
Summary comments:	Minimal crop injury observed at all Callisto rates. Spearmint was cultivated immediately prior to application, thus ensuring crop dormancy and lack of re-growth. Spearmint field was generally weak in spring re-growth.

Evaluation of potential new herbicides in spearmint
Trial ID: 06-08
Location: Portage, WI Investigator: Jed Colquhoun

Rating Date				5/4/2006	5/17/2006	7/13/2006	7/13/2006
Rating Data Type				injury	injury	fresh wt	oil
Rating Unit				%	%	lb/A	lb/A
Crop Stage				Em-4 in	Em-6 in		
Trt No.	Treatment Name	Rate	Rate Unit				
1	nontreated check			0	0	17734	28.4
2	Chateau	0.125	lb ai/a	0	0	16572	33
3	Callisto	0.09375	lb ai/a	0	0	20367	26.9
4	Callisto	0.1875	lb ai/a	1.7	0	20173	36.8
5	Callisto	0.3	lb ai/a	3.3	0	15798	26.1
LSD (P=.05)				5.3	0	4882	18.9

LINGONBERRY MESOTRIONE HERBICIDE EVALUATION - HANCOCK - 2006

Daniel J. Heider and Jed B. Colquhoun

Plot Information:

Location: Hancock Ag Research Station
Soil Type: Plainfield Loamy Sand; pH 5.5; OM 0.8%.
Variety: 'Red Pearl'
Date Planted: Established 2005
Row Spacing: 36 Inches, 2 rows/plot
Plant Spacing: 24 Inches
Date Harvested: Not Harvested (takes several years of establishment to produce sufficient quantity to harvest)
Plot Size-Design: 6' x 20', 3 Reps
Rating Dates: 5/12/06, 5/19/06, 5/30/06, 6/7/06, 6/14/06, 7/3/06

Application Equipment: Backpack CO2 sprayer. GPA 20, PSI 27, MPH 3.3,
Nozzle - XR8003VS, Nozzle spacing 18", Height 18".

Incorporation Equipment: N/A

Herbicide Application Data:

Date	4/27/06	5/30/06
Time	7:30 am	9:00 am
Treatment	PREPRE	POST
Soil Moisture		
SF	dry	dry
1"	moist	moist
3"	moist	moist
Soil Temp (F^o)		
SF	52.0	79.2
3"	46.0	72.4
Air Temp (F^o)	53.1	74.2
Wind (MPH)	1-3 W	3-4 NW
%RH	41%	54%
Sky Condition	sunny	p. sunny
Crop Stage	Dormant	6-10"
Weed & Size	-----	COLQ 2-3"
	-----	CORW 1-2"
	-----	LACG 1"

Trial Summary: Lingonberry crop tolerance to mesotrione was excellent at all rates in this trial. No injury (0 %) was observed at the 3 or 6 fl oz/a rate applied either to a dormant crop or as a split treatment to domant crop followed by post-emergence application to the crop. Weed ratings were not taken, since crop tolerance was the only objective of this trial.

Fertilization and other pesticides: none
Irrigation: not available at this time

Weed Abbreviations:	Plot Weed Density:
COLQ = Common Lambsquarters	Moderate
CORW = Common Ragweed	Moderate
LACG = Large Crabgrass	Moderate

B. Colorado Potato Beetle Control with Soil Insecticides, Hancock.

Snowden variety potatoes were planted on 26 April 2006 into plots consisting of 4 x 20' rows, replicated four times in a randomized block experimental design. Rows were planted on 3' centers with 12 inch plant spacing. Treatments were separated by two untreated border rows (Snowden variety) to provide continual infestation while 15' alleys separated replicates.

Fourteen treatments were evaluated for Colorado potato beetle, potato leafhopper and aphid control:

Imidacloprid was evaluated in furrow and as seed treatments. Admire 2SC was evaluated as a seed piece spray (0.64 oz/cwt) over fungicide treated seed (Tops MZ 8.5DS at the rate of 12 oz./cwt.). Admire Pro 4.6SC was evaluated as a seed piece spray at 0.17 and 0.35 fl. oz./cwt. in combination with Tops MZ 8.5DS (12 oz./cwt.).

Thiamethoxam was evaluated as in furrow and seed treatments. Platinum 2SC was evaluated in furrow at 5.0, 6.5 and 8 fl. oz./a over fungicide treated seed (Maxim 5FS at the rate of 0.04 fl. oz./cwt.). Cruiser 5FS was evaluated as a seed treatment (0.10, 0.13 and 0.16 fl. oz./cwt.) in combination with Maxim 5FS (0.04 fl. oz./cwt.). Thiamethoxam was also evaluated as a seed treatment in a experimental formulation (A14382) at the rates of 0.17, 0.22 and 0.27 fl. oz./cwt.

In furrow insecticides were applied in a 4-6" band over suberized seed pieces using a CO_2 pressurized back pack sprayer with a single hollow cone nozzle (TXVS-6) delivering 5 gpa at 30 psi. Dust seed piece treatments were applied by adding preweighed dry formulation materials to preweighed, cut and suberized potato seed pieces in plastic bags. Bags were shaken thoroughly and seed pieces were hand placed (12" spacing) into open furrows and covered by hilling.

Colorado potato beetle (CPB) populations were surveyed weekly from 5 June through 7 August by counting CPB life stages (adults, egg masses, small and large larvae) on ten plants randomly selected from the center two rows of each plot. Damage was recorded weekly by estimating percent defoliation of each plot. Potato leafhopper adults and aphids were surveyed weekly from 12 June through 31 July by sweep sampling (25 sweeps per plot). Potato leafhopper nymph, green peach aphid and potato aphids were also surveyed weekly from 12 June through 31 July but by leaf sampling (25 leaves per plot). Hopperburn ratings were generated from visual observations of each plot and determining the level of "burn" on a scale of 0-5 with 0 having no damage to 5 where all of the leaf foliage is necrotic.

Plots were overhead irrigated with 0.5" water every 2-5 days from plant emergence to vine kill.

Plots were vine killed on 11 August (Reglone 1 pt./a) and a single row from the center two rows (20') was harvested and graded for yield on 25 August 2005. Plot maintenance was conducted by Hancock Agriculture Research Station personnel and was per commercial production.

Results

Colorado potato beetle adult numbers (first generation) peaked in the study on 12 June while oviposition peaked in the untreated plots on 5 June with an average of 14.25 egg masses per 10 plants (Tables 1 and 2). Egg mass numbers declined during late June and few were detected during July. Overwintered adult numbers declined in the untreated plots after 12 June but second generation adult numbers began increasing in the plots by 10 July. Adults were distributed among all the treatments during peak infestations (1st and 2nd generations), reflecting their mobility and movement among the plots. Egg masses were also evenly distributed among the treatments. Egg laying continued in the plots through 31 July but peak numbers were observed during June.

Small larval numbers peaked in the untreated plots between 47-53 days after planting (dap) from 12 June to 19 June (Table 3). Large larval numbers peaked 7 day later in the untreated plots (26 June) at 118.3 larvae per plot (Table 4). Large larval numbers remained elevated in the plots through 10 July (74 dap). Defoliation from first generation larvae peaked at 80% in the untreated plots on 3 July while second generation adult and large larval feeding resulted in 100% defoliation by 25 July (Table 5).

Platinum provided good CPB control in this study (Tables 1-5). In furrow applications of Platinum provided effective larval control through 17 July (81 dap). The experimental compound A14382 at the high rate (0.23 fl. oz./a) also provided good CPB control through 17 July with only 5.0% defoliation.

Historically in our trials seed treatments with nicotinoids generally exhibit 7-10 days less persistence when compared to similar in furrow treatments. In 2006 the seed treatments performed as well as the in furrow treatments. Admire 2SC, Admire Pro 4.62SC and Cruiser provided good small and large larval control through 81 dap (Tables 3 and 4) and treatments held defoliation close to 0% through 74 dap.

Yields typically reflect the amount of damage from Colorado potato beetle and total yields from the plots ranged from 51.4 cwt. per acre in the untreated plots to 354.4 cwt. per acre in the Cruiser (0.16 oz./cwt.) plots (Table 6). Yields among the treatments ranged from 247.7 to 354.4 cwt/a with the Cruiser seed piece treatments producing the highest yields.

Potato leafhopper adult numbers were low in this study during the 2006 growing season (Table 7). Adult numbers peaked in the untreated plots on 22 June at 0.44 adults per sweep and numbers declined during July. Adult numbers were low and variable among the treatments.

Peak potato leafhopper nymph hatch occurred in the untreated plots during early July with a peak of 4.0 nymphs per 25 leaves occurring on 12 July (Table 9). All of the nicotinyls evaluated provided good season long nymph control.

Hopperburn ratings were initiated on 12 July and ranged from 2.5 to 3.0 among the untreated plots (Table 9). Feeding pressure from CPB's and leafhoppers were high enough in the trial to kill the untreated plots during mid to late July.

Green peach and potato aphid numbers were very low in the trial during the 2006 growing season (Tables 10-12). Aphids were found early during sampling (13 June) but populations remained low through July. Numbers were so low even among the untreated plots that no conclusions about efficacy can be made.

Table 1. Colorado potato beetle adults sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean adults per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	5.3 a	3.3 def	0.0 d	0.0 b	0.0 a	20.3 ab	19.9 bcd	7.0 e	*	*
Cruiser 5FS[1]	S	0.10	5.8 a	9.5 abc	5.0 a	4.8 a	1.3 a	5.5 bcd	16.3 abc	39.0 cd	8.3 de	2.3 cd
Cruiser 5FS[1]	S	0.13	4.3 a	3.5 def	4.3 ab	3.0 a	0.0 a	2.0 d	6.0 cd	48.8 bcd	13.3 a-d	11.7 abc
Cruiser 5FS[1]	S	0.16	1.0 a	4.3 c-f	0.3 cd	3.0 a	1.3 a	3.8 cd	8.5 cd	68.0 ab	21.5 ab	8.5 abc
A14382 2FS[1]	S	0.17	3.5 a	2.0 ef	3.3 a-d	2.8 a	1.5 a	1.8 d	6.5 d	54.3 a-d	20.0 abc	12.0 ab
A14382 2FS	S	0.22	3.5 a	3.5 def	2.5 a-d	5.8 a	1.5 a	6.0 bcd	21.5 ab	44.0 bcd	16.8 a-d	7.3 abc
A14382 2FS	S	0.27	2.3 a	3.5 def	3 abc	4.3 a	0.8 a	2.8 d	10.3 bcd	60.3 abc	12.8 a-d	18.3 a
AdmirePro 4.6SC[2]	S	0.17	4.5 a	4.8 def	5.8 a	4.3 a	0.8 a	10.5 abc	20.5 ab	40.5 cd	8.3 d	8.5 bcd
AdmirePro 4.6SC[2]	S	0.35	2.0 a	3.5 def	2.5 a-d	2.5 a	2.8 a	6.8 bcd	27.0 a	67.3 ab	13 a-d	14.8 a
Admire 2F[2]	S	0.64	5.3 a	3.3 def	0.0 d	0.0 b	0.0 a	20.3 ab	19.9 bcd	7.0 e	*	*
Platinum 2SC[1]	F	5.0 oz./a	5.8 a	9.5 abc	5.0 a	4.8 a	1.3 a	5.5 bcd	16.3 abc	39.0 cd	8.3 de	2.3 cd
Platinum 2SC[1]	F	6.5 oz./a	4.3 a	3.5 def	4.3 ab	3.0 a	0.0 a	2.0 d	6.0 cd	48.8 bcd	13.3 a-d	11.7 abc
Platinum 2SC[1]	F	8.0 oz./a	1.0 a	4.3 c-f	0.3 cd	3.0 a	1.3 a	3.8 cd	8.5 cd	68.0 ab	21.5 ab	8.5 abc
Control[1]	---	---	3.5 a	2.0 ef	3.3 a-d	2.8 a	1.5 a	1.8 d	6.5 d	*	*	*
LSD			0.75	0.83	0.93	0.83	0.59	1.46	1.51	1.63	1.47	1.63
S.D.			0.53	0.58	0.65	0.58	0.42	1.02	1.05	1.14	1.03	1.14
C.V.			24.76	24.35	34.2	29.71	28.49	42.89	29.44	17.55	29.95	41.09
F			1.881	4.766	2.098	2.428	1.57	2.405	2.133	17.534	5.204	3.602
Prob (F)			0.064	0.0001	0.0373	0.0163	0.1365	0.0173	0.0341	0.0001	0.0001	0.0009

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 2. Colorado potato beetle egg masses sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean egg masses per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	15.0 a	6.0 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.1 a	0.0 a	*	*
Cruiser 5FS[1]	S	0.10	2.3 b	2.8 a-d	2.8 a	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	1.8 b	2.0 cde	0.8 a	1.0 a	0.3 a	0.0 a	0.0 a	0.3 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	1.8 b	1.0 cde	0.0 a	0.3 a	0.3 a	0.0 a	0.3 a	0.3 a	2.3 a	0.0 a
A14382 2FS[1]	S	0.17	0.8 b	0.5 de	0.5 a	0.0 a	0.0 a	0.3 a	0.3 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	1.3 b	0.3 e	0.0 a	0.8 a	0.0 a	0.0 a	0.5 a	0.0 a	1.0 a	0.0 a
A14382 2FS	S	0.27	1.3 b	1.5 cde	0.0 a	0.8 a	0.0 a	0.3 a	0.3 a	0.0 a	0.8 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	1.3 b	2.0 b-e	1.3 a	1.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.35	1.0 b	1.0 cde	1.0 a	1.0 a	0.3 a	0.0 a	0.0 a	0.3 a	1.0 a	0.0 a
Admire 2F[2]	S	0.64	1.3 b	0.5 de	0.0 a	1.3 a	0.0 a	0.3 a	0.8 a	0.0 a	*	*
Platinum 2SC[1]	F	5.0 oz./a	0.3 b	5.0 abc	1.3 a	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	1.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	1.8 b	5.8 a	2.5 a	0.8 a	0.0 a	0.0 a	0.0 a	0.0 a	0.5 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	1.5 b	0.5 de	1.5 a	0.5 a	0.3 a	0.0 a	0.0 a	0.3 a	0.8 a	0.0 a
Control[1]	---	---	13.5 a	4.5 abc	1.0 a	0.0 a	0.0 a	0.0 a	0.0 a	*	*	*
LSD			0.7	0.8	0.64	0.36	0.15	0.14	0.21	0.16	0.61	0.00
S.D.			0.49	0.56	0.45	0.25	0.11	0.1	0.14	0.11	0.42	0.00
C.V.			27.22	33.3	34.81	20.24	10.33	9.62	13.71	10.89	36.13	0.000
F			12.753	2.943	1.553	1.712	0.833	0.805	1.625	0.75	0.698	0.000
Prob (F)			0.0001	0.0046	0.1421	0.097	0.6241	0.6515	0.1196	0.7044	0.7534	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 3. Colorado potato beetle small larvae sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean small larvae per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	6.8 a	66.0 a	59.0 a	32.0 abc	1.0 a	0.4 e	0.0 a	0.0 a	*	*
Cruiser 5FS[1]	S	0.10	0.0 b	0.3 b	1.0 b	18.5 a-d	16.8 a	7.3 ab	0.0 a	0.0 a	4.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 b	0.0 b	1.0 b	8.5 b-f	10.3 a	4.3 b-e	0.0 a	0.0 a	9.8 a	4.3 a
Cruiser 5FS[1]	S	0.16	0.0 b	0.0 b	1.0 b	0.0 f	2.0 a	0.3 de	0.0 a	0.0 a	10.3 a	8.3 a
A14382 2FS[1]	S	0.17	0.0 b	0.0 b	0.5 b	3.0 def	7.8 a	4.0 bcd	0.0 a	0.0 a	8.8 a	0.8 a
A14382 2FS	S	0.22	0.0 b	0.0 b	0.0 b	3.5 c-f	10.5 a	3.5 b-e	0.0 a	0.0 a	7.3 a	0.0 a
A14382 2FS	S	0.27	0.0 b	0.0 b	0.0 b	4.5 b-f	7.0 a	3.3 b-e	0.0 a	0.0 a	10.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 b	0.0 b	0.0 b	8.3 b-f	19.5 a	10.8 a	0.0 a	0.0 a	0.0 a	4.0 a
AdmirePro 4.6SC[2]	S	0.35	0.0 b	0.0 b	0.8 b	0.3 f	1.8 a	1.5 cde	0.0 a	0.0 a	5.5 a	4.5 a
Admire 2F[2]	S	0.64	0.0 b	0.0 b	0.0 b	1.5 ef	11.8 a	7.8 abc	0.0 a	0.0 a	*	*
Platinum 2SC[1]	F	5.0 oz./a	0.0 b	0.8 b	10.8 b	27.3 ab	12.5 a	3.8 b-e	0.0 a	0.0 a	6.8 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 b	0.0 b	2.3 b	40.5 a	9.5 a	7.0 ab	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 b	0.0 b	0.0 b	13.5 b-e	9.3 a	0.3 de	0.0 a	0.0 a	3.0 a	0.0 a
Control[1]	---	---	0.8 b	45.0 a	92.3 a	21.5 abc	0.5 a	0.0 e	0.0 a	*	*	*
LSD			0.64	1.92	3.00	2.49	1.96	1.06	0.00	0.00	1.97	1.23
S.D.			0.45	1.34	2.10	1.74	1.37	0.74	0.00	0.00	1.38	0.86
C.V.			40.09	72.84	95.89	57.76	51.99	38.54	0.00	0.00	69.24	65.02
F			2.805	9.82	4.787	3.181	1.734	4.042	0.000	0.000	1.259	1.226
Prob (F)			0.0064	0.0001	0.0001	0.0026	0.092	0.0003	1.0000	1.0000	0.2784	0.2984

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 4. Colorado potato beetle large larvae sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean large larvae per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	0.0 a	2.5 a	81.0 a	118.3 a	30.5 a-d	2.1 e	0.4 d	0.0 a	*	*
Cruiser 5FS[1]	S	0.10	0.0 a	0.0 b	1.5 c	8.5 bc	41.0 ab	27.8 a	4.0 bc	1.8 a	0.0 a	10.3 a
Cruiser 5FS[1]	S	0.13	0.3 a	0.0 b	0.0 c	4.5 bc	21.0 b-e	13.0 bcd	2.3 bcd	0.0 a	4.5 a	23.7 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.0 b	0.5 c	0.8 c	2.8 f	3.0 e	2.5 bcd	0.3 a	1.5 a	16.5 a
A14382 2FS[1]	S	0.17	0.0 a	0.0 b	0.0 c	0.3 c	14.8 c-f	9.0 cde	1.8 cd	0.0 a	4.8 a	11.3 a
A14382 2FS	S	0.22	0.0 a	0.0 b	0.0 c	3.0 bc	10.3 def	7.5 cde	0.3 d	4.3 a	5.3 a	8.3 a
A14382 2FS	S	0.27	0.0 a	0.0 b	0.0 c	3.5 bc	11.0 def	6.8 de	0.3 d	0.0 a	5.3 a	3.3 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 b	0.0 c	2.5 bc	34.8 abc	21.3 ab	6.0 ab	3.3 a	0.0 a	14.5 a
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 b	0.0 c	0.0 c	3.0 f	5.0 de	4.3 abc	1.0 a	5.5 a	5.8 a
Admire 2F[2]	S	0.64	0.0 a	0.0 b	0.0 c	0.0 c	7.5 ef	12.5 bcd	8.5 a	2.0 a	*	*
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 b	2.5 c	13.8 bc	35.0 a-d	21.0 abc	1.8 cd	0.0 a	6.8 a	4.5 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 b	0.0 c	18.5 b	36.8 abc	20.3 ab	1.8 cd	0.0 a	2.0 a	5.3 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 b	0.5 c	0.8 c	11.3 def	3.8 e	0.0 d	0.0 a	0.8 a	0.0 a
Control[1]	---	---	0.0 a	2.3 a	51.8 b	117.8 a	54.8 a	3.5 e	0.6 d	*	*	*
LSD			0.08	0.39	1.25	2.89	2.24	1.49	0.86	0.86	1.43	2.22
S.D.			0.06	0.27	0.87	2.02	1.57	1.04	0.6	0.6	1.00	1.55
C.V.			5.49	24.62	41.47	64.86	36.39	32.91	36.46	48.99	58.17	68.09
F			1.000	3.874	33.116	9.464	4.819	5.133	4.227	1.147	1.467	1.463
Prob (F)			0.4698	0.0005	0.0001	0.0001	0.0001	0.0001	0.0002	0.3525	0.1741	0.1757

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 5. Percent defoliation ratings from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean defoliation ratings per plot									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	0.0 a	1.3 a	15.0 a	50.0 a	73.8 a	83.8 a	95.0 a	98.8 a	100.0 a	100.0 a
Cruiser 5FS[1]	S	0.10	0.0 a	0.0 a	0.0 c	0.0 b	8.8 bcd	12.5 b	23.8 b	45.0 b-e	88.8 abc	98.8 ab
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 a	0.0 c	0.0 b	3.8 bcd	5.0 bcd	7.5 cd	21.3 ef	58.8 de	90.0 abc
Cruiser 5FS[1]	S	0.16	0.0 a	0.0 a	0.0 c	0.0 b	0.0 d	0.0 d	5.0 d	18.8 f	53.8 de	75.0 d
A14382 2FS[1]	S	0.17	0.0 a	0.0 a	0.0 c	0.0 b	1.3 d	2.5 cd	6.3 cd	26.3 def	57.5 de	90.0 abc
A14382 2FS	S	0.22	0.0 a	0.0 a	0.0 c	0.0 b	2.5 cd	2.5 cd	13.8 bcd	67.5 b	77.5 a-d	95.0 abc
A14382 2FS	S	0.27	0.0 a	0.0 a	0.0 c	0.0 b	1.3 d	0.0 d	5.0 d	31.3 c-f	50.0 de	82.5 cd
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 a	0.0 c	0.0 b	3.8 bcd	10.0 bc	25.0 b	67.5 b	92.5 ab	97.5 ab
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 a	0.0 c	0.0 b	0.0 d	1.3 cd	12.5 bcd	51.3 bcd	77.5 a-d	88.8 abc
Admire 2F[2]	S	0.64	0.0 a	0.0 a	0.0 c	0.0 b	0.0 d	2.5 cd	8.8 cd	28.8 c-f	42.5 e	86.3 bcd
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 a	0.0 c	3.8 b	16.3 b	8.8 bcd	18.8 bc	52.5 bc	70.0 b-e	91.3 abc
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 a	0.0 c	3.8 b	15.0 bc	13.8 b	18.8 bc	47.5 bcd	60.0 cde	92.5 abc
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 a	0.0 c	0.0 b	3.8 bcd	0.0 d	7.5 cd	47.5 bcd	78.8 a-d	92.5 abc
Control[1]	---	---	0.0 a	1.3 a	11.3 b	47.5 a	80.0 a	82.5 a	92.5 a	100.0 a	100.0 a	100.0 a
LSD			0.00	1.3	2.44	11.43	13.05	9.06	13.16	25.57	29.21	13.73
S.D.			0.00	0.91	1.71	8.00	9.13	6.34	9.21	17.89	20.44	9.61
C.V.			0.00	508.39	91.12	106.64	60.86	39.45	37.93	35.6	28.41	10.51
F			0.000	1.000	31.871	19.226	34.362	82.442	42.937	8.364	3.384	2.134
Prob (F)			1.0000	0.4697	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0016	0.0341

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application..

Table 6. Yields from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	%Grade A	%Grade B	Yield (cwt/A)
Untreated	---	---	35.7 d	50.2 a	51.4 c
Cruiser 5FS[1]	S	0.10	77.3 abc	12.1 c	273.0 ab
Cruiser 5FS[1]	S	0.13	88.9 a	7.4 c	353.0 a
Cruiser 5FS[1]	S	0.16	88.7 a	7.2 c	354.4 a
A14382 2FS[1]	S	0.17	87.7 a	8.1 c	345.8 ab
A14382 2FS	S	0.22	82.6 ab	13.3 c	310.8 ab
A14382 2FS	S	0.27	88.3 a	5.0 c	345.8 ab
AdmirePro 4.6SC[2]	S	0.17	73.2 abc	12.9 c	262.7 ab
AdmirePro 4.6SC[2]	S	0.35	77.2 abc	9.3 c	278.3 ab
Admire 2F[2]	S	0.64	76.3 abc	9.0 c	328.2 ab
Platinum 2SC[1]	F	5.0 oz./a	75.3 abc	8.1 c	296.7 ab
Platinum 2SC[1]	F	6.5 oz./a	63.8 bc	10.1 c	247.7 b
Platinum 2SC[1]	F	8.0 oz./a	80.0 ab	8.8 c	314.2 ab
Control[1]	---	---	58.0 c	34.1 b	83.3 c
LSD			19.44	10.43	99.74
S.D.			13.61	7.3	69.79
C.V.			18.09	52.24	25.41
F			4.619	11.855	7.34
Prob. (F)			0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application

Table 7. Potato leafhopper adults sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean adults per 25 sweeps							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.5 a	8.0 a	6.3 a	5.0 a	4.5 b-e	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.8 a	8.5 a	7.5 a	4.5 a	1.8 b-e	0.0 c	1.0 cd	1.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	6.3 a	7.5 a	1.3 a	0.8 de	1.3 bc	1.0 cd	0.0 a
Cruiser 5FS[1]	S	0.16	0.3 a	4.0 a	4.3 a	3 a	0.8 de	1.8 ab	2.5 a	0.7 a
A14382 2FS[1]	S	0.17	0.0 a	5.8 a	3.5 a	2.0 a	2.5 bcd	0.3 c	1.0 cd	1.0 a
A14382 2FS	S	0.22	0.0 a	5.0 a	3.8 a	2.8 a	3.0 abc	0.5 bc	0.5 cd	3.0 a
A14382 2FS	S	0.27	0.3 a	4.5 a	6.0 a	3.5 a	0.5 e	3.0 a	0.5 cd	1.0 a
AdmirePro 4.6SC[2]	S	0.17	0.3 a	4.0 a	9.0 a	2.3 a	5.3 a	1.3 bc	0.9 cd	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	4.5 a	6.8 a	4.8 a	4.0 ab	0.5 bc	1.3 bc	1.0 a
Admire 2F[2]	S	0.64	0.0 a	4.3 a	5.0 a	5.8 a	1.3 cde	0.8 bc	1.3 abc	1.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.3 a	6.0 a	3.8 a	3.3 a	0.8 de	0.0 c	1.3 abc	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.5 a	6.8 a	6.0 a	2.0 a	1.8 b-e	1.8 ab	1.0 cd	1.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.5 a	7.5 a	5.0 a	1.8 a	1.5 cde	0.8 bc	2.3 ab	0.3 a
Control[1]	---	---	0.0 a	11.0 a	7.5 a	2.5 a	3.0 cde	✳	✳	✳
LSD			0.33	1.01	0.93	0.78	0.59	0.44	0.41	0.39
S.D.			0.23	0.71	0.65	0.55	0.42	0.31	0.29	0.27
C.V.			21.05	27.63	25.69	29.09	25.24	23.79	20.89	23.13
F			0.666	1.101	0.98	1.501	3.155	3.591	2.982	1.395
Prob (F)			0.7822	0.3867	0.4875	0.1608	0.0027	0.001	0.0041	0.2054

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 8. Potato leafhopper nymphs sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean nymphs per 25 leaves							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.0 a	0.5 a	0.8 b	3.5 a	2.5 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.0 a	0.3 a	0.5 bc	0.0 b	0.0 a	0.0 a	0.5 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.3 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.3 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 a	0.0 c	0.3 b	0.3 a	0.0 a	0.3 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.5 a	0.0 a
Admire 2F[2]	S	0.64	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 a	0.0 c	0.3 b	0.0 a	0.0 a	0.8 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.3 a	0.0 c	0.0 b	0.0 a	0.5 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.0 a	1.0 a	2.5 a	3.5 a	4.0 a	✳	✳	✳
LSD			0.00	0.27	0.24	0.39	0.48	0.16	0.27	0.00
S.D.			0.00	0.19	0.17	0.27	0.34	0.11	0.19	0.00
C.V.			0.00	17.89	15.61	24.78	31.44	11.13	17.74	0.00
F			0.000	1.192	7.459	2.13	0.887	0.914	0.971	0.000
Prob (F)			1.0000	0.321	0.0001	0.0344	0.5732	0.5474	0.4956	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 9. Hopperburn ratings from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean hopperburn per plot			
			12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	3 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.8 bcd	1.5 a	1.5 a	2.0 a
Cruiser 5FS[1]	S	0.13	0.8 bcd	1.3 a	1.5 a	0.7 bc
Cruiser 5FS[1]	S	0.16	0.3 de	0.3 a	1.0 a	0.3 c
A14382 2FS[1]	S	0.17	0.3 de	0.8 a	1.8 a	1.0 abc
A14382 2FS	S	0.22	0.3 de	1.8 a	1.0 a	2.0 a
A14382 2FS	S	0.27	0.0 e	1.0 a	1.3 a	1.0 abc
AdmirePro 4.6SC[2]	S	0.17	1.3 b	2.3 a	1.6 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.8 bcd	1.8 a	1.3 a	0.3 c
Admire 2F[2]	S	0.64	0.5 cde	1.3 a	1.5 a	1.5 ab
Platinum 2SC[1]	F	5.0 oz./a	1.0 bc	1.8 a	1.3 a	1.0 abc
Platinum 2SC[1]	F	6.5 oz./a	0.8 bcd	2.0 a	1.3 a	1.7 ab
Platinum 2SC[1]	F	8.0 oz./a	0.3 de	0.5 a	1.3 a	0.7 bc
Control[1]	---	---	2.5 a	✳	✳	✳
LSD			0.67	1.41	0.89	1.06
S.D.			0.46	0.98	0.62	0.71
C.V.			52.97	73.28	46.31	64.25
F			14.101	1.587	0.535	2.916
Prob. (F)			0.0001	0.1486	0.8646	0.0252

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application,
✳Plots are dead

Table 10. Aphids sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean aphids per 25 sweeps							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.0 a	0.0 a	1.0 a	0.0 a	0.0 b	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.3 a	0.0 a	0.8 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.3 a	0.3 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 a	0.0 a	0.3 a	0.0 a	0.8 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 a	0.0 a	0.5 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 a	1.3 a	0.0 a	0.0 b	0.0 a	0.0 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Admire 2F[2]	S	0.64	0.0 a	0.0 a	0.3 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 a	0.0 a	0.0 a	0 b	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.3 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.0 a	0.5 a	1.0 a	0.0 a	0.0 b	✳	✳	✳
LSD			0.08	0.16	0.4	0.00	0.08	0.08	0.00	0.00
S.D.			0.06	0.11	0.28	0.00	0.06	0.06	0.00	0.00
C.V.			5.49	11.13	24.66	0.00	5.41	5.49	0.00	0.00
F			1.000	0.914	1.225	0.000	9.001	1	0.000	0.000
Prob (F)			0.4698	0.5474	0.2992	1.0000	0.0001	0.4698	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 11. Potato aphids sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean aphids per 25 leaves							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.0 b	2.3 ab	2.8 a	1.0 a	0.5 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.0 b	0.3 c	0.5 bc	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 b	0.0 c	0.0 c	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 b	0.8 bc	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.8 a	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Admire 2F[2]	S	0.64	0.0 b	0.0 c	0.5 bc	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.3 b	0.0 c	0.3 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.3 b	0.0 c	0.3 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.3 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.3 b	3.3 a	1.5 ab	0.0 a	0.0 a	✳	✳	✳
LSD			0.18	0.51	0.43	0.16	0.08	0.00	0.00	0.00
S.D.			0.12	0.35	0.3	0.11	0.06	0.00	0.00	0.00
C.V.			11.65	31.09	26.55	11.13	5.49	0.00	0.00	0.00
F			2.089	2.716	2.53	0.914	1.000	0.000	0.000	0.000
Prob (F)			0.0382	0.008	0.0126	0.5473	0.4698	1.0000	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 12. Green peach aphids sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean aphids per 25 leaves							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.3 a	1.0 b	0.5 a	0.0 a	0.0 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 b	0.3 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 a	0.8 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Admire 2F[2]	S	0.64	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.3 a	2.8 a	0.0 b	0.0 a	0.0 a	✳	✳	✳
LSD			0.11	0.38	0.12	0.00	0.00	0.00	0.00	0.00
S.D.			0.08	0.27	0.08	0.00	0.00	0.00	0.00	0.00
C.V.			7.41	23.66	8.09	0.00	0.00	0.00	0.00	0.00
F			1.000	3.194	2.103	0.000	0.000	0.000	0.000	0.000
Prob (F)			0.4698	0.0025	0.0368	1.0000	1.0000	1.0000	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

B. Colorado Potato Beetle Control with Soil Insecticides, Hancock.

Snowden variety potatoes were planted on 26 April 2006 into plots consisting of 4 x 20' rows, replicated four times in a randomized block experimental design. Rows were planted on 3' centers with 12 inch plant spacing. Treatments were separated by two untreated border rows (Snowden variety) to provide continual infestation while 15' alleys separated replicates.

Fourteen treatments were evaluated for Colorado potato beetle, potato leafhopper and aphid control:

Imidacloprid was evaluated in furrow and as seed treatments. Admire 2SC was evaluated as a seed piece spray (0.64 oz/cwt) over fungicide treated seed (Tops MZ 8.5DS at the rate of 12 oz./cwt.). Admire Pro 4.6SC was evaluated as a seed piece spray at 0.17 and 0.35 fl. oz./cwt. in combination with Tops MZ 8.5DS (12 oz./cwt.).

Thiamethoxam was evaluated as in furrow and seed treatments. Platinum 2SC was evaluated in furrow at 5.0, 6.5 and 8 fl. oz./a over fungicide treated seed (Maxim 5FS at the rate of 0.04 fl. oz./cwt.). Cruiser 5FS was evaluated as a seed treatment (0.10, 0.13 and 0.16 fl. oz./cwt.) in combination with Maxim 5FS (0.04 fl. oz./cwt.). Thiamethoxam was also evaluated as a seed treatment in a experimental formulation (A14382) at the rates of 0.17, 0.22 and 0.27 fl. oz./cwt.

In furrow insecticides were applied in a 4-6" band over suberized seed pieces using a CO_2 pressurized back pack sprayer with a single hollow cone nozzle (TXVS-6) delivering 5 gpa at 30 psi. Dust seed piece treatments were applied by adding preweighed dry formulation materials to preweighed, cut and suberized potato seed pieces in plastic bags. Bags were shaken thoroughly and seed pieces were hand placed (12" spacing) into open furrows and covered by hilling.

Colorado potato beetle (CPB) populations were surveyed weekly from 5 June through 7 August by counting CPB life stages (adults, egg masses, small and large larvae) on ten plants randomly selected from the center two rows of each plot. Damage was recorded weekly by estimating percent defoliation of each plot. Potato leafhopper adults and aphids were surveyed weekly from 12 June through 31 July by sweep sampling (25 sweeps per plot). Potato leafhopper nymph, green peach aphid and potato aphids were also surveyed weekly from 12 June through 31 July but by leaf sampling (25 leaves per plot). Hopperburn ratings were generated from visual observations of each plot and determining the level of "burn" on a scale of 0-5 with 0 having no damage to 5 where all of the leaf foliage is necrotic.

Plots were overhead irrigated with 0.5" water every 2-5 days from plant emergence to vine kill.

Plots were vine killed on 11 August (Reglone 1 pt./a) and a single row from the center two rows (20') was harvested and graded for yield on 25 August 2005. Plot maintenance was conducted by Hancock Agriculture Research Station personnel and was per commercial production.

Results

Colorado potato beetle adult numbers (first generation) peaked in the study on 12 June while oviposition peaked in the untreated plots on 5 June with an average of 14.25 egg masses per 10 plants (Tables 1 and 2). Egg mass numbers declined during late June and few were detected during July. Overwintered adult numbers declined in the untreated plots after 12 June but second generation adult numbers began increasing in the plots by 10 July. Adults were distributed among all the treatments during peak infestations (1^{st} and 2^{nd} generations), reflecting their mobility and movement among the plots. Egg masses were also evenly distributed among the treatments. Egg laying continued in the plots through 31 July but peak numbers were observed during June.

Small larval numbers peaked in the untreated plots between 47-53 days after planting (dap) from 12 June to 19 June (Table 3). Large larval numbers peaked 7 day later in the untreated plots (26 June) at 118.3 larvae per plot (Table 4). Large larval numbers remained elevated in the plots through 10 July (74 dap). Defoliation from first generation larvae peaked at 80% in the untreated plots on 3 July while second generation adult and large larval feeding resulted in 100% defoliation by 25 July (Table 5).

Platinum provided good CPB control in this study (Tables 1-5). In furrow applications of Platinum provided effective larval control through 17 July (81 dap). The experimental compound A14382 at the high rate (0.23 fl. oz./a) also provided good CPB control through 17 July with only 5.0% defoliation.

Historically in our trials seed treatments with nicotinoids generally exhibit 7-10 days less persistence when compared to similar in furrow treatments. In 2006 the seed treatments performed as well as the in furrow treatments. Admire 2SC, Admire Pro 4.62SC and Cruiser provided good small and large larval control through 81 dap (Tables 3 and 4) and treatments held defoliation close to 0% through 74 dap.

Yields typically reflect the amount of damage from Colorado potato beetle and total yields from the plots ranged from 51.4 cwt. per acre in the untreated plots to 354.4 cwt. per acre in the Cruiser (0.16 oz./cwt.) plots (Table 6). Yields among the treatments ranged from 247.7 to 354.4 cwt/a with the Cruiser seed piece treatments producing the highest yields.

Potato leafhopper adult numbers were low in this study during the 2006 growing season (Table 7). Adult numbers peaked in the untreated plots on 22 June at 0.44 adults per sweep and numbers declined during July. Adult numbers were low and variable among the treatments.

Peak potato leafhopper nymph hatch occurred in the untreated plots during early July with a peak of 4.0 nymphs per 25 leaves occurring on 12 July (Table 9). All of the nicotinyls evaluated provided good season long nymph control.

Hopperburn ratings were initiated on 12 July and ranged from 2.5 to 3.0 among the untreated plots (Table 9). Feeding pressure from CPB's and leafhoppers were high enough in the trial to kill the untreated plots during mid to late July.

Green peach and potato aphid numbers were very low in the trial during the 2006 growing season (Tables 10-12). Aphids were found early during sampling (13 June) but populations remained low through July. Numbers were so low even among the untreated plots that no conclusions about efficacy can be made.

Table 1. Colorado potato beetle adults sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean adults per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	5.3 a	3.3 def	0.0 d	0.0 b	0.0 a	20.3 ab	19.9 bcd	7.0 e	*	*
Cruiser 5FS[1]	S	0.10	5.8 a	9.5 abc	5.0 a	4.8 a	1.3 a	5.5 bcd	16.3 abc	39.0 cd	8.3 de	2.3 cd
Cruiser 5FS[1]	S	0.13	4.3 a	3.5 def	4.3 ab	3.0 a	0.0 a	2.0 d	6.0 cd	48.8 bcd	13.3 a-d	11.7 abc
Cruiser 5FS[1]	S	0.16	1.0 a	4.3 c-f	0.3 cd	3.0 a	1.3 a	3.8 cd	8.5 cd	68.0 ab	21.5 ab	8.5 abc
A14382 2FS[1]	S	0.17	3.5 a	2.0 ef	3.3 a-d	2.8 a	1.5 a	1.8 d	6.5 d	54.3 a-d	20.0 abc	12.0 ab
A14382 2FS	S	0.22	3.5 a	3.5 def	2.5 a-d	5.8 a	1.5 a	6.0 bcd	21.5 ab	44.0 bcd	16.8 a-d	7.3 abc
A14382 2FS	S	0.27	2.3 a	3.5 def	3 abc	4.3 a	0.8 a	2.8 d	10.3 bcd	60.3 abc	12.8 a-d	18.3 a
AdmirePro 4.6SC[2]	S	0.17	4.5 a	4.8 def	5.8 a	4.3 a	0.8 a	10.5 abc	20.5 ab	40.5 cd	8.3 d	8.5 bcd
AdmirePro 4.6SC[2]	S	0.35	2.0 a	3.5 def	2.5 a-d	2.5 a	2.8 a	6.8 bcd	27.0 a	67.3 ab	13 a-d	14.8 a
Admire 2F[2]	S	0.64	5.3 a	3.3 def	0.0 d	0.0 b	0.0 a	20.3 ab	19.9 bcd	7.0 e	*	*
Platinum 2SC[1]	F	5.0 oz./a	5.8 a	9.5 abc	5.0 a	4.8 a	1.3 a	5.5 bcd	16.3 abc	39.0 cd	8.3 de	2.3 cd
Platinum 2SC[1]	F	6.5 oz./a	4.3 a	3.5 def	4.3 ab	3.0 a	0.0 a	2.0 d	6.0 cd	48.8 bcd	13.3 a-d	11.7 abc
Platinum 2SC[1]	F	8.0 oz./a	1.0 a	4.3 c-f	0.3 cd	3.0 a	1.3 a	3.8 cd	8.5 cd	68.0 ab	21.5 ab	8.5 abc
Control[1]	---	---	3.5 a	2.0 ef	3.3 a-d	2.8 a	1.5 a	1.8 d	6.5 d	*	*	*
LSD			0.75	0.83	0.93	0.83	0.59	1.46	1.51	1.63	1.47	1.63
S.D.			0.53	0.58	0.65	0.58	0.42	1.02	1.05	1.14	1.03	1.14
C.V.			24.76	24.35	34.2	29.71	28.49	42.89	29.44	17.55	29.95	41.09
F			1.881	4.766	2.098	2.428	1.57	2.405	2.133	17.534	5.204	3.602
Prob (F)			0.064	0.0001	0.0373	0.0163	0.1365	0.0173	0.0341	0.0001	0.0001	0.0009

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 2. Colorado potato beetle egg masses sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean egg masses per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	15.0 a	6.0 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.1 a	0.0 a	✳	✳
Cruiser 5FS[1]	S	0.10	2.3 b	2.8 a-d	2.8 a	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	1.8 b	2.0 cde	0.8 a	1.0 a	0.3 a	0.0 a	0.0 a	0.3 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	1.8 b	1.0 cde	0.0 a	0.3 a	0.3 a	0.0 a	0.3 a	0.3 a	2.3 a	0.0 a
A14382 2FS[1]	S	0.17	0.8 b	0.5 de	0.5 a	0.0 a	0.0 a	0.3 a	0.3 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	1.3 b	0.3 e	0.0 a	0.8 a	0.0 a	0.0 a	0.5 a	0.0 a	1.0 a	0.0 a
A14382 2FS	S	0.27	1.3 b	1.5 cde	0.0 a	0.8 a	0.0 a	0.3 a	0.3 a	0.0 a	0.8 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	1.3 b	2.0 b-e	1.3 a	1.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.35	1.0 b	1.0 cde	1.0 a	1.0 a	0.3 a	0.0 a	0.0 a	0.3 a	1.0 a	0.0 a
Admire 2F[2]	S	0.64	1.3 b	0.5 de	0.0 a	1.3 a	0.0 a	0.3 a	0.8 a	0.0 a	✳	✳
Platinum 2SC[1]	F	5.0 oz./a	0.3 b	5.0 abc	1.3 a	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a	1.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	1.8 b	5.8 a	2.5 a	0.8 a	0.0 a	0.0 a	0.0 a	0.0 a	0.5 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	1.5 b	0.5 de	1.5 a	0.5 a	0.3 a	0.0 a	0.0 a	0.3 a	0.8 a	0.0 a
Control[1]	---	---	13.5 a	4.5 abc	1.0 a	0.0 a	0.0 a	0.0 a	0.0 a	✳	✳	✳
LSD			0.7	0.8	0.64	0.36	0.15	0.14	0.21	0.16	0.61	0.00
S.D.			0.49	0.56	0.45	0.25	0.11	0.1	0.14	0.11	0.42	0.00
C.V.			27.22	33.3	34.81	20.24	10.33	9.62	13.71	10.89	36.13	0.000
F			12.753	2.943	1.553	1.712	0.833	0.805	1.625	0.75	0.698	0.000
Prob (F)			0.0001	0.0046	0.1421	0.097	0.6241	0.6515	0.1196	0.7044	0.7534	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 3. Colorado potato beetle small larvae sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean small larvae per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	6.8 a	66.0 a	59.0 a	32.0 abc	1.0 a	0.4 e	0.0 a	0.0 a	*	*
Cruiser 5FS[1]	S	0.10	0.0 b	0.3 b	1.0 b	18.5 a-d	16.8 a	7.3 ab	0.0 a	0.0 a	4.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 b	0.0 b	1.0 b	8.5 b-f	10.3 a	4.3 b-e	0.0 a	0.0 a	9.8 a	4.3 a
Cruiser 5FS[1]	S	0.16	0.0 b	0.0 b	1.0 b	0.0 f	2.0 a	0.3 de	0.0 a	0.0 a	10.3 a	8.3 a
A14382 2FS[1]	S	0.17	0.0 b	0.0 b	0.5 b	3.0 def	7.8 a	4.0 bcd	0.0 a	0.0 a	8.8 a	0.8 a
A14382 2FS	S	0.22	0.0 b	0.0 b	0.0 b	3.5 c-f	10.5 a	3.5 b-e	0.0 a	0.0 a	7.3 a	0.0 a
A14382 2FS	S	0.27	0.0 b	0.0 b	0.0 b	4.5 b-f	7.0 a	3.3 b-e	0.0 a	0.0 a	10.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 b	0.0 b	0.0 b	8.3 b-f	19.5 a	10.8 a	0.0 a	0.0 a	0.0 a	4.0 a
AdmirePro 4.6SC[2]	S	0.35	0.0 b	0.0 b	0.8 b	0.3 f	1.8 a	1.5 cde	0.0 a	0.0 a	5.5 a	4.5 a
Admire 2F[2]	S	0.64	0.0 b	0.0 b	0.0 b	1.5 ef	11.8 a	7.8 abc	0.0 a	0.0 a	*	*
Platinum 2SC[1]	F	5.0 oz./a	0.0 b	0.8 b	10.8 b	27.3 ab	12.5 a	3.8 b-e	0.0 a	0.0 a	6.8 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 b	0.0 b	2.3 b	40.5 a	9.5 a	7.0 ab	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 b	0.0 b	0.0 b	13.5 b-e	9.3 a	0.3 de	0.0 a	0.0 a	3.0 a	0.0 a
Control[1]	---	---	0.8 b	45.0 a	92.3 a	21.5 abc	0.5 a	0.0 e	0.0 a	*	*	*
LSD			0.64	1.92	3.00	2.49	1.96	1.06	0.00	0.00	1.97	1.23
S.D.			0.45	1.34	2.10	1.74	1.37	0.74	0.00	0.00	1.38	0.86
C.V.			40.09	72.84	95.89	57.76	51.99	38.54	0.00	0.00	69.24	65.02
F			2.805	9.82	4.787	3.181	1.734	4.042	0.000	0.000	1.259	1.226
Prob (F)			0.0064	0.0001	0.0001	0.0026	0.092	0.0003	1.0000	1.0000	0.2784	0.2984

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 4. Colorado potato beetle large larvae sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean large larvae per 10 plants									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	0.0 a	2.5 a	81.0 a	118.3 a	30.5 a-d	2.1 e	0.4 d	0.0 a	*	*
Cruiser 5FS[1]	S	0.10	0.0 a	0.0 b	1.5 c	8.5 bc	41.0 ab	27.8 a	4.0 bc	1.8 a	0.0 a	10.3 a
Cruiser 5FS[1]	S	0.13	0.3 a	0.0 b	0.0 c	4.5 bc	21.0 b-e	13.0 bcd	2.3 bcd	0.0 a	4.5 a	23.7 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.0 b	0.5 c	0.8 c	2.8 f	3.0 e	2.5 bcd	0.3 a	1.5 a	16.5 a
A14382 2FS[1]	S	0.17	0.0 a	0.0 b	0.0 c	0.3 c	14.8 c-f	9.0 cde	1.8 cd	0.0 a	4.8 a	11.3 a
A14382 2FS	S	0.22	0.0 a	0.0 b	0.0 c	3.0 bc	10.3 def	7.5 cde	0.3 d	4.3 a	5.3 a	8.3 a
A14382 2FS	S	0.27	0.0 a	0.0 b	0.0 c	3.5 bc	11.0 def	6.8 de	0.3 d	0.0 a	5.3 a	3.3 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 b	0.0 c	2.5 bc	34.8 abc	21.3 ab	6.0 ab	3.3 a	0.0 a	14.5 a
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 b	0.0 c	0.0 c	3.0 f	5.0 de	4.3 abc	1.0 a	5.5 a	5.8 a
Admire 2F[2]	S	0.64	0.0 a	0.0 b	0.0 c	0.0 c	7.5 ef	12.5 bcd	8.5 a	2.0 a	*	*
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 b	2.5 c	13.8 bc	35.0 a-d	21.0 abc	1.8 cd	0.0 a	6.8 a	4.5 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 b	0.0 c	18.5 b	36.8 abc	20.3 ab	1.8 cd	0.0 a	2.0 a	5.3 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 b	0.5 c	0.8 c	11.3 def	3.8 e	0.0 d	0.0 a	0.8 a	0.0 a
Control[1]	---	---	0.0 a	2.3 a	51.8 b	117.8 a	54.8 a	3.5 e	0.6 d	*	*	*
LSD			0.08	0.39	1.25	2.89	2.24	1.49	0.86	0.86	1.43	2.22
S.D.			0.06	0.27	0.87	2.02	1.57	1.04	0.6	0.6	1.00	1.55
C.V.			5.49	24.62	41.47	64.86	36.39	32.91	36.46	48.99	58.17	68.09
F			1.000	3.874	33.116	9.464	4.819	5.133	4.227	1.147	1.467	1.463
Prob (F)			0.4698	0.0005	0.0001	0.0001	0.0001	0.0001	0.0002	0.3525	0.1741	0.1757

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application.

Table 5. Percent defoliation ratings from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean defoliation ratings per plot									
			5 June (40 dap)	12 June (47 dap)	19 June (53 dap)	26 June (60 dap)	3 July (67 dap)	10 July (74 dap)	17 July (81 dap)	25 July (89 dap)	31 July (95 dap)	7 Aug. (102 dap)
Untreated	---	---	0.0 a	1.3 a	15.0 a	50.0 a	73.8 a	83.8 a	95.0 a	98.8 a	100.0 a	100.0 a
Cruiser 5FS[1]	S	0.10	0.0 a	0.0 a	0.0 c	0.0 b	8.8 bcd	12.5 b	23.8 b	45.0 b-e	88.8 abc	98.8 ab
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 a	0.0 c	0.0 b	3.8 bcd	5.0 bcd	7.5 cd	21.3 ef	58.8 de	90.0 abc
Cruiser 5FS[1]	S	0.16	0.0 a	0.0 a	0.0 c	0.0 b	0.0 d	0.0 d	5.0 d	18.8 f	53.8 de	75.0 d
A14382 2FS[1]	S	0.17	0.0 a	0.0 a	0.0 c	0.0 b	1.3 d	2.5 cd	6.3 cd	26.3 def	57.5 de	90.0 abc
A14382 2FS	S	0.22	0.0 a	0.0 a	0.0 c	0.0 b	2.5 cd	2.5 cd	13.8 bcd	67.5 b	77.5 a-d	95.0 abc
A14382 2FS	S	0.27	0.0 a	0.0 a	0.0 c	0.0 b	1.3 d	0.0 d	5.0 d	31.3 c-f	50.0 de	82.5 cd
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 a	0.0 c	0.0 b	3.8 bcd	10.0 bc	25.0 b	67.5 b	92.5 ab	97.5 ab
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 a	0.0 c	0.0 b	0.0 d	1.3 cd	12.5 bcd	51.3 bcd	77.5 a-d	88.8 abc
Admire 2F[2]	S	0.64	0.0 a	0.0 a	0.0 c	0.0 b	0.0 d	2.5 cd	8.8 cd	28.8 c-f	42.5 e	86.3 bcd
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 a	0.0 c	3.8 b	16.3 b	8.8 bcd	18.8 bc	52.5 bc	70.0 b-e	91.3 abc
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 a	0.0 c	3.8 b	15.0 bc	13.8 b	18.8 bc	47.5 bcd	60.0 cde	92.5 abc
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 a	0.0 c	0.0 b	3.8 bcd	0.0 d	7.5 cd	47.5 bcd	78.8 a-d	92.5 abc
Control[1]	---	---	0.0 a	1.3 a	11.3 b	47.5 a	80.0 a	82.5 a	92.5 a	100.0 a	100.0 a	100.0 a
LSD			0.00	1.3	2.44	11.43	13.05	9.06	13.16	25.57	29.21	13.73
S.D.			0.00	0.91	1.71	8.00	9.13	6.34	9.21	17.89	20.44	9.61
C.V.			0.00	508.39	91.12	106.64	60.86	39.45	37.93	35.6	28.41	10.51
F			0.000	1.000	31.871	19.226	34.362	82.442	42.937	8.364	3.384	2.134
Prob (F)			1.0000	0.4697	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0016	0.0341

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application..

Table 6. Yields from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	%Grade		Yield (cwt/A)
			A	B	
Untreated	---	---	35.7 d	50.2 a	51.4 c
Cruiser 5FS[1]	S	0.10	77.3 abc	12.1 c	273.0 ab
Cruiser 5FS[1]	S	0.13	88.9 a	7.4 c	353.0 a
Cruiser 5FS[1]	S	0.16	88.7 a	7.2 c	354.4 a
A14382 2FS[1]	S	0.17	87.7 a	8.1 c	345.8 ab
A14382 2FS	S	0.22	82.6 ab	13.3 c	310.8 ab
A14382 2FS	S	0.27	88.3 a	5.0 c	345.8 ab
AdmirePro 4.6SC[2]	S	0.17	73.2 abc	12.9 c	262.7 ab
AdmirePro 4.6SC[2]	S	0.35	77.2 abc	9.3 c	278.3 ab
Admire 2F[2]	S	0.64	76.3 abc	9.0 c	328.2 ab
Platinum 2SC[1]	F	5.0 oz./a	75.3 abc	8.1 c	296.7 ab
Platinum 2SC[1]	F	6.5 oz./a	63.8 bc	10.1 c	247.7 b
Platinum 2SC[1]	F	8.0 oz./a	80.0 ab	8.8 c	314.2 ab
Control[1]	---	---	58.0 c	34.1 b	83.3 c
LSD			19.44	10.43	99.74
S.D.			13.61	7.3	69.79
C.V.			18.09	52.24	25.41
F			4.619	11.855	7.34
Prob. (F)			0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application

Table 7. Potato leafhopper adults sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean adults per 25 sweeps							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.5 a	8.0 a	6.3 a	5.0 a	4.5 b-e	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.8 a	8.5 a	7.5 a	4.5 a	1.8 b-e	0.0 c	1.0 cd	1.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	6.3 a	7.5 a	1.3 a	0.8 de	1.3 bc	1.0 cd	0.0 a
Cruiser 5FS[1]	S	0.16	0.3 a	4.0 a	4.3 a	3 a	0.8 de	1.8 ab	2.5 a	0.7 a
A14382 2FS[1]	S	0.17	0.0 a	5.8 a	3.5 a	2.0 a	2.5 bcd	0.3 c	1.0 cd	1.0 a
A14382 2FS	S	0.22	0.0 a	5.0 a	3.8 a	2.8 a	3.0 abc	0.5 bc	0.5 cd	3.0 a
A14382 2FS	S	0.27	0.3 a	4.5 a	6.0 a	3.5 a	0.5 e	3.0 a	0.5 cd	1.0 a
AdmirePro 4.6SC[2]	S	0.17	0.3 a	4.0 a	9.0 a	2.3 a	5.3 a	1.3 bc	0.9 cd	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	4.5 a	6.8 a	4.8 a	4.0 ab	0.5 bc	1.3 bc	1.0 a
Admire 2F[2]	S	0.64	0.0 a	4.3 a	5.0 a	5.8 a	1.3 cde	0.8 bc	1.3 abc	1.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.3 a	6.0 a	3.8 a	3.3 a	0.8 de	0.0 c	1.3 abc	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.5 a	6.8 a	6.0 a	2.0 a	1.8 b-e	1.8 ab	1.0 cd	1.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.5 a	7.5 a	5.0 a	1.8 a	1.5 cde	0.8 bc	2.3 ab	0.3 a
Control[1]	---	---	0.0 a	11.0 a	7.5 a	2.5 a	3.0 cde	✳	✳	✳
LSD			0.33	1.01	0.93	0.78	0.59	0.44	0.41	0.39
S.D.			0.23	0.71	0.65	0.55	0.42	0.31	0.29	0.27
C.V.			21.05	27.63	25.69	29.09	25.24	23.79	20.89	23.13
F			0.666	1.101	0.98	1.501	3.155	3.591	2.982	1.395
Prob (F)			0.7822	0.3867	0.4875	0.1608	0.0027	0.001	0.0041	0.2054

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 8. Potato leafhopper nymphs sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean nymphs per 25 leaves							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.0 a	0.5 a	0.8 b	3.5 a	2.5 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.0 a	0.3 a	0.5 bc	0.0 b	0.0 a	0.0 a	0.5 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.3 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.3 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 a	0.0 c	0.3 b	0.3 a	0.0 a	0.3 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.5 a	0.0 a
Admire 2F[2]	S	0.64	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 a	0.0 c	0.3 b	0.0 a	0.0 a	0.8 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.3 a	0.0 c	0.0 b	0.0 a	0.5 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 a	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.0 a	1.0 a	2.5 a	3.5 a	4.0 a	✳	✳	✳
LSD			0.00	0.27	0.24	0.39	0.48	0.16	0.27	0.00
S.D.			0.00	0.19	0.17	0.27	0.34	0.11	0.19	0.00
C.V.			0.00	17.89	15.61	24.78	31.44	11.13	17.74	0.00
F			0.000	1.192	7.459	2.13	0.887	0.914	0.971	0.000
Prob (F)			1.0000	0.321	0.0001	0.0344	0.5732	0.5474	0.4956	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 9. Hopperburn ratings from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz./cwt)	Mean hopperburn per plot			
			12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	3 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.8 bcd	1.5 a	1.5 a	2.0 a
Cruiser 5FS[1]	S	0.13	0.8 bcd	1.3 a	1.5 a	0.7 bc
Cruiser 5FS[1]	S	0.16	0.3 de	0.3 a	1.0 a	0.3 c
A14382 2FS[1]	S	0.17	0.3 de	0.8 a	1.8 a	1.0 abc
A14382 2FS	S	0.22	0.3 de	1.8 a	1.0 a	2.0 a
A14382 2FS	S	0.27	0.0 e	1.0 a	1.3 a	1.0 abc
AdmirePro 4.6SC[2]	S	0.17	1.3 b	2.3 a	1.6 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.8 bcd	1.8 a	1.3 a	0.3 c
Admire 2F[2]	S	0.64	0.5 cde	1.3 a	1.5 a	1.5 ab
Platinum 2SC[1]	F	5.0 oz./a	1.0 bc	1.8 a	1.3 a	1.0 abc
Platinum 2SC[1]	F	6.5 oz./a	0.8 bcd	2.0 a	1.3 a	1.7 ab
Platinum 2SC[1]	F	8.0 oz./a	0.3 de	0.5 a	1.3 a	0.7 bc
Control[1]	---	---	2.5 a	✳	✳	✳
LSD			0.67	1.41	0.89	1.06
S.D.			0.46	0.98	0.62	0.71
C.V.			52.97	73.28	46.31	64.25
F			14.101	1.587	0.535	2.916
Prob. (F)			0.0001	0.1486	0.8646	0.0252

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application,
✳Plots are dead

Table 10. Aphids sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean aphids per 25 sweeps							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.0 a	0.0 a	1.0 a	0.0 a	0.0 b	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.3 a	0.0 a	0.8 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.3 a	0.3 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 a	0.0 a	0.3 a	0.0 a	0.8 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 a	0.0 a	0.5 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 a	1.3 a	0.0 a	0.0 b	0.0 a	0.0 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Admire 2F[2]	S	0.64	0.0 a	0.0 a	0.3 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 a	0.0 a	0.0 a	0 b	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.3 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.0 a	0.5 a	1.0 a	0.0 a	0.0 b	✳	✳	✳
LSD			0.08	0.16	0.4	0.00	0.08	0.08	0.00	0.00
S.D.			0.06	0.11	0.28	0.00	0.06	0.06	0.00	0.00
C.V.			5.49	11.13	24.66	0.00	5.41	5.49	0.00	0.00
F			1.000	0.914	1.225	0.000	9.001	1	0.000	0.000
Prob (F)			0.4698	0.5474	0.2992	1.0000	0.0001	0.4698	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 11. Potato aphids sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean aphids per 25 leaves							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.0 b	2.3 ab	2.8 a	1.0 a	0.5 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.0 b	0.3 c	0.5 bc	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 b	0.0 c	0.0 c	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 b	0.8 bc	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.8 a	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Admire 2F[2]	S	0.64	0.0 b	0.0 c	0.5 bc	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.3 b	0.0 c	0.3 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.3 b	0.0 c	0.3 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.3 b	0.0 c	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.3 b	3.3 a	1.5 ab	0.0 a	0.0 a	✳	✳	✳
LSD			0.18	0.51	0.43	0.16	0.08	0.00	0.00	0.00
S.D.			0.12	0.35	0.3	0.11	0.06	0.00	0.00	0.00
C.V.			11.65	31.09	26.55	11.13	5.49	0.00	0.00	0.00
F			2.089	2.716	2.53	0.914	1.000	0.000	0.000	0.000
Prob (F)			0.0382	0.008	0.0126	0.5473	0.4698	1.0000	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Table 12. Green peach aphids sampled from Snowden variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Place	Rate (oz/cwt)	Mean aphids per 25 leaves							
			12 June (47 dap)	22 June (56 dap)	27 June (61 dap)	5 July (69 dap)	12 July (76 dap)	18 July (82 dap)	26 July (90 dap)	31 July (95 dap)
Untreated	---	---	0.3 a	1.0 b	0.5 a	0.0 a	0.0 a	✳	✳	✳
Cruiser 5FS[1]	S	0.10	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.13	0.0 a	0.0 b	0.3 ab	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Cruiser 5FS[1]	S	0.16	0.0 a	0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS[1]	S	0.17	0.0 a	0.8 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.22	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
A14382 2FS	S	0.27	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
AdmirePro 4.6SC[2]	S	0.17	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	✳
AdmirePro 4.6SC[2]	S	0.35	0.0 a	0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Admire 2F[2]	S	0.64	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	5.0 oz./a	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	6.5 oz./a	0.0 a	0.0 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Platinum 2SC[1]	F	8.0 oz./a	0.0 a	0.3 b	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Control[1]	---	---	0.3 a	2.8 a	0.0 b	0.0 a	0.0 a	✳	✳	✳
LSD			0.11	0.38	0.12	0.00	0.00	0.00	0.00	0.00
S.D.			0.08	0.27	0.08	0.00	0.00	0.00	0.00	0.00
C.V.			7.41	23.66	8.09	0.00	0.00	0.00	0.00	0.00
F			1.000	3.194	2.103	0.000	0.000	0.000	0.000	0.000
Prob (F)			0.4698	0.0025	0.0368	1.0000	1.0000	1.0000	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
[1]Maxim 4FS added as a seed treatment at 0.04 oz./cwt. for disease control. [2]Tops MZ 8.5DS added as a seed treatment at 12 oz./cwt. for disease control. S = seed treatment, F = In furrow application. ✳Plots are dead.

Part 2. Insect Control with Foliar Insecticides.

A. General Insect Control with Conventional Insecticides, Arlington.

Potato leafhoppers are considered a key insect pest on potatoes in Wisconsin from early June through August. Adult leafhoppers migrate into Wisconsin on strong southerly winds and storm fronts during late May and early June. Eggs hatch within 7-9 days after oviposition, depending on climate and leafhopper nymphs undergo five immature stages each lasting approximately 4-6 days. Potato leafhoppers have few natural enemies and can be difficult to manage due to their mobility. Historically, insecticide use has been the best option to reduce leafhopper populations on potatoes.

Experimental and registered foliar insecticides were evaluated for efficacy on potato leafhoppers, tarnished plant bugs, potato flea beetles and aphids. The study was initiated when potato leafhopper populations reached extremely high potato leafhopper adult (15.9 adults per 25 sweep) and nymph (70.1 nymphs per 25 leaves) numbers.

Superior variety potatoes were planted on 27 April 2006 into plots consisting of 2 x 50' rows, replicated four times in a randomized complete block design. Rows were planted on 3' centers with 12 inch plant spacing. Replicates were separated by 15' alleyways. Dual II magnum at 1 pint product per acre and Spartan at 3 oz product per acre were applied post hilling on 13 May 2006 for weed control. Hand weeding provided additional weed control.

Colorado potato beetle larvae were treated with an application of fipronil (Regent 2SC) at 3.2 ounces product per acre on 13 July 2006.

Six registered and eight experimental insecticides were evaluated and applied at the following rates.

Registered:

- Baythroid 2 (0.0125 lb. a.i./a)
- Actara 25WG (0.234 lb. a.i./a)
- Dimethoate 4EC (0.5 lb. a.i./a)
- Asana 0.66E (0.015 lb. a.i./a)
- Pounce 2E (0.05 lb. a.i./a)
- Leverage 2.7F (0.079 lb. a.i./a)

Experimental:

- Battalion 0.2EC (0.0125 and 0.0157 lb. a.i./a)
- Warrior 1CS (0.0223 and 0.0267 lb. a.i./a)
- Mustang Max 0.8EW (0.025 lb. a.i./a)
- Capture 2E (0.0203 and 0.04 lb. a.i./a)
- A13623 2SC (0.0445 and 0.055 lb. a.i./a)
- A15543 1.55SC (0.052 lb. a.i./a)
- Venom 70SG (0.07 lb. a.i./a)
- V10170 50WG (0.02 lb. a.i./a)

A single application of test materials was applied 13 July 2006. All materials were applied with a tractor mounted, compressed air, boom sprayer operating at 40 psi, delivering 24.27 gpa through four flat fan nozzles (8004VS XR) spaced at 18”.

Treatments were evaluated at 4, 8 and 15 days after application (13 July 2006). Insect populations were monitored using sweep net and leaf sample techniques. Sweep net samples are comprised of 25 sweeps taken from each plot and leaf samples include 25 leaves taken from each plot. Sweep sampling is used to collect potato leafhopper adults, tarnished plant bug adults, and flea beetle adults. Leaf samples are used to collect potato leafhopper nymphs and aphids. Plots were not harvested for yield.

Results

This study was designed to evaluate foliar insecticide efficacy on potato leafhopper adults and nymphs but other sporadic insect pests were also monitored. Potato leafhopper adults were left undisturbed in the studies during May and early June to allow increased oviposition with the purpose of elevating nymph populations during early July. However, when managing potato leafhoppers in commercial growing conditions it is important to limit adult numbers during early season because if they are allowed to oviposit for an extended period of time, managing the resulting nymphs can be difficult.

Potato leafhopper adults were observed in the plots during June and July but peak nymph numbers were observed during the precount on 13 July (70.1 nymphs/25 leaves). Potato leafhopper adults are typically very easy to control but they are also very mobile and can quickly infest potatoes. At 4 days post application (17 July) adult numbers were at threshold levels in the untreated plots but adult numbers among the treatments had been significantly reduced (Table 1). All of the materials evaluated provided 10-14 days of adult protection.

Potato leafhopper nymph numbers peaked in the untreated plots at 70.1 nymphs per sample on 13 July (precount) and remained high at 4 days after application; 43.0 nymphs per sample on 17 July, 39.0 nymphs per sample on 21 July and 12.6 nymphs per sample on 28 July (Table 2). All of the materials evaluated provided excellent potato leafhopper nymph control while providing 10-14 days of protection.

Tarnished plant bug populations were very small during the study and numbers did not exceed 0.3 adults per 25 sweeps (Table 3).

Potato flea beetle populations were also low during the season and numbers peaked at 11.0 adults per sample in the untreated plots on 21 July (Table 4). Peak flea beetle adult numbers occurred 4 days (21 July) after the insecticide applications and all of the materials evaluated significantly reduced flea beetle adult numbers.

Aphid populations were monitored with leaf sampling (Tables 5 and 6). On potatoes, aphids are found on different regions of the potato plant. Green peach aphids tend to dominate the lower regions of the potato plant while potato aphids are predominantly found in the upper regions of the plant. Sweep sampling effectively covers the upper portions of the plant while leaf samples taken from the mid region of the plant detect both species of aphids. Potato aphid numbers were lower than green peach aphid numbers found while leaf sampling and sweep samples reinforce these population trends.

Aphid numbers were very low in these studies and differences among treatments were mostly insignificant.

Table 1. Potato leafhopper adults sampled from Superior variety potatoes treated with foliar insecticides. Arlington Agricultural Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Mean adults per 25 sweeps		
		17 July	21 July	28 July
Battalion 0.2EC	0.0125	0.8 efg	1.8 c-f	1.8 d-g
Battalion 0.2EC	0.0187	0.3 fg	1.3 def	0.7 fg
Warrior 1CS	0.0223	1.0 d-g	0.5 ef	3.0 c-g
[1]Warrior 1CS	0.0267	0.5 fg	0.8 ef	2.0 efg
Actara 25WG	0.0234	5.3 d	5.5 cd	1.3 efg
[1]Actara 25WG	0.0234	2.0 d-g	2.5 c-f	1.8 efg
[1]A15543A	0.052	1.8 d-g	3.3 c-f	3.5 b-g
[1]A13623	0.0445	2.8 d-g	3.5 cde	1.8 d-g
[1]A13623	0.055	1.5 d-g	2.0 c-f	1.5 efg
[1]Leverage 2.7F	0.079	0.5 fg	0.0 f	0.3 g
Venom 70SG	0.07	4.8 de	5.3 cd	2.5 c-g
V10170 50WG	0.02	4 def	6.3 c	2.5 c-g
Baythroid 2E	0.0125	0.5 fg	0.5 ef	1.0 fg
Capture 2E	0.0203	0.8 efg	3.3 c-f	1.8 d-g
Capture 2E	0.04	0.5 fg	1 def	1.8 d-g
Untreated	---	27.5 ab	19.3 b	4 c-g
Mustang Max 0.8EC	0.025	0.8 efg	3.3 c-f	3.0 c-g
Asana XL 0.66EC	0.015	1.5 d-g	0.8 ef	0.8 fg
Pounce 3.2E	0.05	0.0 g	1.3 def	4.5 a-f
Dimethoate 4E	0.5	1.3 d-g	3.8 cde	5.3 a-e
LSD		1.13	1.06	1.00
S.D.		0.8	0.75	0.71
C.V.		36.76	30.45	37.17
F		13.381	15.785	2.278
Prob. (F)		0.0001	0.0001	0.0024

Means in a column followed by the same letter are not significantly different, LSD (P=0.05). [1]NIS added at 0.25% v/v.

Table 2. Potato leafhopper nymphs sampled from Superior variety potatoes treated with foliar insecticides. Arlington Agricultural Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Mean nymphs per 25 leaves		
		17 July	21 July	28 July
Battalion 0.2EC	0.0125	0.3 c	0.0 e	0.0 e
Battalion 0.2EC	0.0187	0.0 c	0.3 de	0.3 de
Warrior 1CS	0.0223	0.0 c	0.0 e	0.0 e
[1]Warrior 1CS	0.0267	0.0 c	0.0 e	0.0 e
Actara 25WG	0.0234	0.0 c	0.3 de	0.0 e
[1]Actara 25WG	0.0234	0.0 c	0.0 e	0.0 e
[1]A15543A	0.052	0.3 c	0.0 e	0.0 e
[1]A13623	0.0445	0.0 c	0.0 e	0.0 e
[1]A13623	0.055	0.0 c	0.0 e	0.0 e
[1]Leverage 2.7F	0.079	0.0 c	0.0 e	0.0 e
Venom 70SG	0.07	0.0 c	0.3 de	0.0 e
V10170 50WG	0.02	0.0 c	0.0 e	0.0 e
Baythroid 2E	0.0125	0.0 c	0.0 e	0.0 e
Capture 2E	0.0203	0.0 c	0.0 e	0.0 e
Capture 2E	0.04	0.0 c	0.3 de	0.0 e
Untreated	---	43.0 a	39.0 a	12.6 c
Mustang Max 0.8EC	0.025	0.5 c	0.0 e	0.0 e
Asana XL 0.66EC	0.015	0.0 c	0.0 e	0.0 e
Pounce 3.2E	0.05	0.0 c	0.0 e	0.0 e
Dimethoate 4E	0.5	0.0 c	0.5 de	1 de
LSD		1.78	1.71	1.25
S.D.		1.26	1.21	0.88
C.V.		64.71	71.82	53.83
F		9.36	5.39	9.254
Prob. (F)		0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different, LSD (P=0.05). [1]NIS added at 0.25% v/v.

Table 3. Tarnished plant bug adults sampled from Superior variety potatoes treated with foliar insecticides. Arlington Agricultural Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Mean adults per 25 sweeps		
		17 July	21 July	28 July
Battalion 0.2EC	0.0125	0.0 a	0.5 a	0.0 a
Battalion 0.2EC	0.0187	0.0 a	0.0 a	0.0 a
Warrior 1CS	0.0223	0.0 a	0.0 a	0.0 a
[1]Warrior 1CS	0.0267	0.0 a	0.0 a	0.0 a
Actara 25WG	0.0234	0.0 a	0.3 a	0.0 a
[1]Actara 25WG	0.0234	0.0 a	0.3 a	0.0 a
[1]A15543A	0.052	0.0 a	0.0 a	0.5 a
[1]A13623	0.0445	0.0 a	0.0 a	0.3 a
[1]A13623	0.055	0.0 a	0.0 a	0.0 a
[1]Leverage 2.7F	0.079	0.0 a	0.0 a	0.0 a
Venom 70SG	0.07	0.0 a	0.0 a	0.3 a
V10170 50WG	0.02	0.0 a	0.0 a	0.0 a
Baythroid 2E	0.0125	0.0 a	0.0 a	0.0 a
Capture 2E	0.0203	0.0 a	0.0 a	0.3 a
Capture 2E	0.04	0.0 a	0.0 a	0.0 a
Untreated	---	0.3 a	0.0 a	0.0 a
Mustang Max 0.8EC	0.025	0.0 a	0.0 a	0.3 a
Asana XL 0.66EC	0.015	0.0 a	0.0 a	0.0 a
Pounce 3.2E	0.05	0.0 a	0.0 a	0.0 a
Dimethoate 4E	0.5	0.0 a	0.0 a	0.0 a
LSD		0.12	0.17	0.19
S.D.		0.08	0.12	0.13
C.V.		8.02	11.71	12.86
F		1.453	0.853	0.806
Prob. (F)		0.1019	0.6714	0.7315

Means in a column followed by the same letter are not significantly different, LSD (P=0.05). [1]NIS added at 0.25% v/v.

Table 4. Flea beetle adults sampled from Superior variety potatoes treated with foliar insecticides. Arlington Agricultural Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Mean adults per 25 sweeps		
		17 July	21 July	28 July
Battalion 0.2EC	0.0125	0.0 c	0.3 de	0.0 a
Battalion 0.2EC	0.0187	0.0 c	0.5 de	0.0 a
Warrior 1CS	0.0223	0.0 c	0.0 e	0.5 a
[1]Warrior 1CS	0.0267	0.0 c	0.0 e	0.0 a
Actara 25WG	0.0234	0.0 c	1.5 cde	0.0 a
[1]Actara 25WG	0.0234	0.3 bc	0.3 de	0.0 a
[1]A15543A	0.052	0.0 c	0.3 de	0.0 a
[1]A13623	0.0445	0.5 bc	0.0 e	0.0 a
[1]A13623	0.055	0.3 bc	0.3 de	0.0 a
[1]Leverage 2.7F	0.079	0.0 c	0.5 de	0.3 a
Venom 70SG	0.07	0.0 c	0.3 de	0.0 a
V10170 50WG	0.02	0.0 c	2.8 b-e	0.0 a
Baythroid 2E	0.0125	0.5 bc	0.0 e	0.0 a
Capture 2E	0.0203	0.0 c	0.8 de	0.0 a
Capture 2E	0.04	0.3 bc	0.0 e	0.0 a
Untreated	---	10.8 a	11.0 a	0.1 a
Mustang Max 0.8EC	0.025	0.0 c	0.3 de	1.0 a
Asana XL 0.66EC	0.015	0.0 c	0.0 e	0.0 a
Pounce 3.2E	0.05	0.8 bc	0.3 de	0.0 a
Dimethoate 4E	0.5	0.8 bc	7.0 ab	0.8 a
LSD		0.34	0.86	0.24
S.D.		0.24	0.61	0.17
C.V.		20.94	44.66	16.32
F		13.705	3.559	1.062
Prob. (F)		0.0001	0.0001	0.4042

Means in a column followed by the same letter are not significantly different, LSD (P=0.05). [1]NIS added at 0.25% v/v.

Table 5. Green peach aphids sampled from Superior variety potatoes treated with foliar insecticides. Arlington Agricultural Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Mean aphids per 25 leaves		
		17 July	21 July	28 July
Battalion 0.2EC	0.0125	0.0 a	1.0 a	0.0 a
Battalion 0.2EC	0.0187	0.0 a	0.0 a	0.4 a
Warrior 1CS	0.0223	0.0 a	0.0 a	0.0 a
[1]Warrior 1CS	0.0267	0.0 a	0.0 a	0.0 a
Actara 25WG	0.0234	0.0 a	0.0 a	0.0 a
[1]Actara 25WG	0.0234	0.0 a	0.0 a	0.0 a
[1]A15543A	0.052	0.0 a	0.0 a	0.0 a
[1]A13623	0.0445	0.0 a	0.0 a	0.0 a
[1]A13623	0.055	0.0 a	0.0 a	0.0 a
[1]Leverage 2.7F	0.079	0.0 a	0.0 a	3.0 a
Venom 70SG	0.07	0.0 a	0.0 a	0.0 a
V10170 50WG	0.02	0.0 a	0.0 a	0.0 a
Baythroid 2E	0.0125	0.0 a	0.3 a	0.0 a
Capture 2E	0.0203	0.0 a	0.0 a	0.0 a
Capture 2E	0.04	0.0 a	1.5 a	0.0 a
Untreated	---	0.0 a	0.0 a	0.0 a
Mustang Max 0.8EC	0.025	0.0 a	0.0 a	0.3 a
Asana XL 0.66EC	0.015	0.0 a	0.0 a	0.3 a
Pounce 3.2E	0.05	0.0 a	4.8 a	0.0 a
Dimethoate 4E	0.5	0.0 a	0.5 a	0.0 a
LSD		0.08	0.60	0.37
S.D.		0.05	0.42	0.26
C.V.		5.39	38.13	25.11
F		1.000	1.083	0.929
Prob. (F)		0.4792	0.379	0.5712

Means in a column followed by the same letter are not significantly different, LSD (P=0.05). [1]NIS added at 0.25% v/v.

Table 6. Potato aphids sampled from Superior variety potatoes treated with foliar insecticides. Arlington Agricultural Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Mean aphids per 25 leaves		
		17 July	21 July	28 July
Battalion 0.2EC	0.0125	0.0 c	0.0 b	0.3 a
Battalion 0.2EC	0.0187	0.0 c	0.0 b	0.0 a
Warrior 1CS	0.0223	0.0 c	0.0 b	0.0 a
[1]Warrior 1CS	0.0267	0.0 c	0.0 b	0.0 a
Actara 25WG	0.0234	0.0 c	0.0 b	0.0 a
[1]Actara 25WG	0.0234	0.0 c	0.0 b	0.0 a
[1]A15543A	0.052	0.0 c	0.0 b	0.0 a
[1]A13623	0.0445	0.0 c	0.0 b	0.0 a
[1]A13623	0.055	0.0 c	0.0 b	0.0 a
[1]Leverage 2.7F	0.079	0.0 c	0.0 b	0.0 a
Venom 70SG	0.07	0.0 c	0.0 b	0.0 a
V10170 50WG	0.02	0.0 c	0.0 b	0.0 a
Baythroid 2E	0.0125	0.0 c	0.0 b	0.0 a
Capture 2E	0.0203	0.0 c	0.0 b	0.0 a
Capture 2E	0.04	0.0 c	0.0 b	0.0 a
Untreated	---	0.5 b	0.0 b	0.0 a
Mustang Max 0.8EC	0.025	0.3 bc	0.0 b	0.0 a
Asana XL 0.66EC	0.015	0.3 bc	0.0 b	0.0 a
Pounce 3.2E	0.05	0.0 c	0.0 b	0.0 a
Dimethoate 4E	0.5	0.0 c	0.8 a	0.0 a
LSD		0.18	0.09	0.06
S.D.		0.13	0.07	0.04
C.V.		12.36	6.65	3.90
F		2.088	2.600	1.000
Prob. (F)		0.006	0.0005	0.4792

Means in a column followed by the same letter are not significantly different, LSD (P=0.05). [1]NIS added at 0.25% v/v.

Part 2. Insect Control with Foliar Insecticides.

B. Colorado Potato Beetle Control with Foliar Insecticides – Arlington 2006.

Colorado potato beetles are considered a key insect pest of potatoes in Wisconsin. Colorado potato beetles overwinter in and around potato fields, typically emerging during late May and early June depending on seasonal temperatures. Colorado potato beetles have a history of rapidly developing resistance to insecticides and they can be difficult to control. Integrated pest management practices for Colorado potato beetles target the larval stages and more specifically the small (1^{st} and 2^{nd} instar) larvae. First generation larval numbers peak in Wisconsin during mid to late June.

In a study conducted at the Entomology Research Farm, Arlington, Wisconsin, experimental and registered foliar insecticides were evaluated for efficacy on all life stages of Colorado potato beetle.

Superior variety potatoes were planted on 29 April 2006 into two 50' row plots, replicated four times in a randomized complete block design. All plots were separated by 15' of cultivated alleyway and replicates were 15' apart. Spartan (sulfentrazone) at 3 ounces product per acre (oz. pr./a) and Dual II Magnum (metolachlor) at 1.25 pints product per acre (pt. pr./a) was applied post hilling on 11 May for weed control. Hand weeding provided additional weed control.

Orthene 97 (acephate) at the rate of 1 pound product per acre (lb. pr./a) was applied on 19, 28 June, and 5 July for potato leafhopper adult control.

Fourteen registered and nine experimental insecticides were evaluated at the following rates:

Registered:

- Agrimek 0.15EC (0.0094 lb. a.i./a)
- Provado 1.6SC (0.047 lb. a.i./a))
- Actara 25WG (0.0231 and 0.047 lb. a.i./a)
- Leverage 2.7SE (0.079 lb. a.i./a)
- Baythroid 2EC (0.0437 lb. a.i./a)
- Asana 0.66E (0.05 lb. a.i./a)
- Avaunt 30DG (0.084 lb. a.i./a)
- Spintor 2SC (0.047 and 0.0625 lb. a.i./a)
- Entrust 80WP (0.1 lb. a.i./a)
- Rimon 0.83EC (0.0584, and 0.078 lb. a.i./a)
- Assail 30WG (0.051 lb. a.i./a)
- Decis 1.5EC (0.0234 lb. a.i./a)
- Thiodan 3EC (0.975 lb. a.i./a)
- Guthion 50WP (0.375 lb. a.i./a)

Experimental:

Clutch 50WG (0.094 and 0.125 lb. a.i./a)
Mustang Max 0.8EC (0.025 lb. a.i./a)
Capture 2EC (0.08 lb. a.i./a)
Warrior 1CS (0.0223 and 0.0267 lb. a.i./a)
Venom 20SG (0.066 lb. a.i./a)
V10170 50WG (0.022 lb. a.i./a)
Trigard 75WP (0.125 and 0.25 lb. a.i./a)
DPX E2Y45 35WG (0.044, 0.066 and 0.088 lb. a.i./a)
A13623 2.06SC (0.044 and 0.0644 lb. a.i./a)

All materials were applied with a tractor mounted, compressed air, boom sprayer operating at 40 psi, delivering 24.17 gpa through four flat fan nozzles (8004VS XR) spaced at 18".

Insecticides were applied on 12 June 2006 for first generation Colorado potato beetle (CPB) larval efficacy. First generation CPB efficacy was evaluated at 3, 7 and 16 days after the first insecticide application (12 June). CPB populations were monitored with plant counts. All life stages of the CPB (adults, eggs, small and large larvae) were counted on ten randomly chosen plants per plot.

Plant foliage was rated for defoliation on each survey date from 15 June through 28 June. The study was not harvested for yield due to the low insect pressure.

Results

Peak adult and egg mass numbers occurred in early June prior to sampling. Preliminary CPB counts on 12 June revealed that there were 12.4 adults, 9.7 egg masses, 90.4 small larvae and 17.5 large larvae per sample (10 plants per sample) and no defoliation in the plots. Small larval numbers peaked in the untreated plots on 19 June while large larval numbers peaked on 28 June (Tables 3 and 4). Defoliation peaked at 7.5-13.8 in the untreated plots on 28 June (Table 5).

All of the materials evaluated reduced Colorado potato beetle larval numbers under the lower insect pressures found at the Arlington location (Tables 3 and 4). Registered and experimental pyrethroids provided good small and large larval control with good persistence (Tables 3 and 4) and minimal defoliation was recorded (generally less than 10%) (Table 5).

The registered nicotinyls Assail, Provado and Actara also effectively controlled CPB larvae and these treatments limited defoliation to 2% or less (Table 5). Assail provided good efficacy and provided good persistent. The experimental nicotinyls Clutch, Venom and V10170 provided excellent larval control with 16 days persistence (Tables 3 and 4) and limited defoliation in those plots close to 0% (Table 5).

The reduced risk insecticides Spintor, Avaunt and Agrimek were less persistent than either the pyrethroids or nicotinyls and defoliation was increasing in many of these treatments.

The growth regulator Rimon, which was registered in 2004, provided excellent control at both 9 and 12 oz. rates (0.0584 and 0.078 lb. a.i./a) (Tables 3 and 4). Small larval control was not seen at 3 days after application, as expected with the growth regulator mode of action, but subsequent control was excellent through 16 days. Similar trends were seen with large larvae (Table 4) which were controlled effectively after 3 days and defoliation was held below 5% through 28 June.

DPX E2Y45 also provided good control after application on 12 June (Tables 3 and 4). The higher rates of DPX E2Y45 reduced small larval numbers more quickly and all the rates persisted for 16 days. The addition of MSO (methylated seed oil) did not enhance insecticide performance.

Table 1. Colorado potato beetle adults sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean adults per 10 plants		
		15 June	19 June	28 June
Untreated	---	3.3 abc	1.3 ab	0.5 a
Clutch 50WG	0.094	0.5 ghi	0.5 bcd	0.8 a
Clutch 50WG	0.125	0.3 hi	0.0 d	0.3 a
Venom 70SG	0.066	0.3 hi	0.8 bcd	0.3 a
V10170 50WG	0.022	1.3 e-i	0.5 bcd	0.3 a
Assail 70WP	0.051	0.0 i	0.3 cd	0.8 a
Actara 25WG	0.0234	0.8 f-i	0.0 d	0.3 a
Actara 25WG + NIS	0.047 + 0.25% v/v	1.0 e-i	0.3 cd	0.0 a
Actara 25WG + Agrimek 0.15EC + NIS	0.0231 + 0.0094 + 0.25% v/v	0.3 hi	0.3 cd	0.3 a
Warrior 1CS + NIS	0.0267 + 0.25% v/v	0.0 i	0.8 bcd	0.0 a
A13623 2.06SC + NIS	0.044 + 0.25% v/v	0.5 ghi	0.5 bcd	1.3 a
A13623 2.06SC + NIS	0.0644 + 0.25% v/v	0.3 hi	0.5 bcd	0.0 a
Leverage 2.7SC + NIS	0.079 + 0.25% v/v	0.0 i	0.3 cd	0.5 a
Asana XL 0.66EC + PBO	0.05 + 4 fl oz/a	0.5 ghi	0.8 bcd	0.3 a
Rimon 0.83EC	0.0584	1.8 c-g	0.5 bcd	0.8 a
Spintor 2SC	0.0625	2.3 b-f	0.5 bcd	0.5 a
Rimon 0.83EC	0.078	3.5 abc	1 abc	0.5 a
Untreated	---	2.0 b-f	0.5 bcd	0.5 a
DPX-E2Y45 35WG	0.044	4.0 abc	0.3 cd	0.0 a
DPX-E2Y45 35WG	0.066	3.5 a-d	0.0 d	0.5 a
DPX-E2Y45 35WG	0.088	4.0 ab	2.0 a	0.0 a
DPX-E2Y45 35WG + MSO	0.044 + 0.5% v/v	5.5 a	0.5 bcd	0.0 a

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 1. (Continued). Colorado potato beetle adults sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean adults per 10 plants		
		15 June	19 June	28 June
Warrior 1CS	0.0223	0.8 e-i	0.5 bcd	1.5 a
Untreated	---	1.8 c-g	0.0 d	0.3 a
Baythroid 2E	0.0437	0.8 f-i	0.5 bcd	0.0 a
Capture 2EC	0.008	0.3 hi	0.5 bcd	0.5 a
Mustang Max 0.8EC	0.025	1.0 e-i	0.8 bcd	1.0 a
Rimon 0.83EC	0.0584	2.3 b-e	0.5 bcd	0.3 a
Spintor 2SC	0.047	0.5 ghi	0.0 d	0.8 a
Entrust 80WP	0.1	0.5 ghi	1.5 ab	0.3 a
Agrimek 0.15EC	0.0094	0.8 f-i	0.3 cd	0.8 a
Provado 1.6F	0.047	0.8 f-i	0.3 cd	1.3 a
Decis 1.5EC	0.0234	0.8 e-i	0.5 bcd	1.5 a
Thiodan 3EC	0.975	0.8 e-i	0.3 cd	0.8 a
Guthion 50WP	0.375	1.3 e-i	0.0 d	0.5 a
Trigard 75WP	0.25	1.5 d-h	1.0 bc	0.0 a
Avaunt 30WG	0.84	1.3 e-i	0.8 bcd	2.0 a
LSD		0.5	0.35	0.42
S.D.		0.35	0.25	0.3
F		4.118	1.51	1.025
Prob. (F)		0.0001	0.044	0.4443

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 2. Colorado potato beetle egg masses sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean egg masses per 10 plants		
		15 June	19 June	28 June
Untreated	---	2.8 a	0.0 a	0.3 a
Clutch 50WG	0.094	3.5 a	0.3 a	0.0 a
Clutch 50WG	0.125	2.5 a	0.0 a	0.0 a
Venom 70SG	0.066	5.3 a	0.3 a	0.0 a
V10170 50WG	0.022	5.5 a	0.0 a	0.0 a
Assail 70WP	0.051	3.5 a	0.5 a	0.0 a
Actara 25WG	0.0234	4.3 a	0.0 a	0.0 a
Actara 25WG + NIS	0.047 + 0.25% v/v	4.5 a	0.3 a	0.0 a
Actara 25WG + Agrimek 0.15EC + NIS	0.0231 + 0.0094 + 0.25% v/v	4.5 a	0.0 a	0.0 a
Warrior 1CS + NIS	0.0267 + 0.25% v/v	4.5 a	0.3 a	0.3 a
A13623 2.06SC + NIS	0.044 + 0.25% v/v	3.3 a	0.0 a	0.0 a
A13623 2.06SC + NIS	0.0644 + 0.25% v/v	2.3 a	0.0 a	0.0 a
Leverage 2.7SC + NIS	0.079 + 0.25% v/v	3.8 a	0.0 a	0.3 a
Asana XL 0.66EC + PBO	0.05 + 4 fl oz/a	3.3 a	0.0 a	0.0 a
Rimon 0.83EC	0.0584	3.3 a	0.0 a	0.0 a
Spintor 2SC	0.0625	4.8 a	0.3 a	0.3 a
Rimon 0.83EC	0.078	3.3 a	0.0 a	0.0 a
Untreated	---	4.8 a	0.0 a	0.0 a
DPX-E2Y45 35WG	0.044	2.0 a	0.3 a	0.0 a
DPX-E2Y45 35WG	0.066	3.8 a	0.0 a	0.0 a
DPX-E2Y45 35WG	0.088	5.5 a	0.0 a	0.0 a
DPX-E2Y45 35WG + MSO	0.044 + 0.5% v/v	4.3 a	0.0 a	0.0 a

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 2. (Continued). Colorado potato beetle egg masses sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean egg masses per 10 plants		
		15 June	19 June	28 June
Warrior 1CS	0.0223	6.0 a	0.0 a	0.0 a
Untreated	---	6.3 a	0.3 a	0.0 a
Baythroid 2E	0.0437	2.8 a	0.0 a	0.0 a
Capture 2EC	0.008	5.0 a	0.0 a	0.0 a
Mustang Max 0.8EC	0.025	3.0 a	0.0 a	0.0 a
Rimon 0.83EC	0.0584	5.0 a	0.0 a	0.0 a
Spintor 2SC	0.047	5.0 a	0.0 a	0.3 a
Entrust 80WP	0.1	6.3 a	0.0 a	0.0 a
Agrimek 0.15EC	0.0094	4.5 a	0.0 a	0.0 a
Provado 1.6F	0.047	3.8 a	0.0 a	0.3 a
Decis 1.5EC	0.0234	6.0 a	0.0 a	0.0 a
Thiodan 3EC	0.975	4.0 a	0.3 a	0.0 a
Guthion 50WP	0.375	4.3 a	0.0 a	0.0 a
Trigard 75WP	0.25	6.0 a	0.0 a	0.0 a
Avaunt 30WG	0.84	5.0 a	0.3 a	0.0 a
LSD		0.72	0.16	0.11
S.D.		0.52	0.12	0.08
F		1.027	0.775	0.88
Prob. (F)		0.4422	0.8242	0.6736

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 3. Colorado potato beetle small larvae sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants		
		15 June	19 June	28 June
Untreated	---	11.3 a-g	17.3 bc	10.8 b-e
Clutch 50WG	0.094	7.3 d-h	0.5 ijk	0.0 j
Clutch 50WG	0.125	5.3 fgh	0.0 k	0.0 j
Venom 70SG	0.066	6.5 e-h	0.0 k	0.3 ij
V10170 50WG	0.022	14.5 a-g	0.3 jk	0.0 j
Assail 70WP	0.051	4.0 fgh	0.8 h-k	0.0 j
Actara 25WG	0.0234	5.5 e-h	0.0 k	0.3 ij
Actara 25WG + NIS	0.047 + 0.25% v/v	6.5 e-h	0.0 k	1.5 e-j
Actara 25WG + Agrimek 0.15EC + NIS	0.0231 + 0.0094 + 0.25% v/v	8.3 c-h	0.0 k	0.5 hij
Warrior 1CS + NIS	0.0267 + 0.25% v/v	6.0 e-h	0.5 ijk	0.3 ij
A13623 2.06SC + NIS	0.044 + 0.25% v/v	5.3 e-h	0.5 ijk	0.5 hij
A13623 2.06SC + NIS	0.0644 + 0.25% v/v	8.3 b-h	0.3 jk	0.0 j
Leverage 2.7SC + NIS	0.079 + 0.25% v/v	4.8 fgh	0.0 k	1.5 f-j
Asana XL 0.66EC + PBO	0.05 + 4 fl oz/a	3.8 gh	0.0 k	0.0 j
Rimon 0.83EC	0.0584	19.5 a	3.8 e-k	0.0 j
Spintor 2SC	0.0625	6.3 e-h	0.0 k	0.8 g-j
Rimon 0.83EC	0.078	13.5 a-f	5.8 e-i	0.5 hij
Untreated	---	18.5 a-e	28.8 a	5.0 b-i
DPX-E2Y45 35WG	0.044	22.0 abc	0.0 k	0.0 j
DPX-E2Y45 35WG	0.066	17.5 abc	0.8 h-k	0.0 j
DPX-E2Y45 35WG	0.088	15.0 a-e	0.8 h-k	0.5 hij
DPX-E2Y45 35WG + MSO	0.044 + 0.5% v/v	20.0 ab	0.5 ijk	0.3 ij

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 3. (Continued). Colorado potato beetle small larvae sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants		
		15 June	19 June	28 June
Warrior 1CS	0.0223	3.8 gh	0.0 k	0.0 j
Untreated	---	10.5 a-h	20.5 ab	7.5 b-g
Baythroid 2E	0.0437	5.5 e-h	2.0 g-k	5.5 c-j
Capture 2EC	0.008	6.0 fgh	2.5 f-k	6.3 b-h
Mustang Max 0.8EC	0.025	2.0 h	1.3 g-k	2.8 d-j
Rimon 0.83EC	0.0584	15.3 a-d	9.5 c-f	9.8 abc
Spintor 2SC	0.047	6.3 e-h	0.8 h-k	11.5 b-f
Entrust 80WP	0.1	5.0 fgh	0.5 ijk	4.3 c-j
Agrimek 0.15EC	0.0094	7.8 c-h	1.5 g-k	12.3 a-d
Provado 1.6F	0.047	4.3 fgh	0.8 h-k	8.5 b-f
Decis 1.5EC	0.0234	3.8 gh	0.0 k	0.0 j
Thiodan 3EC	0.975	7.0 c-h	5.0 d-h	8.3 c-j
Guthion 50WP	0.375	5.3 fgh	13 bcd	19.8 a
Trigard 75WP	0.25	10.3 a-h	10.5 cde	17.3 ab
Avaunt 30WG	0.84	11.5 a-h	9.8 cde	8.8 b-e
LSD		1.49	1.14	1.38
S.D.		1.06	0.81	0.99
F		1.802	6.575	3.108
Prob. (F)		0.0072	0.0001	0.0001

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 4. Colorado potato beetle large larvae sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants		
		15 June	19 June	28 June
Untreated	---	11.3 a	9.0 b	31.5 abc
Clutch 50WG	0.094	3.8 b-f	0.3 fg	0.0 n
Clutch 50WG	0.125	0.8 def	0.0 g	0.5 lmn
Venom 70SG	0.066	1.0 def	0.0 g	5.5 h-n
V10170 50WG	0.022	0.8 def	0.0 g	1.3 lmn
Assail 70WP	0.051	0.5 def	0.0 g	0.0 n
Actara 25WG	0.0234	2.0 b-f	0.0 g	1.3 lmn
Actara 25WG + NIS	0.047 + 0.25% v/v	0.5 def	0.0 g	0.8 lmn
Actara 25WG + Agrimek 0.15EC + NIS	0.0231 + 0.0094 + 0.25% v/v	0.3 ef	0.3 fg	0.3 mn
Warrior 1CS + NIS	0.0267 + 0.25% v/v	1.5 c-f	0.0 g	1.0 lmn
A13623 2.06SC + NIS	0.044 + 0.25% v/v	0.3 ef	0.0 g	0.0 n
A13623 2.06SC + NIS	0.0644 + 0.25% v/v	0.8 def	0.3 fg	0.5 lmn
Leverage 2.7SC + NIS	0.079 + 0.25% v/v	0.0 f	0.0 g	0.8 lmn
Asana XL 0.66EC + PBO	0.05 + 4 fl oz/a	0.0 f	0.0 g	6.5 g-m
Rimon 0.83EC	0.0584	11.0 a	0.0 g	4.8 h-n
Spintor 2SC	0.0625	2.0 b-f	0.5 fg	5.3 h-n
Rimon 0.83EC	0.078	4.5 bc	1.0 fg	2.0 j-n
Untreated	---	5.5 ab	17.0 a	35.0 ab
DPX-E2Y45 35WG	0.044	4.0 bcd	0.0 g	0.3 mn
DPX-E2Y45 35WG	0.066	3.0 b-e	0.0 g	1.5 k-n
DPX-E2Y45 35WG	0.088	2.5 b-f	0.3 fg	1.3 lmn
DPX-E2Y45 35WG + MSO	0.044 + 0.5% v/v	3.8 bcd	0.0 g	4.0 i-n

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 4. (Continued). Colorado potato beetle large larvae sampled from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants		
		15 June	19 June	28 June
Warrior 1CS	0.0223	0.0 f	0.0 g	4.8 h-n
Untreated	---	2.3 b-f	15.3 a	45.0 a
Baythroid 2E	0.0437	0.8 def	0.0 g	14.8 d-g
Capture 2EC	0.008	1.0 def	2.5 d-g	18.8 c-f
Mustang Max 0.8EC	0.025	0.3 ef	0.5 fg	9.5 f-i
Rimon 0.83EC	0.0584	5.5 ab	4.5 cde	32.8 abc
Spintor 2SC	0.047	1.3 c-f	1.8 efg	19.5 c-f
Entrust 80WP	0.1	0.5 def	0.3 fg	13.8 e-h
Agrimek 0.15EC	0.0094	1.3 c-f	0.8 fg	28.0 a-d
Provado 1.6F	0.047	0.5 def	0.8 fg	16.0 c-f
Decis 1.5EC	0.0234	0.0 f	0.0 g	4.8 h-n
Thiodan 3EC	0.975	0.0 f	8.5 b	24.0 b-e
Guthion 50WP	0.375	0.0 f	5.8 bcd	41.3 ab
Trigard 75WP	0.25	1.0 def	3.3 def	29.5 a-d
Avaunt 30WG	0.84	3.5 bcd	6.3 bc	33.5 abc
LSD		0.87	0.76	1.5
S.D.		0.62	0.54	1.07
F		3.03	8.471	10.456
Prob. (F)		0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 5. Percent defoliation ratings from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean defoliation per plot		
		15 June	19 June	28 June
Untreated	---	1.3 a	1.3 bc	7.5 bc
Clutch 50WG	0.094	2.5 a	0.0 c	0.0 f
Clutch 50WG	0.125	0.0 a	0.0 c	0.0 f
Venom 70SG	0.066	0.0 a	0.0 c	1.3 ef
V10170 50WG	0.022	1.3 a	0.0 c	0.0 f
Assail 70WP	0.051	0.0 a	0.0 c	0.0 f
Actara 25WG	0.0234	1.3 a	0.0 c	0.0 f
Actara 25WG + NIS	0.047 + 0.25% v/v	0.0 a	0.0 c	0.0 f
Actara 25WG + Agrimek 0.15EC + NIS	0.0231 + 0.0094 + 0.25% v/v	0.0 a	0.0 c	0.0 f
Warrior 1CS + NIS	0.0267 + 0.25% v/v	0.0 a	0.0 c	0.0 f
A13623 2.06SC + NIS	0.044 + 0.25% v/v	2.5 a	0.0 c	0.0 f
A13623 2.06SC + NIS	0.0644 + 0.25% v/v	1.3 a	0.0 c	0.0 f
Leverage 2.7SC + NIS	0.079 + 0.25% v/v	2.5 a	0.0 c	0.0 f
Asana XL 0.66EC + PBO	0.05 + 4 fl oz/a	1.3 a	0.0 c	0.0 f
Rimon 0.83EC	0.0584	1.3 a	0.0 c	1.3 ef
Spintor 2SC	0.0625	1.3 a	0.0 c	0.0 f
Rimon 0.83EC	0.078	1.3 a	0.0 c	0.0 f
Untreated	---	2.5 a	2.5 b	13.8 a
DPX-E2Y45 35WG	0.044	2.5 a	0.0 c	0.0 f
DPX-E2Y45 35WG	0.066	1.3 a	0.0 c	0.0 f
DPX-E2Y45 35WG	0.088	1.3 a	0.0 c	0.0 f
DPX-E2Y45 35WG + MSO	0.044 + 0.5% v/v	1.3 a	0.0 c	0.0 f

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 5. (Continued). Percent defoliation ratings from Superior variety potatoes treated with foliar insecticides. Arlington Ag Research Station, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean defoliation per plot		
		15 June	19 June	28 June
Warrior 1CS	0.0223	0.0 a	0.0 c	1.3 ef
Untreated	---	2.5 a	5.0 a	12.5 a
Baythroid 2E	0.0437	1.3 a	0.0 c	2.5 def
Capture 2EC	0.008	1.3 a	0.0 c	6.3 bcd
Mustang Max 0.8EC	0.025	1.3 a	1.3 bc	2.5 def
Rimon 0.83EC	0.0584	1.3 a	1.3 bc	5.0 cde
Spintor 2SC	0.047	0.0 a	0.0 c	2.5 def
Entrust 80WP	0.1	1.3 a	1.3 bc	2.5 def
Agrimek 0.15EC	0.0094	1.3 a	0.0 c	3.8 c-f
Provado 1.6F	0.047	0.0 a	0.0 c	1.3 ef
Decis 1.5EC	0.0234	0.0 a	0.0 c	1.3 ef
Thiodan 3EC	0.975	0.0 a	0.0 c	5.0 cde
Guthion 50WP	0.375	1.3 a	1.3 bc	10.0 ab
Trigard 75WP	0.25	0.0 a	0.0 c	5.0 cde
Avaunt 30WG	0.84	1.3 a	1.3 bc	10.0 ab
LSD		2.4	1.59	4.65
S.D.		1.71	1.13	3.32
F		0.99	2.683	4.711
Prob. (F)		0.4985	0.0001	0.0001

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Part 2. Insect Control with Foliar Insecticides.

C. Colorado Potato Beetle Control with Foliar Insecticides – Hancock 2006.

a. Colorado Potato Beetle Control on Russet Burbank Potatoes.

Colorado potato beetles are a very adaptive insect and they can develop resistance to insecticides rapidly. Colorado potato beetles are exposed to a wide range of insecticides across the potato growing regions of Wisconsin however the main region of potato production is located in the central sands area. Potatoes grown at the Hancock Agricultural Research Station in central Wisconsin provide an opportunity to evaluate insecticides in an environment of high beetle pressure from individuals that are more likely to have developed resistance to certain insecticides.

In a study conducted at the Hancock Agricultural Research Station, Hancock, Wisconsin, experimental and registered foliar insecticides were evaluated for efficacy on all life stages of Colorado potato beetle.

Russet Burbank variety potatoes were planted on 17 April 2006 into four 20' row plots, replicated four times in a randomized complete block design with replications separated by 15' of cultivated alleyway. Lorox (linuron) at 1 pound product per acre was applied post hilling on 25 May for weed control. Hand weeding provided additional weed control.

Plots were overhead irrigated with 0.5" water every 2-5 days from plant emergence to vine kill.

Seven registered and seven experimental materials were evaluated at the following rates:

Registered:

- Actara 25WG (0.0234 and 0.047 lb. a.i./a)
- Leverage 2.7SE (0.079 lb. a.i./a)
- Asana 0.66E (0.04 lb. a.i./a)
- Avaunt 30DG (0.084 lb. a.i./a)
- Spintor 2SC (0.047 and 0.07 lb. a.i./a)
- Rimon 0.83EC (0.058, and 0.078 lb. a.i./a)
- Assail 30WG (0.0262 and 0.0506 lb. a.i./a)

Experimental:

- Clutch 50WG (0.125 lb. a.i./a)
- Warrior 1CS (0.025 lb. a.i./a)
- Venom 20SG (0.132 lb. a.i./a)
- V10170 50WG (0.132 lb. a.i./a)
- DPX E2Y45 18.5SC (0.022, 0.044, and 0.066 lb. a.i./a)
- A13623 2.06SC (0.044 lb. a.i./a)
- A15543

All materials were applied with a CO_2 backpack sprayer operating at 30 psi, delivering 25 gpa through four flat fan nozzles (8004VS XR) spaced at 18".

Insecticides were applied on 11 June 2006 and 18 June 2006 for first generation Colorado potato beetle (CPB) larval efficacy. First generation CPB efficacy was evaluated at 2 and 5 days after the first insecticide application (11 June) and 3, 8 and 15 days after the second insecticide application on 18 June. CPB populations were monitored with plant counts. All life stages of the CPB (adults, eggs, small and large larvae) were counted on ten randomly chosen plants per plot.

Plant foliage was rated for defoliation on each survey date from 13 June through 3 July. The study was not harvested for yield due to second generation feeding pressure.

Results

Peak first generation adult and egg mass numbers occurred in early June prior to sampling. Preliminary CPB counts on 11 June revealed that there were 6.5 adults, 4.4 egg masses, 103.9 small larvae and 11.5 large larvae per sample (10 plants per sample) and no defoliation in the plots. Adult numbers declined in the study after the initial insecticide applications on 11 June (Table 1) and they remained low through the end of sampling on 3 July. Small larval numbers were high in the untreated plots through 16 June while large larval numbers peaked on 22 June and they remained high through 3 July (Tables 3 and 4). Plant defoliation slowly increased in the untreated plots during June and peaked at 68.8% on 3 July (Table 5).

Many of the materials evaluated provided good Colorado potato beetle control under the high insect pressures found at the Hancock location. Registered and experimental pyrethroids provided good small and large larval control with good persistence (Tables 3 and 4) and minimal defoliation was recorded in the plots (Table 5).

The registered nicotinyls Assail and Actara also effectively controlled CPB larvae and these treatments and after 2 applications at a 7 day interval had prevented additional defoliation (Table 5). The experimental nicotinyls Clutch, Venom and V10170 provided excellent larval control with 14 days persistence (Tables 3 and 4) that resulted in no defoliation (Table 5).

The reduced risk insecticide Spintor is typically less persistent than either the pyrethroids or nicotinyls but in this study (a two spray program) defoliation was similar to what was seen in the pyrethroid treatments.

The growth regulator Rimon provided good control at both 9 and 12 oz. rates (0.0584 and 0.078 lb. a.i./a) (Tables 3 and 4). Small larval control was not seen at 2 days after application, as expected with the growth regulator mode of action, but subsequent control was good through 15 days. Similar trends were seen with large larvae (Table 4) which were controlled effectively after 2 days and defoliation was held below 4% through 3 July.

DPX E2Y45 also provided good control after application on 11 June (Tables 3 and 4). The higher rates of DPX E2Y45 performed better than the low rate. The addition of MSO (methylated seed oil) did enhance insecticide performance at this location.

Table 1. Colorado potato beetle adults sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean adults per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Clutch 50WG	0.094	0.3 de	0.3 f	0.0 d	0.0 cd	0.0 d
Clutch 50WG	0.125	1.3 a-e	0.3 f	0.0 d	0.0 cd	0.0 d
Venom 70SG	0.066	1 b-e	1.3 b-f	0.3 cd	0.3 bcd	0.3 cd
V10170 50WG	0.022	0.3 de	1.0 c-f	0.0 d	0.5 bcd	0.5 bcd
Assail 30WG	0.0506	0.3 de	0.5 ef	0.0 d	0.0 cd	0.0 d
Actara 50WG	0.0234	0.0 e	0.5 ef	0.0 d	0.8 bcd	0.8 bcd
Actara 50WG	0.047	0.0 e	0.3 f	0.3 cd	0.0 cd	0.0 d
A15543	0.234	0.0 e	0.8 def	0.0 d	0.3 bcd	0.3 cd
Warrior 1CS + NIS[1]	0.025	1.8 abc	3.0 ab	2.0 ab	2.8 a	2.8 a
A13623 2.06SC + NIS[1]	0.044	0.0 e	0.0 f	0.0 d	0.0 cd	0.0 d
A13623 2.06SC + NIS[1]	0.0644	0.1 e	0.1 f	0.0 d	0.0 d	0.0 d
Leverage 2.7SC	0.079	0.3 de	0.5 ef	0.0 d	0.3 bcd	0.3 cd
Asana XL 0.66EC + PBO	0.05 + 4 oz/a	0.0 e	2.3 a-e	0.3 cd	0.3 bcd	0.3 cd

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 1. (Continued). Colorado potato beetle adults sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean adults per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Rimon 0.83EC	0.0584	0.5 cde	0.5 ef	0.3 cd	1.0 b	1.0 bc
Spintor 2SC	0.0625	0.3 de	0.3 f	0.0 d	0.0 cd	0.0 d
Rimon 0.83EC	0.078	1.8 a-d	0.8 def	0.3 cd	0.0 cd	0.0 d
DPX-E2Y45 18.5SC	0.022	0.0 e	2.3 a-d	0.5 bcd	1.3 ab	1.3 b
DPX-E2Y45 18.5SC	0.044	1.2 a-d	0.8 def	0.7 bcd	1.0 bc	1.0 bc
DPX-E2Y45 18.5SC	0.066	1.5 a-d	2.8 abc	1.0 bcd	0.5 bcd	0.5 bcd
DPX-E2Y45 18.5SC + MSO	0.022 + 1.0	1.3 a-e	0.5 ef	2.5 a	1.0 b	1.0 bc
Warrior 1CS	0.0223	2.5 ab	5.3 a	1.0 bcd	1.0 bcd	1.0 bc
Untreated	---	2.8 a	0.3 f	1.8 abc	0.0 cd	0.0 d
LSD		0.47	0.57	0.44	0.38	0.36
S.D.		0.33	0.4	0.31	0.27	0.25
C.V.		26.2	29.54	26.68	22.52	21.32
F		2.944	2.771	2.258	2.754	3.106
Prob. (F)		0.0005	0.001	0.0071	0.0011	0.0003

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 2. Colorado potato beetle egg masses sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean egg masses per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Clutch 50WG	0.094	1.5 a	1.3 a	0.0 b	0.0 a	0.0 a
Clutch 50WG	0.125	1.0 a	1.0 a	0.0 b	0.0 a	0.0 a
Venom 70SG	0.066	3.0 a	0.3 a	0.3 b	0.0 a	0.0 a
V10170 50WG	0.022	2.5 a	2.0 a	0.0 b	0.0 a	0.0 a
Assail 30WG	0.0506	1.5 a	1.0 a	0.0 b	0.0 a	0.0 a
Actara 50WG	0.234	0.0 a	1.5 a	0.0 b	0.0 a	0.0 a
A15543	0.234	0.5 a	0.3 a	0.0 b	0.0 a	0.0 a
Warrior 1CS + NIS[1]	0.025	0.0 a	0.8 a	0.0 b	0.0 a	0.0 a
A13623 2.06SC + NIS[1]	0.044	1.3 a	0.8 a	0.8 a	0.3 a	0.3 a
A13623 2.06SC + NIS[1]	0.0644	1.0 a	0.8 a	0.0 b	0.0 a	0.0 a
Leverage 2.7SC	0.079	0.3 a	0.7 a	0.0 b	0.0 a	0.0 a
Asana XL 0.66EC + PBO	0.05 + 4 oz/a	2.3 a	2.0 a	0.0 b	0.0 a	0.0 a

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 2. (Continued). Colorado potato beetle egg masses sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean egg masses per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Rimon 0.83EC	0.0584	0.0 a	0.8 a	0.0 b	0.3 a	0.3 a
Spintor 2SC	0.0625	1.3 a	0.5 a	0.3 b	0.3 a	0.3 a
Rimon 0.83EC	0.078	0.0 a	1.0 a	0.3 b	0.0 a	0.0 a
DPX-E2Y45 18.5SC	0.022	0.0 a	0.8 a	0.0 b	0.0 a	0.0 a
DPX-E2Y45 18.5SC	0.044	0.3 a	0.4 a	1.0 a	0.3 a	0.3 a
DPX-E2Y45 18.5SC	0.066	1.3 a	1.0 a	0.3 b	0.0 a	0.0 a
DPX-E2Y45 18.5SC + MSO	0.022 + 1.0	1.0 a	0.8 a	0.0 b	0.0 a	0.0 a
Warrior 1CS	0.0223	0.8 a	1.3 a	0.0 b	0.0 a	0.0 a
Untreated	---	0.3 a	1.3 a	0.0 b	0.0 a	0.0 a
LSD		0.62	0.5	0.17	0.13	0.13
S.D.		0.44	0.36	0.12	0.09	0.09
C.V.		34.03	26.33	11.18	8.73	8.73
F		1.488	0.762	3.293	1.018	1.018
Prob. (F)		0.1162	0.7511	0.0001	0.4569	0.4569

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 3. Colorado potato beetle small larvae sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Clutch 50WG	0.094	12.0 ef	2.0 ghi	0.5 b	0.0 c	0.0 c
Clutch 50WG	0.125	17.0 cde	3.0 f-i	0.0 b	0.0 c	0.0 c
Venom 70SG	0.066	26.5 cde	0.8 hi	0.3 b	0.3 c	0.3 c
V10170 50WG	0.022	19.8 cde	3.3 e-i	0.0 b	0.3 c	0.3 c
Assail 30WG	0.0506	10.8 ef	1.0 hi	0.3 b	0.0 c	0.0 c
Actara 50WG	0.234	15.8 def	3.5 f-i	0.0 b	0.0 c	0.0 c
A15543	0.234	10.8 ef	0.0 i	0.0 b	0.0 c	0.0 c
Warrior 1CS + NIS[1]	0.025	24.8 cde	5.0 f-i	0.0 b	0.0 c	0.0 c
A13623 2.06SC + NIS[1]	0.044	13.3 def	8.0 d-h	2.8 b	0.3 c	0.3 c
A13623 2.06SC + NIS[1]	0.0644	15.5 def	1.5 ghi	0.0 b	0.0 c	0.0 c
Leverage 2.7SC	0.079	0.1 f	2.0 i	0.4 b	0.1 c	0.1 c
Asana XL 0.66EC + PBO	0.05 + 4 oz/a	18.3 def	0.3 i	0.0 b	0.0 c	0.0 c

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 3. (Continued). Colorado potato beetle small larvae sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Rimon 0.83EC	0.0584	75.0 a	29.5 b	13.8 a	6.5 a	6.5 a
Spintor 2SC	0.0625	10.8 ef	0.5 i	0.0 b	0.0 c	0.0 c
Rimon 0.83EC	0.078	67.5 a	21.8 bc	14.5 a	5.5 ab	5.5 ab
DPX-E2Y45 18.5SC	0.022	31.8 cde	14.0 c-f	5.5 b	4.3 abc	4.3 abc
DPX-E2Y45 18.5SC	0.044	36.6 bcd	15.4 bcd	1.4 b	0.1 c	0.1 c
DPX-E2Y45 18.5SC	0.066	43.3 abc	9.0 c-g	1.8 b	0.0 c	0.0 c
DPX-E2Y45 18.5SC + MSO	0.022 + 1.0	31.8 bcd	11.8 c-f	0.5 b	1.0 bc	1.0 bc
Warrior 1CS	0.0223	13.0 def	16.3 cde	1.5 b	1.0 bc	0.3 c
Untreated	---	62.8 ab	75.5 a	13.3 a	5.5 ab	5.5 ab
LSD		2.31	1.68	1.21	0.94	0.93
S.D.		1.64	1.19	0.85	0.66	0.66
C.V.		35.86	43.23	54.93	50.63	50.99
F		4.299	9.674	3.922	2.198	2.219
Prob. (F)		0.0001	0.0001	0.0001	0.009	0.0083

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 4. Colorado potato beetle large larvae sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Clutch 50WG	0.094	3.3 def	0.8 f	0.0 f	0.0 d	0.0 d
Clutch 50WG	0.125	1.8 def	3.3 ef	0.0 f	0.0 d	0.0 d
Venom 70SG	0.066	7.5 def	1.0 f	0.5 f	1.0 d	1.0 d
V10170 50WG	0.022	2.3 def	1.3 f	1.5 def	0.0 d	0.0 d
Assail 30WG	0.0506	3.3 def	0.0 f	0.0 f	0.0 d	0.0 d
Actara 50WG	0.234	5.5 def	1.3 f	0.0 f	0.0 d	0.0 d
A15543	0.234	1.3 ef	0.3 f	0.5 f	0.0 d	0.0 d
Warrior 1CS + NIS[1]	0.025	5.3 def	4.5 def	0.0 f	0.0 d	0.0 d
A13623 2.06SC + NIS[1]	0.044	1.5 ef	7.0 def	5.8 b-e	3.3 cd	3.3 cd
A13623 2.06SC + NIS[1]	0.0644	0.8 ef	0.0 f	0.0 f	0.0 d	0.0 d
Leverage 2.7SC	0.079	0.1 f	1.6 f	1.1 ef	0.6 d	0.6 d
Asana XL 0.66EC + PBO	0.05 + 4 oz/a	1.3 ef	1.0 f	0.5 f	0.0 d	0.0 d

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 4. (Continued). Colorado potato beetle large larvae sampled from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants				
		13 June	16 June	22 June	28 June	3 July
Rimon 0.83EC	0.0584	61.3 a	26.8 c	7.8 bc	10.8 bc	10.8 bc
Spintor 2SC	0.0625	5.5 def	1.0 f	0.0 f	0.0 d	0.0 d
Rimon 0.83EC	0.078	44.0 a	25.3 c	8.3 bcd	12.0 bc	12.0 bc
DPX-E2Y45 18.5SC	0.022	11.5 cde	15.0 cde	2.3 c-f	3.8 cd	3.8 cd
DPX-E2Y45 18.5SC	0.044	17.8 bc	13.4 cd	6.1 cde	1.3 d	1.2 d
DPX-E2Y45 18.5SC	0.066	10.3 bcd	7.5 def	2.3 c-f	0.3 d	0.3 d
DPX-E2Y45 18.5SC + MSO	0.022 + 1.0	24.3 b	11.0 cde	4.0 c-f	1.8 d	1.8 d
Warrior 1CS	0.0223	3.0 def	12.5 cde	4.3 c-f	4.3 cd	1.3 d
Untreated	---	48.8 a	112.8 a	114.0 a	49.0 a	49.0 a
LSD		1.74	1.75	1.2	1.25	1.23
S.D.		1.23	1.24	0.85	0.89	0.87
C.V.		43.22	43.35	40.91	49.59	49.6
F		10.326	14.542	23.087	9.591	9.946
Prob. (F)		0.0001	0.0001	0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 5. Percent defoliation ratings from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean defoliation per plot				
		13 June	16 June	22 June	28 June	3 July
Clutch 50WG	0.094	5.0 a	1.3 de	0.0 b	0.0 b	0.0 b
Clutch 50WG	0.125	6.3 a	1.3 de	0.0 b	0.0 b	0.0 b
Venom 70SG	0.066	3.8 a	1.3 de	0.0 b	0.0 b	0.0 b
V10170 50WG	0.022	5.0 a	0.0 e	0.0 b	0.0 b	0.0 b
Assail 30WG	0.0506	5.0 a	0.0 e	0.0 b	0.0 b	0.0 b
Actara 50WG	0.234	7.5 a	0.0 e	0.0 b	0.0 b	0.0 b
A15543	0.234	6.3 a	0.0 e	0.0 b	0.0 b	0.0 b
Warrior 1CS + NIS[1]	0.025	6.3 a	1.3 de	0.0 b	0.0 b	0.0 b
A13623 2.06SC + NIS[1]	0.044	6.3 a	2.5 cde	0.0 b	0.0 b	0.0 b
A13623 2.06SC + NIS[1]	0.0644	3.8 a	0.0 e	0.0 b	0.0 b	0.0 b
Leverage 2.7SC	0.079	7.0 a	0.3 e	0.1 b	0.4 b	0.4 b
Asana XL 0.66EC + PBO	0.05 + 4 oz/a	7.5 a	1.3 de	0.0 b	0.0 b	0.0 b

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

Table 5. (Continued). Percent defoliation ratings from Russet Burbank variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean defoliation per plot				
		13 June	16 June	22 June	28 June	3 July
Rimon 0.83EC	0.0584	10.0 a	11.3 b	5.0 b	2.5 b	2.5 b
Spintor 2SC	0.0625	7.5 a	0.0 e	0.0 b	0.0 b	0.0 b
Rimon 0.83EC	0.078	8.8 a	6.3 bcd	3.8 b	3.8 b	3.8 b
DPX-E2Y45 18.5SC	0.022	6.3 a	1.3 de	0.0 b	1.3 b	1.3 b
DPX-E2Y45 18.5SC	0.044	8.7 a	3.6 cde	0.1 b	0.4 b	0.4 b
DPX-E2Y45 18.5SC	0.066	6.3 a	3.8 cde	0.0 b	0.0 b	0.0 b
DPX-E2Y45 18.5SC + MSO	0.022 + 1.0	6.3 a	7.5 bc	0.0 b	0.0 b	0.0 b
Warrior 1CS	0.0223	6.3 a	3.8 cde	1.3 b	0.0 b	0.0 b
Untreated	---	10.0 a	25.0 a	63.8 a	68.8 a	68.8 a
LSD		4.57	5.7	7.38	10.09	10.09
S.D.		3.23	4.03	5.22	7.14	7.14
C.V.		49.26	114.23	150.26	197.61	197.61
F		1.131	7.843	26.921	16.707	16.707
Prob. (F)		0.343	0.0001	0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 18 June.
[1]NIS added at 0.25% v/v.

b. Colorado Potato Beetle Control on Dark Red Norland Potatoes.

In a study conducted at the Hancock Agricultural Research Station, Hancock, Wisconsin, experimental and registered foliar insecticides were evaluated for efficacy on all life stages of Colorado potato beetle.

Dark Red Norland variety potatoes were planted on 17 April 2006 into four 20' row plots, replicated four times in a randomized complete block design with replications separated by 15' of cultivated alleyway. Lorox (linuron) at 1 pound product per acre was applied post hilling on 25 May for weed control. Hand weeding provided additional weed control.

Plots were overhead irrigated with 0.5" water every 2-5 days from plant emergence to vine kill.

Asana 0.66E (0.04 lb. a.i./a) and Rynaxypyr 35WG (0.044, 0.066 and 0.088 lb. a.i./a) were evaluated for CPB efficacy.

All materials were applied with a CO_2 backpack sprayer operating at 30 psi, delivering 25 gpa through four flat fan nozzles (8004VS XR) spaced at 18".

Insecticides were applied on 11 June 2006 and 22 June 2006 for first generation Colorado potato beetle (CPB) larval efficacy. First generation CPB efficacy was evaluated at 2, 5 and 11 days after the first insecticide application (11 June) and 4, 7, 13, 20, 27 and 33 days after the second insecticide application on 22 June. CPB populations were monitored with plant counts. All life stages of the CPB (adults, eggs, small and large larvae) were counted on ten randomly chosen plants per plot.

Plant foliage was rated for defoliation on each survey date from 13 June through 25 July. The study was not harvested for yield due to second generation feeding pressure.

Results

Peak first generation adult and egg mass numbers occurred in early June prior to sampling. Adult numbers declined in the study after the initial insecticide applications on 11 June (Table 1) and they remained low through 3 July. Second generation adult numbers peaked on 10 July at 26.8 adults per sample in the untreated plots. Adult numbers remained consistent among the treatments that had foliage, adult numbers declined in the untreated plots due to reduced foliage. Small larval numbers were elevated in the untreated plots through 29 June while large larval numbers peaked on 22 June and they remained high through 3 July (Tables 3 and 4). Plant defoliation slowly increased in the untreated plots during June and peaked at 47.5% on 3 July (Table 5). Second generation adult pressure combined with the remaining first generation larvae caused rapid defoliation in the untreated plots and the plots were totally defoliated by 25 July.

Rynaxypyr provided good control of CPB larvae after application on 11 June (Tables 3 and 4). A second application of Rynaxypyr on 22 June further reduced larval numbers and effectively limited defoliation through 17 July (Table 5). The higher rates of Rynaxypyr performed better than the low rate. The addition of MSO (methylated seed oil) did not enhance insecticide performance at this location.

Asana did reduce larval numbers after the initial application on 11 June and numbers were further reduced after the second application on 22 June (Tables 3 and 4). Defoliation ratings were also lower in the Asana treatment than the untreated plots but higher than the Rynaxypyr treatments (Table 5).

Table 1. Colorado potato beetle adults sampled from Superior variety potatoes treated with foliar insecticides. Hancock Ag Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean adults per 10 plants								
		13 June	16 June	22 June	26 June	29 June	3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	1.0 a	0.8 a	1.3 a	0.3 a	0.0 a	1.0 c	18.5 ab	8.0 a	12.5 a-c
Rynaxypyr 35WG	0.066	0.3 a	0.5 a	1.5 a	2.0 a	0.5 a	0.3 c	7.3 bc	2.0 a	8.5 bcd
Rynaxypyr 35WG	0.088	1.3 a	1.5 a	2.3 a	1.8 a	0.0 a	0.5 c	6.5 c	3.5 a	15.5 ab
Rynaxypyr 35WG + MSO	0.044 + 0.5% v/v	0.5 a	0.8 a	1.8 a	0.3 a	0.5 a	1.5 c	8.8 bc	3.8 a	6.8 cd
Asana XL 0.66EC	0.05	0.5 a	0.0 a	0.5 a	0.8 a	0.3 a	6.0 ab	16.8 ab	7.5 a	5.3 d
Untreated	---	0.5 a	0.5 a	0.3 a	0.3 a	0.3 a	7.5 a	26.8 a	6.3 a	0.0 e
Untreated	---	0.5 a	0.5 a	0.3 a	0.0 a	0.3 a	3.3 bc	25.0 a	7.3 a	0.0 e
LSD		0.52	0.45	0.49	0.48	0.25	0.75	1.33	1.23	1.12
S.D.		0.35	0.31	0.34	0.33	0.17	0.51	0.91	0.84	0.76
C.V.		28.58	24.41	24.00	25.95	15.54	31.58	25.17	35.51	26.81
F		0.370	1.143	1.852	2.189	1.056	6.243	5.272	1.748	10.445
Prob (F)		0.9260	0.3718	0.1162	0.0659	0.4243	0.0002	0.0007	0.1383	0.0001

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 2. Colorado potato beetle egg masses sampled from Superior variety potatoes treated with foliar insecticides. Hancock Ag Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean egg masses per 10 plants								
		13 June	16 June	22 June	26 June	29 June	3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	0.8 a	0.5 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.066	0.5 a	1 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.088	1 a	1 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5% v/v	0.5 a	1.5 a	0.0 a	0.3 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a
Asana XL 0.66EC	0.05	1.3 a	1.3 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Untreated	---	1.5 a	1 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
Untreated	---	1.5 a	1.3 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
LSD		0.53	0.4	0.13	0.23	0.10	0.00	0.00	0.00	0.00
S.D.		0.37	0.27	0.09	0.16	0.07	0.00	0.00	0.00	0.00
C.V.		27.44	19.69	8.93	14.84	6.83	0.00	0.00	0.00	0.00
F		0.447	1.695	1.000	0.484	1.000	0.000	0.000	0.000	0.000
Prob (F)		0.8805	0.1512	0.4613	0.8555	0.4614	1.0000	1.0000	1.0000	1.0000

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 3. Colorado potato beetle small larvae sampled from Superior variety potatoes treated with foliar insecticides. Hancock Ag Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants								
		13 June	16 June	22 June	26 June	29 June	3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	13.3 c	10.3 a	1.0 b	0.8 b	0.3 c	0.0 b	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.066	19.3 bc	9.5 a	4.8 ab	3.0 b	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.088	14.8 c	4.0 a	1.3 b	0.0 b	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5% v/v	23.5 abc	10.0 a	1.0 b	0.0 b	0.0 c	0.0 b	0.0 a	0.0 a	0.0 a
Asana XL 0.66EC	0.05	15.3 c	22.3 a	6.3 ab	0.8 b	2.3 bc	8.0 a	2.5 a	0.0 a	0.0 a
Untreated	---	32.5 ab	17.0 a	9.5 a	11.3 a	9.5 a	0.0 b	0.0 a	0.0 a	0.0 a
Untreated	---	38.5 a	13.5 a	12.5 a	9.8 a	6.5 ab	0.0 b	0.3 a	0.0 a	0.0 a
LSD		1.70	2.37	1.37	1.21	1.12	0.93	0.56	0.00	0.00
S.D.		1.17	1.62	0.94	0.83	0.76	0.64	0.38	0.00	0.00
C.V.		26.56	55.36	49.22	50.35	52.81	54.71	35.66	0.00	0.00
F		2.52	0.896	3.048	4.734	3.59	2.455	1.000	0.000	0.000
Prob (F)		0.0381	0.5352	0.0163	0.0014	0.0071	0.0424	0.4613	1.0000	1.0000

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 4. Colorado potato beetle large larvae sampled from Superior variety potatoes treated with foliar insecticides. Hancock Ag Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants								
		13 June	16 June	22 June	26 June	29 June	3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	11.0 b	16.0 bc	18.8 c	40 b	2.8 bc	0.3 c	0.0 c	0.0 a	0.0 a
Rynaxypyr 35WG	0.066	8.5 b	9.0 bc	15.3 c	6.0 b	1.3 c	0.0 c	0.0 c	0.0 a	0.0 a
Rynaxypyr 35WG	0.088	6.8 b	4.5 c	3.3 cd	0.5 b	0.8 c	0.5 c	0.0 c	0.0 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5% v/v	6.0 b	6.5 c	17.3 c	3.0 b	0.8 c	0.5 c	0.0 c	0.0 a	0.0 a
Asana XL 0.66EC	0.05	9.0 b	27.0 ab	57.5 b	4.8 b	7.5 b	13.5 b	15.8 a	1.8 a	0.0 a
Untreated	---	49.3 a	45.3 a	117.3 a	56.5 a	52.5 a	44.0 a	4.3 b	0.8 a	0.0 a
Untreated	---	44.3 a	49.5 a	85.5 ab	53.3 a	39.5 a	41.8 a	5.8 b	1.3 a	0.0 a
LSD		1.52	2.41	2.4	1.68	1.16	1.12	1.06	0.53	0.00
S.D.		1.04	1.65	1.65	1.15	0.8	0.77	0.72	0.36	0.00
C.V.		29.1	43.29	34.01	38.54	29.9	29.83	44.99	32.05	0.00
F		12.9	4.8	16.298	18.063	35.65	39.028	7.918	1.38	0.000
Prob (F)		0.0001	0.0013	0.0001	0.0001	0.0001	0.0001	0.0001	0.2548	1.0000

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 5. Percent defoliation sampled from Superior variety potatoes treated with foliar insecticides. Hancock Ag Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean defoliation per plot								
		13 June	16 June	22 June	26 June	29 June	3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	0.0 a	0.0 a	0.0 c	1.3 b	0.0 c	1.3 b	0.0 c	1.3 c	53.8 bc
Rynaxypyr 35WG	0.066	0.0 a	0.0 a	0.0 c	0.0 b	0.0 c	0.0 b	1.3 c	0.0 c	30.0 c
Rynaxypyr 35WG	0.088	0.0 a	0.0 a	0.0 c	0.0 b	0.0 c	1.3 b	0.0 c	2.5 c	43.8 bc
Rynaxypyr 35WG + MSO	0.044 + 0.5% v/v	0.0 a	0.0 a	1.3 c	0.0 b	0.0 c	1.3 b	0.0 c	1.3 c	48.8 bc
Asana XL 0.66EC	0.05	0.0 a	1.3 a	10.0 b	6.3 b	7.5 b	10.0 b	8.8 b	37.5 b	95.0 a
Untreated	---	0.0 a	1.3 a	20.0 a	27.5 a	31.3 a	43.8 a	68.8 a	92.5 a	100.0 a
Untreated	---	0.0 a	1.3 a	18.8 a	30.0 a	27.5 a	47.5 a	70.0 a	91.3 a	100.0 a
LSD		0.00	2.08	5.82	7.51	5.53	11.60	5.15	14.51	27.19
S.D.		0.00	1.42	3.99	5.14	3.79	7.95	3.53	9.94	18.63
C.V.		0.00	341.57	71.81	69.86	51.46	68.14	21.34	39.56	29.16
F		0.000	0.771	18.076	22.891	45.339	24.132	291.195	63.755	8.690
Prob (F)		1.0000	0.6311	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Part 2. Insect Control with Foliar Insecticides.

D. Colorado Potato Beetle Control with Rynaxypyr on Dark Red Norland variety Potatoes – Hancock 2006.

In a study conducted at the Hancock Agricultural Research Station, Hancock, Wisconsin, Rynaxypyr was evaluated for efficacy on all life stages of Colorado potato beetle.

Dark Red Norland variety potatoes were planted on 17 April 2006 into four 20' row plots, replicated four times in a randomized complete block design with replications separated by 15' of cultivated alleyway. Lorox (linuron) at 1 pound product per acre was applied post hilling on 25 May for weed control. Hand weeding provided additional weed control.

Plots were overhead irrigated with 0.5" water every 2-5 days from plant emergence to vine kill.

All materials were applied with a CO_2 backpack sprayer operating at 30 psi, delivering 25 gpa through four flat fan nozzles (8004VS XR) spaced at 18".

Insecticides were applied on 11 June 2006 and 22 June 2006 for first generation Colorado potato beetle (CPB) larval efficacy. First generation CPB efficacy was evaluated at 2, 5, and 11 days after the first insecticide application (11 June) and 4, 9, 14, 21, 28 and 36 days after the second insecticide application on 22 June. CPB populations were monitored with plant counts. All life stages of the CPB (adults, eggs, small and large larvae) were counted on ten randomly chosen plants per plot.

Plant foliage was rated for defoliation on each survey date from 13 June through 25 July. The study was not harvested for yield.

Results

Peak first generation adult and egg mass numbers occurred in early June prior to sampling. Preliminary CPB counts on 11 June revealed that there were 6.5 adults, 4.4 egg masses, 103.9 small larvae and 11.5 large larvae per sample (10 plants per sample) and no defoliation in the plots. Adult numbers declined in the study after the initial insecticide applications on 11 June (Table 1) and they remained low through 3 July. Second generation adult numbers peaked at 26.8 adults per sample in the study on 10 July. Adult numbers declined slightly on 17 July and increased slightly on the final sample date (25 July). Small larval numbers were high in the untreated plots through 16 June while large larval numbers peaked on 22 June and they remained high through 3 July (Tables 3 and 4). Plant defoliation slowly increased in the untreated plots during June and became totally defoliated by 25 July (Table 5).

Rynaxypyr provided good Colorado potato beetle control under the high insect pressures found at the Hancock location. Rynaxypyr appears to have some adult efficacy (Table 1). Adult numbers were significantly lower among three of the Rynaxypyr treatments than numbers in the untreated plots on 10 July. (21 days after the second application). A rate response was also observed with the higher rates providing better adult control and the addition on MSO numerically increased efficacy at the low rate. At 36 days after application (25 July) adult numbers had significantly increased in all the Rynaxypyr treatments.

A 2 spray program of Rynaxypyr effectively reduced small and large larval numbers at the three rates evaluated (0.044, 0.066 and 0.088 lb. a.i./a) (Tables 3 and 4). Small and large larval numbers were significantly reduced in the Rynaxypyr treatments by 2 days after application numbers were further reduced after a second application on 22 June.

Defoliation ratings from the plot reveal that even though there were low numbers of larvae found among the Rynaxypyr treatments there was no significant defoliation occurring (Table 5). Defoliation was limited to less than 3% in all the Rynaxypyr treatments through 17 July while defoliation had reached 37.5% in the Asana treated plots and 90% in the untreated plots.

Table 1. Colorado potato beetle adults sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean adults per 10 plants				
		13 June	16 June	22 June	26 June	29 June
Rynaxypyr 35WG	0.044	1.0 a	0.8 a	1.3 a	0.3 a	0.0 a
Rynaxypyr 35WG	0.066	0.3 a	0.5 a	1.5 a	2.0 a	0.5 a
Rynaxypyr 35WG	0.088	1.3 a	1.5 a	2.3 a	1.8 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5%	0.5 a	0.8 a	1.8 a	0.3 a	0.5 a
Asana XL 0.66EC	0.05	0.5 a	0.0 a	0.5 a	0.8 a	0.3 a
Untreated	---	0.5 a	0.5 a	0.3 a	0.3 a	0.3 a
Untreated	---	0.5 a	0.5 a	0.3 a	0.0 a	0.3 a
LSD		0.52	0.45	0.49	0.48	0.25
S.D.		0.35	0.31	0.34	0.33	0.17
C.V.		28.58	24.41	24	25.95	15.54
F		0.37	1.143	1.852	2.189	1.056
Prob. (F)		0.926	0.3718	0.1162	0.0659	0.4243

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 1. (Continued). Colorado potato beetle adults sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean adults per 10 plants			
		3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	1.0 c	18.5 ab	8.0 a	12.5 abc
Rynaxypyr 35WG	0.066	0.3 c	7.3 bc	2.0 a	8.5 bcd
Rynaxypyr 35WG	0.088	0.5 c	6.5 c	3.5 a	15.5 ab
Rynaxypyr 35WG + MSO	0.044 + 0.5%	1.5 c	8.8 bc	3.8 a	6.8 cd
Asana XL 0.66EC	0.05	6.0 ab	16.8 ab	7.5 a	5.3 d
Untreated	---	7.5 a	26.8 a	6.3 a	0.0 e
Untreated	---	3.3 bc	25.0 a	7.3 a	0.0 e
LSD		0.75	1.33	1.23	1.12
S.D.		0.51	0.91	0.84	0.76
C.V.		31.58	25.17	35.51	26.81
F		6.243	5.272	1.748	10.445
Prob. (F)		0.0002	0.0007	0.1383	0.0001

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 2. Colorado potato beetle egg masses sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean egg masses per 10 plants				
		13 June	16 June	22 June	26 June	29 June
Rynaxypyr 35WG	0.044	0.8 a	0.5 a	0.0 a	0.3 a	0.0 a
Rynaxypyr 35WG	0.066	0.5 a	1.0 a	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.088	1.0 a	1.0 a	0.0 a	0.3 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5%	0.5 a	1.5 a	0.0 a	0.3 a	0.3 a
Asana XL 0.66EC	0.05	1.3 a	1.3 a	0.0 a	0.3 a	0.0 a
Untreated	---	1.5 a	1.0 a	0.3 a	0.0 a	0.0 a
Untreated	---	1.5 a	1.3 a	0.0 a	0.3 a	0.0 a
LSD		0.53	0.40	0.13	0.23	0.10
S.D.		0.37	0.27	0.09	0.16	0.07
C.V.		27.44	19.69	8.93	14.84	6.83
F		0.447	1.695	1.000	0.484	1.000
Prob. (F)		0.8805	0.1512	0.4613	0.8555	0.4614

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 2. (Continued). Colorado potato beetle egg masses sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean egg masses per 10 plants			
		3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	0.0 a	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.066	0.0 a	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.088	0.0 a	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5%	0.0 a	0.0 a	0.0 a	0.0 a
Asana XL 0.66EC	0.05	0.0 a	0.0 a	0.0 a	0.0 a
Untreated	---	0.0 a	0.0 a	0.0 a	0.0 a
Untreated	---	0.0 a	0.0 a	0.0 a	0.0 a
LSD		0.00	0.00	0.00	0.00
S.D.		0.00	0.00	0.00	0.00
C.V.		0.00	0.00	0.00	0.00
F		0.000	0.000	0.000	0.000
Prob. (F)		1.0000	1.0000	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 3. Colorado potato beetle small larvae sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants				
		13 June	16 June	22 June	26 June	29 June
Rynaxypyr 35WG	0.044	13.3 c	10.3 a	1.0 b	0.8 b	0.3 c
Rynaxypyr 35WG	0.066	19.3 bc	9.5 a	4.8 ab	3.0 b	0.0 c
Rynaxypyr 35WG	0.088	14.8 c	4.0 a	1.3 b	0.0 b	0.0 c
Rynaxypyr 35WG + MSO	0.044 + 0.5%	23.5 abc	10.0 a	1.0 b	0.0 b	0.0 c
Asana XL 0.66EC	0.05	15.3 c	22.3 a	6.3 ab	0.8 b	2.3 bc
Untreated	---	32.5 ab	17.0 a	9.5 a	11.3 a	9.5 a
Untreated	---	38.5 a	13.5 a	12.5 a	9.8 a	6.5 ab
LSD		1.7	2.37	1.37	1.21	1.12
S.D.		1.17	1.62	0.94	0.83	0.76
C.V.		26.56	55.36	49.22	50.35	52.81
F		2.52	0.896	3.048	4.734	3.59
Prob. (F)		0.0381	0.5352	0.0163	0.0014	0.0071

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 3. (Continued). Colorado potato beetle small larvae sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants			
		3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	0.0 b	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.066	0.0 b	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG	0.088	0.0 b	0.0 a	0.0 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5%	0.0 b	0.0 a	0.0 a	0.0 a
Asana XL 0.66EC	0.05	8 a	2.5 a	0.0 a	0.0 a
Untreated	---	0.0 b	0.0 a	0.0 a	0.0 a
Untreated	---	0.0 b	0.3 a	0.0 a	0.0 a
LSD		0.93	0.56	0.00	0.00
S.D.		0.64	0.38	0.00	0.00
C.V.		54.71	35.66	0.00	0.00
F		2.455	1.000	0.000	0.000
Prob. (F)		0.0424	0.4613	1.0000	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 4. Colorado potato beetle large larvae sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants				
		13 June	16 June	22 June	26 June	29 June
Rynaxypyr 35WG	0.044	11.0 b	16.0 bc	18.8 c	4.0 b	2.8 bc
Rynaxypyr 35WG	0.066	8.5 b	9.0 bc	15.3 c	6.0 b	1.3 c
Rynaxypyr 35WG	0.088	6.8 b	4.5 c	3.3 cd	0.5 b	0.8 c
Rynaxypyr 35WG + MSO	0.044 + 0.5%	6.0 b	6.5 c	17.3 c	3.0 b	0.8 c
Asana XL 0.66EC	0.05	9.0 b	27.0 ab	57.5 b	4.8 b	7.5 b
Untreated	---	49.3 a	45.3 a	117.3 a	56.5 a	52.5 a
Untreated	---	44.3 a	49.5 a	85.5 ab	53.3 a	39.5 a
LSD		1.52	2.41	2.40	1.68	1.16
S.D.		1.04	1.65	1.65	1.15	0.80
C.V.		29.05	43.29	34.01	38.54	29.90
F		12.891	4.800	16.298	18.063	35.650
Prob. (F)		0.0001	0.0013	0.0001	0.0001	0.0001

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 4. (Continued). Colorado potato beetle large larvae sampled from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 10 plants			
		3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	0.3 c	0.0 c	0.0 a	0.0 a
Rynaxypyr 35WG	0.066	0.0 c	0.0 c	0.0 a	0.0 a
Rynaxypyr 35WG	0.088	0.5 c	0.0 c	0.0 a	0.0 a
Rynaxypyr 35WG + MSO	0.044 + 0.5%	0.5 c	0.0 c	0.0 a	0.0 a
Asana XL 0.66EC	0.05	13.5 b	15.8 a	1.8 a	0.0 a
Untreated	---	44.0 a	4.3 b	0.8 a	0.0 a
Untreated	---	41.8 a	5.8 b	1.3 a	0.0 a
LSD		1.12	1.06	0.53	0.00
S.D.		0.77	0.72	0.36	0.00
C.V.		29.83	44.99	32.05	0.00
F		39.028	7.918	1.380	0.000
Prob. (F)		0.0001	0.0001	0.2548	1.0000

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 5. Percent defoliation ratings from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean defoliation per plot				
		13 June	16 June	22 June	26 June	29 June
Rynaxypyr 35WG	0.044	0.0 a	0.0 a	0.0 c	1.3 b	0.0 c
Rynaxypyr 35WG	0.066	0.0 a	0.0 a	0.0 c	0.0 b	0.0 c
Rynaxypyr 35WG	0.088	0.0 a	0.0 a	0.0 c	0.0 b	0.0 c
Rynaxypyr 35WG + MSO	0.044 + 0.5%	0.0 a	0.0 a	1.3 c	0.0 b	0.0 c
Asana XL 0.66EC	0.05	0.0 a	1.3 a	10.0 b	6.3 b	7.5 b
Untreated	---	0.0 a	1.3 a	20.0 a	27.5 a	31.3 a
Untreated	---	0.0 a	1.3 a	18.8 a	30 a	27.5 a
LSD		0.00	2.08	5.82	7.51	5.53
S.D.		0.00	1.42	3.99	5.14	3.79
C.V.		0.00	341.57	71.81	69.86	51.46
F		0.000	0.771	18.076	22.891	45.339
Prob. (F)		1.0000	0.6311	0.0001	0.0001	0.0001

(Continued)

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

Table 5. (Continued). Percent defoliation ratings from Dark Red Norland variety potatoes treated with foliar insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean defoliation per plot			
		3 July	10 July	17 July	25 July
Rynaxypyr 35WG	0.044	1.3 b	0.0 c	1.3 c	53.8 bc
Rynaxypyr 35WG	0.066	0.0 b	1.3 c	0.0 c	30.0 c
Rynaxypyr 35WG	0.088	1.3 b	0.0 c	2.5 c	43.8 bc
Rynaxypyr 35WG + MSO	0.044 + 0.5%	1.3 b	0.0 c	1.3 c	48.8 bc
Asana XL 0.66EC	0.05	10.0 b	8.8 b	37.5 b	95.0 a
Untreated	---	43.8 a	68.8 a	92.5 a	100.0 a
Untreated	---	47.5 a	70 a	91.3 a	100.0 a
LSD		11.60	5.15	14.51	27.19
S.D.		7.95	3.53	9.94	18.63
C.V.		68.14	21.34	39.56	29.16
F		24.132	291.195	63.755	8.69
Prob. (F)		0.0001	0.0001	0.0001	0.0001

Means in a column followed by the same letter are not significantly different (Least Significant Difference Test, P = 0.05).
All treatments applied 11 June and 22 June.

E. Aphid Control with Foliar Insecticides, Arlington, WI 2006.

Aphid control is frequently necessary in fresh market and processing potato production to avoid direct damage from aphid feeding and to prevent transmission of potato leaf roll virus that can reduce raw product quality due to tuber net necrosis. Both green peach and to a lesser extent potato aphids are important vectors in this regard and although thresholds for treatment vary, treatment is usually applied when populations exceed one per leaf in samples consisting of twenty-five leaves.

Russet Burbank variety potatoes were planted on 26 April into a solid block that was divided into 4 replications of 4 row plots. Rows were planted on 3' centers and plants were 12" apart. Plots were bordered by 2 untreated rows with 12' of bare ground between replications. Spartan (sulfentrazone) at 4 ounces product per acre (oz. pr./a) and Dual II Magnum (metolachlor) at 1.5 pints product per acre (pt. pr./a) was applied post hilling on 25 May for weed control. Hand weeding provided additional weed control. Regent 4SC (fipronil) was applied at the rate of 3.2 oz./a on 17 June for CPB control. All plots were sprayed with Sevin (carbaryl) at 1 qt. pr./a on 17, 23, 30 June, 7, 14, 22 July and 9 August to reduce potato leafhopper and beneficial arthropod populations. Aphid populations were allowed to increase until green peach and potato aphid numbers were at high levels. Infestation levels were monitored by counting green peach and potato aphids on 25 mid plant leaves removed per replication. Aphid numbers did not reach treatable levels and no test materials were applied and no counts were taken.

Results

Aphid numbers did not reach treatable levels at Arlington and no treatments were applied.

Part 3. Full Season Insect Control with Systemic and Foliar Insecticides – Hancock 2006.

In a study conducted at the Hancock Agricultural Research Station, Hancock, Wisconsin, experimental and registered systemic and foliar insecticides were evaluated for efficacy on Colorado potato beetles, potato leafhoppers and aphids. Insect management programs were designed to primarily target the Colorado potato beetle (CPB). Insecticides were chosen to target early, mid and late season CPB populations; not necessarily 1st or 2nd generations.

Russet Burbank variety potatoes were planted on 20 April 2006 into twelve 50' row plots, replicated three times in a randomized complete block design. All plots were separated by 15' of cultivated alleyway and replicates were 15' apart. Plot maintenance was per commercial production practices and was completed by HARS personnel.

Nine management programs were evaluated:

Systemic based programs:

1. Platinum 2SC (8.0 fl. oz./a) in furrow followed by;
   Spintor 2SC (4 fl. oz./a) foliar on 29 June
   Warrior 1CS (3.84 fl. oz./a) on 8 August

2. Cruiser 5FS (0.16 fl. oz./cwt) seed treated followed by;
   Spintor 2SC (4 fl. oz./a) foliar on 29 June
   Warrior 1CS (3.84 fl. oz./a) on 2 August
   Warrior 1CS (3.84 fl. oz./a) on 8 August

7. Admire Pro 4.6SC (7.0 fl oz/a) in furrow followed by;
   Spintor 2SC (4 fl. oz./a) foliar on 29 June
   Spintor 2SC (4.5 fl. oz./a) foliar on 2 August
   Baythroid 2E (2.8 fl. oz./a) foliar on 8 August

Foliar based programs:

3. Spintor 2SC (4.5 fl. oz./a) foliar on 11 June
   Spintor 2SC (4.5 fl. oz./a) foliar on 20 June
   (PLH) Pounce 3.2EC (4 fl oz/a) foliar on 23 June
   Actara 25WG (3 oz/a) foliar on 20 July
   Agrimek 0.15EC (8 fl oz/a) foliar on 14 August

4. Spintor 2SC (4.5 fl. oz./a) foliar on 11 June
   Spintor 2SC (4.5 fl. oz./a) foliar on 20 June
   (PLH) Pounce 3.2EC (4 fl oz/a) foliar on 23 June
   Engeo (4 fl oz./a) foliar on 20 July
   Engeo (4 fl. oz/a) foliar on 8 August

5. Spintor 2SC (4.5 fl. oz./a) foliar on 11 June
   Spintor 2SC (4.5 fl. oz./a) foliar on 20 June
   (PLH) Pounce 3.2EC (4 fl oz/a) foliar on 23 June
   Warrior 1CS (3.84 fl. oz./a) on 20 July
   Warrior 1CS (3.84 fl. oz./a) on 2 August
   Agrimek 0.15EC (8 fl oz/a) foliar on 14 August

6. Alverde 2SC (2.25 fl oz/a) foliar on 11 June
   Alverde 2SC (2.25 fl oz/a) foliar on 20 June
   (PLH) Pounce 3.2EC (4 fl oz/a) foliar on 23 June
   Alverde 2SC (4.5 fl oz/a) foliar on 20 July
   Alverde 2SC (4.5 fl oz/a) foliar on 2 August

8. Rimon 0.83EC (12 fl. oz./a) foliar on 11 June
   Rimon 0.83EC (12 fl. oz./a) foliar on 20 June
   (PLH) Pounce 3.2EC (4 fl oz/a) foliar on 23 June
   Assail 30SG (2.7 oz./a) foliar on 20 July
   Assail 30SG (2.7 oz./a) foliar on 2 August

9. Actara 25WG (3.0 oz./a) foliar on 11 June
   Actara 25WG (3.0 oz./a) foliar on 20 June
   Actara 25WG (3.0 oz./a) foliar on 2 August

Seed spray treatments were applied with a CO_2 pressurized backpack sprayer operating at 30 psi. Preweighed, cut and suberized potato seed was placed in a single layer and sprayed with half of a spray solution. The seed was allowed to dry and then it was flipped over and the remaining spray solution was applied on the other half of the seed pieces. Treated seed was machine planted into solid blocks of potatoes (36’ x 50’). In furrow insecticides were applied in a 4-6” band over suberized seed pieces placed into an open furrow using a CO_2 pressurized back pack sprayer with a single hollow cone nozzle (TXVS-6) delivering 5 gpa at 30 psi.

Foliar materials were applied on 11 June, 20 June and 29 June with a CO_2 backpack sprayer with a 12’ boom operating at 30 psi, delivering 25 gpa through eight flat fan nozzles (8004VS XR) spaced at 18”. Foliar materials were applied on 23 June, 20 July, 2 August, 8 August and 14 August with Hancock Agricultural Research Stations “Spray Coupe”.

Colorado potato beetle (CPB) populations were surveyed weekly from 31 May through 14 August by counting CPB life stages (adults, egg masses, small and large larvae) on ten plants randomly selected from the center two rows of each plot. Damage was recorded weekly by estimating percent defoliation of each plot. Potato leafhopper adults were surveyed weekly from 31 May through 14 August with sweep sampling (25 sweeps per plot). Potato leafhopper nymph, green peach aphid and potato aphids were also surveyed weekly from 31 May through 14 August but with leaf sampling (25 leaves per plot).

Plots were overhead irrigated with 0.5" water every 2-5 days from plant emergence to vine kill.

Plots were vine killed on 15 September (Reglone 1 pt./a) and a single row from the center from each plot was harvested and graded for yield on 11 October. Plot maintenance was conducted by Hancock Agriculture Research Station personnel and was per commercial production.

Results

First generation CPB adults infested the plots during early-mid May and peak oviposition occurred between 31 May and 5 June (Tables 1 and 2). First generation adult and egg mass numbers declined throughout the study after 5 June and remained low until second generation adult numbers began to increase on 10 July. Second generation egg mass numbers were very low and insignificant throughout the study.

Small larval numbers peaked in the study on 5 June and the first foliar applications occurred on 11 June (Table 2). Small larval numbers remained high during the counts on 19 June and a second foliar application was made on 20 June. Small larval numbers peaked again between 31 July and 7 August. Small larval numbers declined after 7 August and they remained low through 29 August.

Large larval numbers peaked in the study on 19 June, 8 days after the first foliar insecticide applications (Table 3). Large larval numbers declined in most of the treatments after the second foliar applications on 20 June. Large larval numbers remained low in most of the treatments through 7 August. After foliar insecticide treatments on 8 August and 14 August large larval numbers declined in all the plots and numbers remained low until the study ended on 29 August.

All of the materials evaluated reduced Colorado potato beetle larval numbers after application (Tables 1-4). It should be noted that the initial applications of Alverde (11 and 20 June) were at half rates due to an error. The remaining applications on 20 July and 2 August were at the correct rates.

The at plant treatments of Platinum, Cruiser and Admire Pro all performed similarly on CPB larvae (Tables 1-4). Platinum applied in furrow at 8 fluid ounces per acre, Cruiser at 0.16 fluid ounces per hundred-weight and Admire Pro applied in furrow a 7 fluid ounces per acre all provided 70 days of larval protection (29 June). Spintor 2SC was applied at 4 fluid ounces per acre to all three treatments on 29 June.

The foliar nicotinyls Actara (3 oz/a) and Assail (2.7 oz./a) provided excellent control of larvae, even under the high larval populations experienced at the Hancock Ag Research Station (Tables 1-4). Both small and large larval numbers were significantly reduced after Actara applications on 11 June, 20 June, 20 July and 8 August. Small and large larval numbers were also significantly reduced after applications of Assail on 20 July and 2 August. Both nicotinyls limited defoliation to less than 10% through 14 August.

Alverde provided excellent larval control at the 4.5 oz/a rate and larval numbers were significantly reduced after applications on 20 July and 2 August (Tables 2 and 3). The mid to late season applications of Alverde limited defoliation to 10% through 21 August. Spintor applied at 4 to 4.5 fluid ounces per acre also reduced larval numbers after application but it required 2 applications during first generation to significantly reduce larval numbers (Tables 2 and 3). The growth regulator Rimon, which was registered in 2004, also required 2 applications during first generation and due to the nature of the insecticide (insect growth regulator) it is a little slower acting than Spintor. Agrimek (8 fl. oz/a) also reduced larval numbers after application during late season. However, defoliation significantly increased after Agrimek had been applied on 14 August but this may have been the result of second generation adult feeding not larval feeding.

The pyrethroids Warrior (3.84 fl oz/a) and Baythroid (2.8 fl. oz./a) provided excellent larval control after applications throughout the season, even though the CPB populations at the Hancock Ag Research Station have shown resistance to the pyrethroids during previous years (Tables 2 and 3).

Potato leafhopper adult populations were low during early June and peaked at 19 adults per 25 sweeps on 19 June (Table 6). After an application on Pounce (4 fl oz/a) on 23 June adult numbers declined throughout the study and numbers remained below threshold levels through 29 August.

The at plant treatments Platinum, Cruiser and Admire Pro provided effective season long potato leafhopper adult control and no additional foliar applications were necessary.

The foliar treatment of Actara in management program 9 also effectively controlled leafhopper populations and no additional foliar were required in management program 9. The management programs with foliar applications of Spintor, Rimon and Alverde did require applications of Pounce (4 fl oz/a) to reduce potato leafhopper adult numbers in the plots.

Potato leafhopper nymph numbers remained well below threshold levels during the season (Table 7). The data demonstrates that with a timely application of a pyrethroid at a reduced rate can effectively limit both potato leafhopper adult and nymph numbers.

Aphid numbers were very low throughout the season (both green peach and potato aphid) and there were no significant differences among treatments (Tables 8 and 9). Potato aphids were found in slightly higher numbers than green peach aphids but both populations remained well below threshold levels through 29 August.

Yields among the treatments were not significantly different and ranged from 511.8 to 589.9 cwt/a (Table 10). There were no percent grade differences among treatment either, indicating that all the management programs provided similar levels of insect control during the season.

This study demonstrates that there are effective systemic and foliar insect management options for insect control on potatoes.

Table 1. Colorado potato beetle adults sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean adults per 10 plants						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	1.0 a	4.3 a	6.7 a	2.0 a	2.0 bc	2.3 ab	0.3 c
2	1.0 a	2.0 a	2.7 a	0.7 a	3.0 ab	0.7 bcd	0.0 c
3	4.3 a	7.0 a	0.3 a	1.3 a	0.7 cd	0.3 cd	2.7 bc
4	2.7 a	3.0 a	4.0 a	1.3 a	0.0 d	0.3 cd	2.0 bc
5	4.0 a	4.3 a	0.7 a	1.0 a	0.3 d	0.0 d	1.3 bc
6	3.3 a	4.7 a	0.0 a	0.3 a	0.0 d	0.3 cd	15.7 a
7	4.0 a	3.0 a	5.3 a	2.3 a	4.7 a	3.0 a	0.3 c
8	4.7 a	6.3 a	1.7 a	1.3 a	0.0 d	1.3 a-d	5.0 b
9	5.3 a	2.7 a	0.0 a	1.3 a	0.0 d	2.0 abc	1.7 bc
LSD	0.95	0.88	1.18	0.99	0.49	0.61	1.13
S.D.	0.55	0.51	0.68	0.57	0.28	0.35	0.66
C.V.	27.16	23.06	40.97	39.70	20.47	25.00	36.62
F	1.522	1.729	2.525	0.265	9.537	2.884	5.624
Prob. (F)	0.2256	0.1672	0.0547	0.9687	0.0001	0.0340	0.0017

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 1. (Continued). Colorado potato beetle adults sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean adults per 10 plants						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	4.0 a	7.3 ab	3.7 a	5.7 ab	1.0 a	5.0 a	5.3 a
2	1.3 a	5.0 bcd	2.0 a	1.7 bc	0.7 a	5.0 a	10.3 a
3	3.0 a	0.0 e	2.7 a	8.3 a	2.0 a	1.3 a	3.7 a
4	0.7 a	0.7 de	1.3 a	3.3 abc	0.7 a	2.7 a	7.3 a
5	3.0 a	7.0 abc	4.7 a	4.0 ab	2.0 a	5.7 a	23.7 a
6	4.3 a	1.7 cde	3.0 a	0.0 c	0.7 a	1.0 a	8.3 a
7	1.7 a	3.7 b-e	7.0 a	6.3 ab	2.3 a	7.3 a	6.7 a
8	5.0 a	3.0 b-e	4.7 a	3.0 bc	0.0 a	3.7 a	4.3 a
9	1.0 a	15.3 a	4.7 a	1.7 bc	0.3 a	3.7 a	10.3 a
LSD	1.17	1.14	1.14	1.12	0.62	1.08	1.61
S.D.	0.68	0.66	0.66	0.65	0.36	0.63	0.93
C.V.	37.61	30.30	32.11	32.09	26.25	29.64	31.58
F	1.136	5.355	1.049	2.770	1.704	1.926	2.504
Prob. (F)	0.3923	0.0022	0.4419	0.0394	0.1733	0.1260	0.0563

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 2. Colorado potato beetle egg masses sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean egg masses per 10 plants						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.3 c	2.0 d	2.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	0.3 c	1.3 d	1.0 a	0.7 a	1.0 a	0.0 a	0.3 a
3	9.0 ab	10.7 ab	0.7 a	0.3 a	0.0 a	0.3 a	0.7 a
4	8.0 ab	10.3 ab	4.0 a	0.3 a	0.3 a	0.0 a	0.0 a
5	10.7 ab	9.7 ab	2.0 a	0.3 a	0.0 a	0.0 a	0.0 a
6	8.0 ab	5.3 bc	1.3 a	0.7 a	0.0 a	0.3 a	0.0 a
7	0.0 c	2.0 cd	3.3 a	0.7 a	1.0 a	0.0 a	0.0 a
8	4.3 bc	10.7 a	1.7 a	1.0 a	0.0 a	0.3 a	0.0 a
9	13.0 a	8.0 ab	1.7 a	0.3 a	0.0 a	0.7 a	0.0 a
LSD	1.22	0.88	1.00	0.62	0.38	0.35	0.29
S.D.	0.70	0.51	0.58	0.36	0.22	0.20	0.17
C.V.	29.57	19.37	35.52	30.53	19.94	18.94	15.94
F	6.591	7.948	0.665	0.217	1.536	0.623	0.847
Prob. (F)	0.0007	0.0002	0.7148	0.9827	0.2210	0.7471	0.5765

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 2. (Continued). Colorado potato beetle egg masses sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean egg masses per 10 plants						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	0.0 a	0.0 b	1.3 abc	0.7 a	0.0 a	0.0 a	0.0 a
2	0.0 a	0.7 a	0.3 bc	0.0 a	0.0 a	0.0 a	0.0 a
3	0.3 a	0.0 b	0.3 bc	0.3 a	0.0 a	0.0 a	0.0 a
4	0.0 a	0.0 b	0.3 bc	0.0 a	0.0 a	0.0 a	0.0 a
5	0.0 a	0.0 b	0.0 c	0.3 a	0.0 a	0.0 a	0.0 a
6	0.0 a	0.0 b	0.0 c	0.0 a	0.0 a	0.0 a	0.0 a
7	0.3 a	0.0 b	2.0 ab	0.3 a	0.0 a	0.0 a	0.0 a
8	0.3 a	0.0 b	0.7 bc	0.0 a	0.0 a	0.0 a	0.0 a
9	0.0 a	0.7 a	3.7 a	0.0 a	0.0 a	0.0 a	0.0 a
LSD	0.25	0.18	0.62	0.32	0.00	0.00	0.00
S.D.	0.15	0.11	0.36	0.19	0.00	0.00	0.00
C.V.	14.00	9.94	26.97	17.36	0.00	0.00	0.00
F	0.667	4.000	3.012	0.741	0.000	0.000	0.000
Prob. (F)	0.7133	0.0088	0.0288	0.6558	1.0000	1.0000	1.0000

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 3. Colorado potato beetle small larvae sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean larvae per 10 plants						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.0 a	0.7 a	0.0 c	10.3 bc	5.3 bc	6.3 b	0.0 a
2	0.0 a	0.0 a	1.0 bc	4.0 c	8.3 b	3.0 bc	0.3 a
3	0.0 a	22.3 a	11.0 bc	8.3 bc	2.0 c	0.7 c	0.3 a
4	3.0 a	21.7 a	9.7 bc	10.7 bc	0.0 c	1.0 c	0.3 a
5	0.0 a	21.3 a	15.7 b	22.7 abc	0.7 c	0.0 c	1.0 a
6	1.3 a	28.3 a	75.7 a	59.3 a	1.0 c	1.7 c	0.0 a
7	0.0 a	0.0 a	1.0 bc	3.3 c	25.7 a	30.3 a	0.3 a
8	0.0 a	28.7 a	50.3 a	23.3 ab	3.3 bc	1.0 c	3.3 a
9	2.0 a	30.3 a	17.3 b	5.3 bc	0.0 c	0.0 c	0.0 a
LSD	1.05	3.67	2.75	2.98	1.37	0.90	0.83
S.D.	0.61	2.12	1.59	1.72	0.79	0.52	0.48
C.V.	51.14	60.87	42.93	48.50	38.36	26.60	40.45
F	0.688	2.320	7.930	3.239	7.993	23.106	0.782
Prob. (F)	0.6965	0.0723	0.0002	0.0217	0.0002	0.0001	0.6251

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 3. (Continued). Colorado potato beetle small larvae sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean larvae per 10 plants						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	0.0 c	0.0 a	7.3 cd	41.3 a	0.0 b	1.7 a	0.0 a
2	0.0 c	0.3 a	33.0 abc	7.7 cd	1.3 b	1.7 a	0.0 a
3	8 ab	0.0 a	0.0 d	2.7 de	10.7 a	0.0 a	0.0 a
4	2.7 bc	0.0 a	0.0 d	27.0 ab	0.0 b	1.0 a	2.3 a
5	1.7 bc	0.7 a	28.0 ab	4.7 cde	2.3 b	2.7 a	2.3 a
6	4.3 abc	0.0 a	10.0 bcd	0.0 e	0.0 b	0.0 a	0.0 a
7	0.0 c	0.0 a	47.3 a	12.3 bc	0.0 b	1.3 a	0.3 a
8	10.7 a	0.0 a	7.0 cd	1.0 de	0.0 b	2.7 a	0.0 a
9	0.0 c	0.3 a	31.7 a	0.0 e	0.0 b	0.3 a	1.0 a
LSD	1.32	0.31	2.52	1.65	1.00	0.87	0.66
S.D.	0.76	0.18	1.46	0.95	0.58	0.50	0.38
C.V.	44.90	16.90	38.85	33.96	41.87	35.40	31.43
F	3.674	0.794	6.229	12.267	5.025	1.245	2.040
Prob. (F)	0.0128	0.6162	0.0010	0.0001	0.0030	0.3363	0.1070

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 4. Colorado potato beetle large larvae sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean larvae per 10 plants						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.0 a	0.0 a	0.0 c	5.7 c	5.3 abc	6.7 b	0.0 b
2	0.0 a	0.0 a	0.0 c	4.3 c	4.0 a-d	5.3 bc	0.0 b
3	0.0 a	2.0 a	4.0 bc	10.3 bc	0.3 cd	0.7 d	5.0 a
4	0.0 a	1.3 a	6.7 bc	7.0 c	0.0 d	0.7 d	3.0 ab
5	0.0 a	1.3 a	16.7 abc	10.0 c	2 bcd	0.7 d	2.7 ab
6	0.0 a	1.7 a	39.7 a	69.3 a	0.0 d	2.3 cd	0.3 b
7	0.0 a	0.0 a	0.0 c	6.3 c	12.0 a	15.7 a	0.3 b
8	0.0 a	2.3 a	16.7 ab	36.0 b	7.3 ab	4.7 bc	5.7 a
9	0.0 a	1.0 a	1.7 bc	3.3 c	0.0 d	1.0 d	0.0 b
LSD	0.00	1.04	2.72	2.42	1.31	0.91	1.06
S.D.	0.00	0.60	1.57	1.40	0.76	0.52	0.61
C.V.	0.00	45.20	65.36	39.38	41.64	25.55	40.11
F	0.000	0.541	3.142	6.808	4.129	9.889	2.750
Prob. (F)	1.0000	0.8089	0.0245	0.0006	0.0076	0.0001	0.0405

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 4. (Continued). Colorado potato beetle large larvae sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean larvae per 10 plants						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	0.3 c	0.0 a	0.0 a	32.3 a	0.7 b	3.3 ab	0.0 b
2	0.7 c	0.0 a	2.7 a	17.7 a	2.3 b	1.0 b	0.7 b
3	10.3 ab	0.0 a	0.0 a	0.0 b	13 a	0.0 b	0.0 b
4	2.3 bc	0.0 a	0.7 a	15.3 a	0.0 b	0.0 b	12.7 a
5	3.7 abc	1.0 a	12.7 a	18.3 a	13.0 a	2.7 b	11.0 a
6	4.0 abc	0.0 a	6.7 a	0.0 b	0.0 b	0.7 b	0.0 b
7	0.3 c	0.0 a	12.3 a	17.0 a	1.0 b	4.0 ab	0.0 b
8	15.7 a	0.0 a	6.0 a	2.7 b	1.0 b	9.7 a	2.3 b
9	0.0 c	0.7 a	5.3 a	0.7 b	0.0 b	1.3 b	0.3 b
LSD	1.71	0.31	2.07	1.92	1.48	1.22	0.85
S.D.	0.99	0.18	1.20	1.11	0.85	0.70	0.49
C.V.	52.21	16.53	56.66	36.91	49.69	42.19	29.54
F	2.717	1.943	1.844	7.564	4.272	2.898	14.120
Prob. (F)	0.0423	0.1229	0.1416	0.0003	0.0065	0.0334	0.0001

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 5. Percent defoliation ratings from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean defoliation per plot						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.0 a	0.0 a	0.0 b	0.0 a	0.0 b	0.0 c	0.0 b
2	0.0 a	0.0 a	0.0 b	0.0 a	0.0 b	0.0 c	0.0 b
3	0.0 a	0.0 a	3.3 ab	0.0 a	0.0 b	0.0 c	0.0 b
4	0.0 a	0.0 a	0.0 b	0.0 a	0.0 b	0.0 c	0.0 b
5	0.0 a	0.0 a	0.0 b	0.0 a	0.0 b	0.0 c	0.0 b
6	0.0 a	0.0 a	8.3 a	5.0 a	21.7 a	23.3 a	10.0 a
7	0.0 a	0.0 a	1.7 b	0.0 a	0.0 b	0.0 c	0.0 b
8	0.0 a	0.0 a	5.0 ab	1.7 a	3.3 b	5.0 b	0.0 b
9	0.0 a	0.0 a	5.0 ab	0.0 a	0.0 b	0.0 c	0.0 b
LSD	0.00	0.00	5.07	3.33	4.67	4.16	0.00
S.D.	0.00	0.00	2.93	1.92	2.70	2.41	0.00
C.V.	0.00	0.00	112.88	259.81	97.21	76.41	0.00
F	0.000	0.000	3.189	2.313	21.143	31.120	0.000
Prob. (F)	1.0000	1.0000	0.0231	0.0731	0.0001	0.0001	1.0000

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 5. (Continued). Percent defoliation ratings from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean defoliation per plot						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	0.0 b	1.7 b	0.0 c	15.0 a	16.7 ab	16.7 bc	46.7 bcd
2	0.0 b	0.0 b	3.3 ab	3.3 a	8.3 bc	8.3 c	36.7 cd
3	1.7 b	0.0 b	0.0 c	1.7 a	28.3 a	50.0 a	91.7 a
4	0.0 b	0.0 b	3.3 ab	6.7 a	5.0 bc	15.0 bc	70.0 abc
5	0.0 b	3.3 ab	5.0 a	6.7 a	10.0 bc	28.3 abc	70.0 abc
6	8.3 a	8.3 a	1.7 bc	5.0 a	5.0 bc	10.0 c	80.0 ab
7	0.0 b	0.0 b	5.0 a	6.7 a	3.3 bc	8.3 c	61.7 abc
8	1.7 b	5.0 ab	3.3 ab	3.3 a	1.7 c	38.3 ab	86.7 ab
9	0.0 b	0.0 b	5.0 a	0.0 a	1.7 c	6.7 c	16.7 d
LSD	3.00	5.27	3.17	9.87	13.99	27.15	40.09
S.D.	1.73	3.04	1.83	5.70	8.08	15.69	23.16
C.V.	133.82	149.38	61.83	106.19	90.89	77.71	37.22
F	7.462	2.875	3.586	1.715	3.479	2.882	3.406
Prob. (F)	0.0004	0.0344	0.0142	0.1705	0.0162	0.0341	0.0177

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 6. Potato leafhopper adults sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean adults per 25 sweeps						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.0 a	0.0 a	0.7 a	2.0 c	1.7 a	1.0 de	2.3 a
2	0.0 a	0.0 a	2.7 a	3.0 c	5.0 a	5.7 abc	2.7 a
3	0.0 a	0.0 a	4.7 a	19.0 a	1.0 a	7.7 ab	3.0 a
4	0.0 a	0.0 a	7.0 a	17.3 a	1.0 a	6.0 abc	4.3 a
5	0.0 a	0.0 a	6.0 a	18.0 a	1.0 a	9.7 a	2.3 a
6	0.0 a	0.0 a	6.0 a	10.0 b	0.7 a	3.7 bcd	5.3 a
7	0.0 a	0.0 a	1.7 a	3.7 c	8.3 a	3.0 cde	3.0 a
8	0.0 a	0.0 a	5.3 a	11.7 ab	2.0 a	5.0 abc	3.3 a
9	0.0 a	0.0 a	1.5 a	2.9 c	3.9 a	0.6 e	2.9 a
LSD	0.00	0.00	1.07	0.92	1.13	0.82	0.92
S.D.	0.00	0.00	0.61	0.53	0.65	0.47	0.53
C.V.	0.00	0.00	29.15	17.21	36.57	20.68	26.28
F	0.000	0.000	2.421	13.653	2.342	5.889	0.563
Prob. (F)	1.0000	1.0000	0.0666	0.0001	0.0739	0.0016	0.7919

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 6. (Continued). Potato leafhopper adults sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean adults per 25 sweeps						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	1.3 a	2.0 a	0.3 b	0.0 c	0.0 b	0.0 a	0.0 a
2	2.3 a	0.3 a	0.3 b	0.0 c	0.0 b	0.0 a	0.0 a
3	5.0 a	0.0 a	0.0 b	0.0 c	0.7 b	0.0 a	0.0 a
4	5.0 a	0.3 a	0.7 b	0.3 bc	0.0 b	0.0 a	0.0 a
5	5.3 a	0.7 a	0.7 b	0.0 c	0.0 b	0.0 a	0.0 a
6	1.7 a	3.7 a	8.0 a	2.7 a	5.7 a	0.0 a	0.0 a
7	3.7 a	0.3 a	0.0 b	2.0 ab	0.3 b	0.0 a	0.0 a
8	4.0 a	0.7 a	1.0 b	0.0 c	0.7 b	0.0 a	0.0 a
9	0.8 a	0.1 a	0.3 b	1.7 abc	0.5 b	0.0 a	0.0 a
LSD	0.97	0.80	0.51	0.57	0.37	0.00	0.00
S.D.	0.56	0.46	0.29	0.33	0.21	0.00	0.00
C.V.	28.50	35.71	21.48	26.58	16.81	0.00	0.00
F	1.779	1.724	13.224	3.137	16.117	0.000	0.000
Prob. (F)	0.1600	0.1730	0.0001	0.0269	0.0001	1.0000	1.0000

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 7. Potato leafhopper nymphs sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean nymphs per 25 leaves						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.0 a	0.0 a	0.0 a	0.3 a	0.3 a	0.0 a	0.0 b
2	0.0 a	0.0 a	0.0 a	1.0 a	0.0 a	0.0 a	0.0 b
3	0.0 a	0.0 a	0.3 a	0.3 a	0.0 a	1.3 a	1.3 a
4	0.0 a	0.0 a	1.3 a	1.0 a	0.0 a	0.0 a	0.0 b
5	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.7 a	0.0 b
6	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	6.0 a	0.0 b
7	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b
8	0.0 a	0.0 a	0.3 a	2.3 a	0.0 a	0.3 a	0.0 b
9	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 b
LSD	0.00	0.00	0.38	0.66	0.14	0.96	0.25
S.D.	0.00	0.00	0.22	0.38	0.08	0.55	0.15
C.V.	0.00	0.00	20.13	31.91	8.10	42.78	13.75
F	0.000	0.000	1.557	1.286	0.960	2.093	3.739
Prob. (F)	1.0000	1.0000	0.2190	0.3206	0.5006	0.1035	0.0134

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 7. (Continued). Potato leafhopper nymphs sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean nymphs per 25 leaves						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
2	0.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
3	0.0 a	0.3 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
4	0.7 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
5	1.0 a	0.0 a	0.0 b	0.0 a	0.0 a	0.0 a	0.0 a
6	1.3 a	1.3 a	2.3 a	7.0 a	0.3 a	0.0 a	0.0 a
7	0.3 a	0.0 a	0.3 b	0.0 a	0.0 a	0.0 a	0.0 a
8	0.7 a	0.0 a	0.3 b	0.0 a	0.0 a	0.0 a	0.0 a
9	0.1 a	0.1 a	0.1 b	0.4 a	0.0 a	0.0 a	0.0 a
LSD	0.48	0.46	0.45	1.17	0.14	0.00	0.00
S.D.	0.28	0.26	0.26	0.67	0.08	0.00	0.00
C.V.	23.82	24.89	23.06	59.02	8.10	0.00	0.00
F	1.407	0.869	2.653	1.320	0.960	0.000	0.000
Prob. (F)	0.2706	0.5622	0.0492	0.3061	0.5006	1.0000	1.0000

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 8. Green peach aphids sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean aphids per 25 leaves						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	0.0 a	0.0 a	0.3 a	0.3 a	0.0 a	0.0 a	0.7 a
4	0.0 a	0.0 a	1.3 a	0.7 a	0.0 a	0.3 a	2.0 a
5	0.0 a	0.0 a	3.0 a	1.7 a	0.0 a	0.7 a	1.3 a
6	0.0 a	0.0 a	0.3 a	1.3 a	0.0 a	0.3 a	0.0 a
7	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a
8	0.0 a	0.0 a	0.7 a	0.0 a	0.0 a	0.3 a	1.3 a
9	0.0 a	0.0 a	0.3 a	0.1 a	0.0 a	0.0 a	0.0 a
LSD	0.00	0.00	0.72	0.44	0.00	0.30	0.63
S.D.	0.00	0.00	0.41	0.25	0.00	0.17	0.36
C.V.	0.00	0.00	34.73	21.73	0.00	15.99	29.51
F	0.000	0.000	1.427	2.531	0.000	1.059	1.627
Prob. (F)	1.0000	1.0000	0.2630	0.0577	1.0000	0.4390	0.1983

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 8. (Continued). Green peach aphids sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean aphids per 25 leaves						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
4	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
5	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.7 a
6	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
7	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
8	2.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	1.0 a
9	0.2 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
LSD	0.59	0.14	0.00	0.00	0.00	0.00	0.30
S.D.	0.34	0.08	0.00	0.00	0.00	0.00	0.17
C.V.	31.43	8.10	0.00	0.00	0.00	0.00	16.45
F	0.847	0.960	0.000	0.000	0.000	0.000	0.832
Prob. (F)	0.5779	0.5006	1.0000	1.0000	1.0000	1.0000	0.5883

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 9. Potato aphids sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean aphids per 25 leaves						
	31 May	5 June	13 June	19 June	26 June	3 July	10 July
1	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	0.0 a	0.0 a	1.7 a	1.0 a	0.0 a	0.3 a	1.0 a
4	0.0 a	0.0 a	1.3 a	3.3 a	0.0 a	1.0 a	2.7 a
5	0.0 a	0.0 a	0.7 a	1.0 a	0.7 a	0.7 a	2.3 a
6	0.0 a	0.0 a	0.7 a	2.7 a	0.3 a	1.3 a	0.0 a
7	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.7 a
8	0.0 a	0.0 a	3.0 a	3.3 a	0.3 a	0.3 a	1.7 a
9	0.0 a	0.0 a	0.4 a	0.2 a	0.1 a	0.1 a	0.3 a
LSD	0.00	0.00	0.76	0.95	0.32	0.49	0.79
S.D.	0.00	0.00	0.44	0.55	0.18	0.28	0.46
C.V.	0.00	0.00	34.11	39.39	17.41	24.17	35.28
F	0.000	0.000	1.381	1.753	0.805	1.165	1.742
Prob. (F)	1.0000	1.0000	0.2807	0.1659	0.6087	0.3794	0.1687

(Continued)

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 9. (Continued). Potato aphids sampled from Russet Burbank variety potatoes managed with various insecticide programs. Hancock Ag Research Station, Hancock, WI 2006.

Management Program	Mean aphids per 25 leaves						
	17 July	25 July	31 July	7 August	14 August	21 August	29 August
1	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
2	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
3	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
4	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
5	0.3 a	0.0 a	0.0 a	0.0 a	0.3 a	0.3 a	0.0 a
6	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
7	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
8	2.0 a	1.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
9	0.0 a	0.1 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a
LSD	0.48	0.35	0.00	0.00	0.14	0.14	0.00
S.D.	0.28	0.20	0.00	0.00	0.08	0.08	0.00
C.V.	25.19	19.17	0.00	0.00	8.10	8.10	0.00
F	1.641	0.960	0.000	0.000	0.960	0.960	0.000
Prob. (F)	0.1943	0.5006	1.0000	1.0000	0.5006	0.5006	1.0000

Means in a column followed by the same letter are not significantly different, LSD (P=0.05).

Table 10. Yields from Russet Burbank variety potatoes treated with systemic insecticides. Hancock Agricultural Research Station, Hancock, WI 2006.

Management program	%Grade		Yield (cwt/A)
	A	B	
1	83.7 a	8.9 a	548.3 a
2	82.9 a	9.4 a	543.3 a
3	83.0 a	8.8 a	520.2 a
4	85.1 a	7.6 a	589.9 a
5	82.0 a	11.9 a	536.9 a
6	84.2 a	10.3 a	511.8 a
7	84.9 a	7.6 a	576.6 a
8	85.1 a	10.6 a	526.8 a
9	83.4 a	10.6 a	572.6 a
LSD	5.76	3.75	75.82
S.D.	3.33	2.16	43.8
C.V.	3.97	22.72	8.00
F	0.336	1.335	1.144
Prob. (F)	0.9390	0.2954	0.3879

Means in a column followed by the same letter are not significantly different LSD (P = 0.05).

Section II. Insect Control on Other Crops.

Part 1. Insect Control on Snap Beans, Arlington, WI 2006.

In the Midwestern United States snap beans are grown primarily for processing with production areas in Wisconsin, Illinois, Minnesota, and Michigan. Wisconsin ranks first nationally with 35% of national production on over 80,000 acres valued at $36 million annually.

The most damaging insect pests are those that attack the pods which result in either pod damage or contamination of the processed product. The European corn borer (ECB) and to a lesser extent the corn earworm (CEW) are the major pod feeding pests with damage primarily from 2^{nd} generation ECB and late flights of CEW in August/September. Damage from both species occurs from flowering to harvest, creating a treatment window of 30-7 days before harvest. Pods are protected during this window with a 2-4 spray program when crop maturity coincides with moth flights. A typical spray program in Wisconsin includes a pyrethroid (Capture, Warrior, or Mustang) frequently used in rotation with an organophosphate (Orthene).

Although much of the insecticides used on snap beans are targeted at bloom/pod pests, there is never the less a complex of insects which frequently attacks snap beans prior to bloom. These insect pests in Wisconsin have traditionally been the seed corn maggot (SCM) and potato leafhopper (PLH). SCM adults lay eggs in the soil over freshly planted bean seeds and larvae (maggots) tunnel in germinating seeds and plants causing seedling distortion and stand loss. Control of SCM has been achieved with a seed treatment using the organophosphate (OP) insecticide Lorsban with most of the snap bean acreage being treated. PLH adults migrate into emerged beans and feed by extracting sap and causing leaf chlorosis, necrosis and yield loss. Control of PLH is achieved with foliar sprays at threshold using low rates of pyrethroids (Capture, Warrior, Asana, and Mustang), organophosphates (Dimethoate) or carbamates (Sevin, Lannate).

A. European Corn Borer Control on Snap Bean with Foliar Insecticides. Arlington.

In 2006, an experiment was established at the Arlington entomology research farm to evaluate efficacy of registered and experimental insecticides on European corn borer (ECB) on snap bean.

Plots of Hystyle variety snap beans were planted on 29 May and consisted of two rows by 50’, planted on 30” centers. Plots were separated by two untreated border rows and 12’ alleyways separated four replications arranged in a randomized complete block experimental design. Metolachlor (Dual II Magnum) at 1.3 pint product and imazomox (Raptor) at 4.0 ounces product per acre were applied preemergence on 29 May for weed control. Plots were also mechanically cultivated and hand weeded as necessary to maintain weed control.

All materials were applied using a tractor mounted, air pressurized sprayer operating at 40 psi while delivering 16.9 gpa through four TeeJet XR8004 flat fan nozzles spaced at 18”.

The following insecticides were evaluated for ECB efficacy on snap bean:

Capture 2EC (0.040 lb. a.i./A),
Mustang Max 0.8EC (0.025 lb. a.i./A),
Warrior 1CS (0.0198 and 0.030 lb. a.i./A),
Asana XL 0.66EC (0.0495 lb. a.i./A),
Baythroid 2E (0.0437 lb. a.i./A)
Proaxis 5SC (0.0125 lb. a.i./A)
Spinosad 2SC (0.094 lb. a.i./A),
Entrust 80WP (0.1 lb. a.i./A)
Avaunt 30WG (0.0656 and 0.11 lb. a.i./A),
Orthene 97SP (1.0 lb. a.i./A),
Lannate 29E (0.91 lb. a.i./A)
Assail 30SG (0.094 lb. a.i./A)
Sevin 4F (1.0 lb. a.i./A)
Decis 1.5EC (0.028 lb. a.i./A)

Insecticide applications were made on 15 July, which was three days after the first ECB infestation (12 July) and three days prior to the second infestation (18 July).

Five consecutive plants in each plot were pinned with wax paper strips, each containing 10 blackhead stage ECB egg masses. Egg masses were placed on the plants during optimal environmental conditions (early evening hours) to increase larval survival.

Plots were harvested and evaluated on 3 August (early pinning) and 8 August (late pinning) and included the inspection of the pods and stems of the five infested plants from each infestation, recording damage and presence of live larvae.

Results

The early artificial infestations in 2006 (12 July) at first pin pod resulted in an average of 2.3 larvae in 8.8 damaged pods from the untreated plots while an average of 3.5 larvae were found in 11.0 damaged stems (Table 1). The pyrethroids (Capture, Mustang Max, Warrior, Baythroid, Proaxis, Asana and Decis) performed well and all had fewer damaged pods and stems than the untreated plots. Spintor, Entrust and Orthene performed very well, limiting pod and stem damage with few larvae found. Sevin and Avaunt provided control similar to the pyrethroids.

The late artificial infestations on 18 July resulted in an average of 7.0 larvae in 9.3 damaged pods while an average of 1.0 larvae were found in 5.0 damaged stems from the untreated plots (Table 2). Overall larval numbers were lower among all the treatments in comparison to the earlier infested plots, indicating a less successful artificial infestation. However, pod and stem damage was significantly lower among the treated plots than numbers found in the untreated plots.

Table 1. European corn borer larvae and damage on Hystyle variety snap beans infested on 12 July. Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Damage per 5 plants			Total pods	Mean larvae from stems			Mean larvae from pods		
		Plants	Stems	Pods		Total	Small	Large	Total	Small	Large
Untreated	---	5.0 a	11.0 a	8.8 ab	54.0 a	3.5 a	1.5 a	2.0 a	2.3 abc	0.8 a	1.5 abc
Capture 2EC	0.04	1.0 cde	1.0 d	1.5 e	68.3 a	0.3 b	0.3 a	0.0 c	0.3 e	0.3 a	0.0 d
Mustang Max 0.8EC	0.025	1.0 cde	1.5 cd	2.5 de	56.3 a	0.3 b	0.3 a	0.0 c	0.8 cde	0.8 a	0.0 d
Warrior 1CS	0.0198	2.0 cd	2.3 cd	5.0 b-e	60.8 a	0.0 b	0.0 a	0.0 c	2.0 a-d	1.0 a	1.0 bcd
Warrior 1CS	0.03	1.0 de	0.8 d	2.0 de	61.8 a	0.3 b	0.3 a	0.0 c	1.3 b-e	0.5 a	0.8 bcd
Asana XL 0.66EC	0.0495	4.0 ab	5.5 bc	6.3 bcd	52.0 a	1.3 b	0.3 a	1.0 b	2.0 a-d	0.8 a	1.3 abc
Baythroid 2E	0.0437	2.0 cd	3.0 cd	4.3 cde	56.5 a	0.8 b	0.5 a	0.3 bc	1.0 b-e	0.8 a	0.3 cd
Proaxis 5SC	0.0125	2.0 cd	2.8 cd	1.8 e	51.5 a	0.0 b	0.0 a	0.0 c	1.3 b-e	0.5 a	0.8 bcd
Untreated	---	5.0 a	10.8 a	7.5 abc	49.0 a	2.8 a	0.8 a	2.0 a	3.5 a	1.3 a	2.3 a
Spintor 2SC	0.094	2.0 cd	2.3 cd	2.5 de	67.0 a	1.3 b	1.3 a	0.0 c	0.3 e	0.3 a	0.0 d
Entrust 80WP	0.1	1.0 de	0.8 d	1.3 e	54.3 a	0.0 b	0.0 a	0.0 c	0.5 de	0.3 a	0.3 cd
Orthene 97SP	1.0	2.0 cd	1.5 cd	2.0 de	51.5 a	0.5 b	0.3 a	0.3 bc	0.3 e	0.0 a	0.3 cd
Lannate 29E	0.91	1.0 cde	1.3 d	4.3 cde	50.0 a	0.5 b	0.5 a	0.0 c	1.3 b-e	0.3 a	1.0 a-d
Assail 30SG	0.094	4.0 a	7.8 ab	11.0 a	52.3 a	1.0 b	0.3 a	0.8 bc	3.0 ab	1.3 a	1.8 ab
Avaunt 30WG	0.0656	2.0 cd	2.5 cd	2.8 de	57.5 a	0.3 b	0.3 a	0.0 c	0.0 e	0.0 a	0.0 d
Avaunt 30WG	0.11	0.0 e	0.0 d	1.8 e	59.5 a	0.0 b	0.0 a	0.0 c	0.0 e	0.0 a	0.0 d
Sevin 4F	1.0	2.0 bc	4.0 bcd	5.3 b-e	55.5 a	0.8 b	0.3 a	0.5 bc	2.5 ab	0.8 a	1.8 ab
Decis 1.5EC	0.028	1.0 cde	1.5 cd	3.5 cde	69.5 a	0.5 b	0.5 a	0.0 c	0.5 de	0.3 a	0.3 cd
LSD		1.4	4.11	4.33	19.51	0.44	0.4	0.27	0.51	0.38	0.42
S.D.		1	2.91	3.06	13.8	0.31	0.28	0.19	0.36	0.27	0.3
C.V.		52.6	87.17	74.75	24.18	24.51	24.91	16.81	25.37	22.53	23.82
F		7.264	5.191	3.252	0.824	3.753	0.966	6.048	3.338	1.233	2.781
Prob. (F)		0.0001	0.0001	0.0006	0.6591	0.0001	0.5085	0.0001	0.0004	0.2746	0.0025

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).

Table 2. European corn borer larvae and damage on Hystyle variety snap beans infested on 18 July. Arlington, WI 2006.

Treatment	Rate (lb. a.i./A)	Damage per 5 plants			Total pods	Mean larvae from stems			Mean larvae from pods		
		Plants	Stems	Pods		Total	Small	Large	Total	Small	Large
Untreated	---	3.5 a	5.0 a	9.3 ab	46.5 a	1.0 a	0.5 a	0.5 a	7.0 a	4.3 a	2.8 a
Capture 2EC	0.04	0.3 de	0.3 cd	3.5 cd	48.3 a	0.0 b	0.0 a	0.0 a	0.5 c	0.0 a	0.5 b
Mustang Max 0.8EC	0.025	1.8 bc	2.0 b	0.8 d	43.8 a	1.0 a	0.8 a	0.3 a	0.3 c	0.3 a	0.0 b
Warrior 1CS	0.0198	0.5 de	0.5 bcd	0.8 d	59.8 a	0.0 b	0.0 a	0.0 a	0.0 c	0.0 a	0.0 b
Warrior 1CS	0.03	0.5 de	0.5 bcd	1.0 d	58.0 a	0.3 b	0.3 a	0.0 a	0.3 c	0.3 a	0.0 b
Asana XL 0.66EC	0.0495	0.5 de	0.5 bcd	1.8 d	43.0 a	0.0 b	0.0 a	0.0 a	0.0 c	0.0 a	0.0 b
Baythroid 2E	0.0437	0.0 e	0.0 d	1.5 d	53.5 a	0.0 b	0.0 a	0.0 a	0.5 c	0.5 a	0.0 b
Proaxis 5SC	0.0125	0.0 e	0.0 d	0.8 d	55.8 a	0.0 b	0.0 a	0.0 a	0.3 c	0.3 a	0.0 b
Untreated	---	2.8 ab	4.3 a	11.8 a	58.0 a	0.3 b	0.0 a	0.3 a	5.0 ab	3.0 a	2.0 a
Spintor 2SC	0.094	0.5 de	0.5 bcd	1.3 d	68.0 a	0.0 b	0.0 a	0.0 a	0.5 c	0.3 a	0.3 b
Entrust 80WP	0.1	0.3 de	0.3 cd	2.0 d	55.0 a	0.0 b	0.0 a	0.0 a	0.8 c	0.3 a	0.5 b
Orthene 97SP	1.0	0.3 de	0.3 cd	1.3 d	61.8 a	0.0 b	0.0 a	0.0 a	0.3 c	0.0 a	0.3 b
Lannate 29E	0.91	0.5 de	0.8 bcd	3.8 cd	51.5 a	0.5 ab	0.5 a	0.0 a	1.5 c	1.0 a	0.5 b
Assail 30SG	0.094	1.3 cd	1.8 bc	6.3 bc	56.0 a	0.3 b	0.0 a	0.3 a	1.3 c	1.0 a	0.3 b
Avaunt 30WG	0.0656	0.5 de	0.5 bcd	2.5 d	48.8 a	0.0 b	0.0 a	0.0 a	0.5 c	0.3 a	0.3 b
Avaunt 30WG	0.11	0.5 de	0.5 bcd	1.5 d	54.3 a	0.0 b	0.0 a	0.0 a	0.3 c	0.3 a	0.0 b
Sevin 4F	1.0	0.0 e	0.0 d	1.3 d	45.8 a	0.0 b	0.0 a	0.0 a	2.8 bc	2.5 a	0.3 b
Decis 1.5EC	0.028	0.3 de	0.3 cd	2.5 d	54.8 a	0.0 b	0.0 a	0.0 a	0.0 c	0.0 a	0.0 b
LSD		1.2	1.65	3.74	22.59	0.25	0.21	0.14	0.75	0.69	0.36
S.D.		0.85	1.17	2.65	15.97	0.18	0.15	0.1	0.53	0.49	0.25
C.V.		110.81	118.32	89.47	29.88	16.4	13.97	9.92	39.38	39.4	21.99
F		5.233	6.038	5.471	0.685	1.906	1.401	1.359	2.951	1.605	3.723
Prob. (F)		0.0001	0.0001	0.0001	0.8029	0.0392	0.1752	0.197	0.0015	0.0977	0.0001

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).

B. Seed Corn Maggot, Aphid, Leafhopper and Bean Leaf Beetle Control on Snap Beans with Soil Treatments. Arlington.

In 2006, two experiments were conducted at the Arlington Experimental Station to evaluate efficacy of seed treatments on seed corn maggot, aphids and leafhoppers on snap bean. An early planted trial (4 June) focused on seed corn maggot control with seed treatments and a second planting (18 July) evaluated seed corn maggot, aphid and leafhopper control with the same insecticides.

1. Seed corn maggot study (3 June planting).

At planting (3 June) 360 pretreated Hystyle variety snap bean seeds were counted out for each row and planted into 4-38 foot row plots that were replicated 4 times in a randomized complete block experimental design. Blood meal was applied directly over the rows after planting to attract adult seed corn maggots. Dual II Magnum (metolachlor) at 1 pt./acre and Sandea (halosulfuron) at 0.5 oz./acre were applied pre emergence on 3 June for weed control. Mechanical cultivation and hand weeding provided additional weed control.

Potato leafhopper numbers did not reach threshold levels and were not treated with Warrior 1CS at the rate of 3.2 oz./acre in treatments 8 and 9. Soybean aphid numbers did not reach threshold levels in this study and no foliar treatments were applied for their control.

Seed corn maggot damage ratings were taken at emergence (20 June) and potato leafhopper and soybean aphid counts were taken on 22 June, 28 June, 6 July, 13 July, 19 July, and 27 July. Potato leafhopper adults numbers were monitored by sweep sampling (25 sweeps per plot) while potato leafhopper nymphs and aphids numbers were monitored by leaf samples (25 leaves per plot). Bean leaf beetles did not infest the plots.

The following treatments were evaluated:

1. UNTREATED
2. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v
3. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, A9765 1.28 fl. oz./cwt
4. APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, A14379 3.0 fl. oz/cwt
5. APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, DYNASTY 0.15 fl. oz/cwt, A14379 3.0 fl. oz/cwt
6. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, LORSBAN 2.0 oz wt/cwt
7. CAPTAN 1.75 fl oz/cwt, ALLEGIANCE 1.18 fl oz/cwt, GAUCHO 2.0 fl oz/cwt, STREPTOMYCIN 2.0% v/v
8. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, WARRIOR 3.2 fl oz/a
9. APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, A14379 3.0 fl. oz/cwt, WARRIOR 3.2 fl oz/a

10. FORCE 0.5 fl oz/cwt, A14379 3.0 fl. oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v
11. CAPTAN 2.5 fl oz/cwt, ALLEGIANCE FL 0.2 fl oz/cwt, AG-STREPTOMYCIN 0.7 fl oz/cwt
12. CAPTAN 2.5 fl oz/cwt, ALLEGIANCE FL 0.2 fl oz/cwt, AG-STREPTOMYCIN 0.7 fl oz/cwt, SPINOSAD 0.25 fl oz/cwt

Yields were taken from the center 2 rows of each plot with a commercial bean harvester. Total bean weights were recorded in tons per acre. At the time of harvest (1 August), 75% of the beans were grade 4 and 5.

Results

Seed corn maggot adult populations were closely monitored prior to planting by pan traps and sweep sampling tall grassy areas adjacent to the field. Peak seed corn maggot adult numbers were collected on 3 June (5-6 adults per sweep).

Seed corn maggot populations were moderate at planting and at plant emergence stands were significantly impacted (Table 1). Plant stands ranged from 165.3 to 199.0 plants per row among the treatments. Many of the seed treatments increased plant stands with the A9765 treatment providing the least stand loss. However, all the seed treatments performed very well with similar stands. Spinosad did not provide any added protection with numbers similar to the untreated plots.

Potato leafhopper adults were collected in low numbers from the plots during late June and July (Table 2) and the resulting nymph numbers were also low among the treatments (Table 3). There were significant differences among treatments but since adult numbers were so low and due to the mobile nature of adults' clear trends are difficult to quantify. Potato leafhopper nymph numbers peaked on 13 July at 6 nymphs per sample in the spinosad treatment. The numbered compounds A9765, A14379 and Force provided very good control of potato leafhopper nymphs.

Soybean aphid numbers were very low in the plots during June and July (Table 4) and there were no significant differences among treatments.

Yields among the plots ranged from 2.4 tons/A in the untreated plots to 3.3 tons/A in the A9765 treated plots (Table 5). .Yields among the treated plots were similar reflecting the low insect pressure during the trial, however, yields among the treatments were typically higher than the untreated plots.

Table 1. Seed corn maggot damage on Hystyle variety snap beans treated with systemic insecticides (June 3 planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Final stand	Damaged plants
Untreated	---	181.9 a-d	6.0 a
Control	---	175.6 bcd	4.1 bc
A9765 5FS	1.28	199.0 a	3.8 bcd
A14379 2.4FS	3.0	192.4 ab	3.8 bcd
A14379 2.4FS	3.0	193.3 ab	3.3 bcd
Lorsban 50WP	2.0	188.6 abc	2.9 bcd
Gaucho 4FS	2.0	188.8 abc	3.8 bcd
Warrior 1CS	3.2 fl. oz/a	185.8 abc	3.5 bcd
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	192.4 ab	2.5 cd
Force 2.5FS	0.5	187.4 abc	2.3 d
Control	---	165.3 d	4.4 ab
Spinosad 4SC	0.25	171.4 cd	4.1 bc
LSD		18.69	1.72
S.D.		12.94	1.19
C.V.		6.99	32.23
F		2.344	2.613
Prob (F)		0.029	0.0162

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Table 2. Potato leafhopper adults sampled from Hystyle variety snap beans treated with systemic insecticides (June 3 planting). Arlington, WI 2005.

*Insecticide treatment	Rate (oz/cwt seed)	Mean adults per 25 sweeps					
		20 June	28 June	6 July	13 July	19 July	27 July
Untreated	---	0.0 a	7.8 a	3.3 a	1.5 abc	3.5 bc	9.0 a
Control	---	0.5 a	6.0 ab	5.5 a	2.5 a	4.3 bc	8.3 a
A9765 5FS	1.28	1.0 a	2.3 c-f	2.3 a	2.0 ab	3.3 bc	7.3 a
A14379 2.4FS	3.0	0.5 a	1.8 c-f	2.5 a	1.5 abc	4.0 bc	3.8 a
A14379 2.4FS	3.0	1.0 a	0.5 f	2.3 a	0.3 c	2.5 c	6.0 a
Lorsban 50WP	2.0	0.8 a	4.0 abc	4.0 a	1.0 abc	7.3 ab	10.0 a
Gaucho 4FS	2.0	0.8 a	2.0 c-f	4.3 a	2.5 ab	6.5 ab	8.3 a
Warrior 1CS	3.2 fl. oz/a	0.3 a	3.5 b-e	3.3 a	2.3 ab	6.5 ab	5.3 a
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	0.8 a	1.3 def	2.5 a	0.5 c	7.0 ab	6.0 a
Force 2.5FS	0.5	1.3 a	1.0 ef	2.0 a	0.8 bc	5.0 bc	3.3 a
Control	---	0.8 a	3.5 bcd	1.5 a	0.3 c	5.3 bc	9.5 a
Spinosad 4SC	0.25	1.0 a	7.5 a	5.3 a	0.8 bc	10.3 a	11.5 a
LSD		0.56	0.71	0.9	0.53	0.8	1.1
S.D.		0.39	0.49	0.63	0.37	0.55	0.76
C.V.		30.87	24.78	31.85	25.29	22.46	27.78
F		0.379	5.343	0.942	2.264	2.496	1.327
Prob (F)		0.9554	0.0001	0.5145	0.0345	0.0208	0.2538

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Table 3. Potato leafhopper nymphs sampled from Hystyle variety snap beans treated with systemic insecticides (June 3 planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Mean nymphs per 25 leaves					
		20 June	28 June	6 July	13 July	19 July	27 July
Untreated	---	0.0 a	3.3 a	2.3 abc	3.5 abc	0.8 a	2.0 a
Control	---	0.0 a	0.3 a	5.0 a	1.3 def	1.0 a	1.5 a
A9765 5FS	1.28	0.0 a	0.0 a	0.0 d	0.0 f	1.3 a	1.8 a
A14379 2.4FS	3.0	0.0 a	0.0 a	0.0 d	0.5 ef	0.0 a	2.0 a
A14379 2.4FS	3.0	0.0 a	0.0 a	0.3 cd	0.3 f	0.0 a	1.8 a
Lorsban 50WP	2.0	0.0 a	1.3 a	2.0 a-d	4.3 abc	0.5 a	0.8 a
Gaucho 4FS	2.0	0.3 a	0.0 a	4.0 ab	2.8 cde	1.5 a	2.5 a
Warrior 1CS	3.2 fl. oz/a	0.3 a	0.8 a	2.5 ab	6.0 ab	2.3 a	1.3 a
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	0.0 a	0.0 a	0.0 d	0.5 ef	0.5 a	1.3 a
Force 2.5FS	0.5	0.0 a	0.0 a	0.0 d	0.3 f	0.3 a	0.8 a
Control	---	0.0 a	0.5 a	2.0 bcd	2.8 bcd	0.5 a	1.8 a
Spinosad 4SC	0.25	0.0 a	0.3 a	4.0 ab	6.0 a	1.8 a	2.5 a
LSD		0.12	0.59	0.7	0.66	0.53	0.65
S.D.		0.09	0.41	0.48	0.46	0.36	0.45
C.V.		8.44	35.58	31.18	27.27	28.13	28.79
F		0.882	1.17	4.374	6.538	1.499	0.671
Prob (F)		0.5657	0.3442	0.0005	0.0001	0.1789	0.7552

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Table 4. Soybean aphids sampled from Hystyle variety snap beans treated with systemic insecticides (June 3 planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Mean aphids per 25 leaves					
		20 June	28 June	6 July	13 July	19 July	27 July
Untreated	---	0.5 a	0.3 a	4.0 a	0.0 a	0.0 a	0.0 a
Control	---	2.5 a	0.5 a	0.0 a	0.0 a	0.3 a	0.0 a
A9765 5FS	1.28	1.0 a	0.3 a	0.5 a	0.0 a	0.0 a	0.0 a
A14379 2.4FS	3.0	0.8 a	0.0 a	0.8 a	0.3 a	0.0 a	0.0 a
A14379 2.4FS	3.0	0.5 a	0.5 a	0.8 a	0.0 a	0.3 a	0.0 a
Lorsban 50WP	2.0	0.3 a	0.3 a	0.8 a	0.0 a	0.0 a	0.0 a
Gaucho 4FS	2.0	1.0 a	0.5 a	0.0 a	0.0 a	0.0 a	0.0 a
Warrior 1CS	3.2 fl. oz/a	1.5 a	0.0 a	1.8 a	0.3 a	0.0 a	0.0 a
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	0.0 a	0.0 a	4.0 a	0.0 a	1.3 a	0.0 a
Force 2.5FS	0.5	0.8 a	0.0 a	1.3 a	0.0 a	0.0 a	0.0 a
Control	---	0.8 a	0.3 a	3.0 a	0.0 a	0.0 a	0.0 a
Spinosad 4SC	0.25	0.3 a	0.0 a	3.5 a	0.0 a	0.0 a	0.0 a
LSD		0.61	0.27	0.81	0.12	0.32	0.00
S.D.		0.42	0.19	0.56	0.09	0.22	0.00
C.V.		32.98	17.15	37.34	8.44	21.27	0.00
F		0.888	0.809	1.952	0.882	0.921	0.000
Prob (F)		0.5611	0.6307	0.068	0.5657	0.532	1.0000

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Table 5. Yields of Hystyle variety snap beans treated with systemic insecticides (June 3 planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Yield (tons/A)
Untreated	---	2.4 c
Control	---	2.7 bc
A9765 5FS	1.28	3.3 a
A14379 2.4FS	3.0	3.2 a
A14379 2.4FS	3.0	2.7 bc
Lorsban 50WP	2.0	2.9 ab
Gaucho 4FS	2.0	2.9 ab
Warrior 1CS	3.2 fl. oz/a	2.7 bc
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	3.1 ab
Force 2.5FS	0.5	3.0 ab
Control	---	2.4 c
Spinosad 4SC	0.25	2.4 c
LSD		0.4
S.D.		0.28
C.V.		9.89
F		4.961
Prob (F)		0.0002

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

2. **Seed Corn Maggot, Aphid, Leaf Hopper and Bean Leaf Beetle (16 June planting).**

A second seed treated snap bean trial was planted on 18 July at the Entomology Research Farm, Arlington, WI. At planting 360 pretreated Hystyle variety snap bean seeds were counted out for each row and planted into 4-38 foot row plots that were replicated 4 times in a randomized complete block experimental design. Blood meal was applied directly over the rows after planting to attract adult seed corn maggots. Dual II Magnum (metolachlor) at 1 pt./acre and Sandea (halosulfuron) at 0.5 oz./acre were applied pre emergence on 1 August for weed control. Mechanical cultivation and hand weeding provided additional weed control.

The same treatments were evaluated in this study as the earlier planted study (4 June).

Seed corn maggot damage ratings were taken at emergence (28 July) and potato leafhopper, bean leaf beetle, and soybean aphid counts were taken on 10 August, 15 August and 21 August. Potato leafhopper adults were collected during sweep sampling (25 sweeps per plot) while potato leafhopper nymphs and aphids were monitored with leaf samples (25 leaves per plot). Bean leaf beetles did not infest the plots.

The following treatments were evaluated:

1. UNTREATED
2. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v
3. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, A9765 1.28 fl. oz./cwt
4. APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, A14379 3.0 fl. oz/cwt
5. APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, DYNASTY 0.15 fl. oz/cwt, A14379 3.0 fl. oz/cwt
6. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, LORSBAN 2.0 oz wt/cwt
7. CAPTAN 1.75 fl oz/cwt, ALLEGIANCE 1.18 fl oz/cwt, GAUCHO 2.0 fl oz/cwt, STREPTOMYCIN 2.0% v/v
8. APRON MAXX 1.5 fl oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, WARRIOR 3.2 fl oz/a
9. APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v, A14379 3.0 fl. oz/cwt, WARRIOR 3.2 fl oz/a
10. FORCE 0.5 fl oz/cwt, A14379 3.0 fl. oz/cwt, APRON XL 0.16 fl oz/cwt, STREPTOMYCIN 2.0% v/v
11. CAPTAN 2.5 fl oz/cwt, ALLEGIANCE FL 0.2 fl oz/cwt, AG-STREPTOMYCIN 0.7 fl oz/cwt
12. CAPTAN 2.5 fl oz/cwt, ALLEGIANCE FL 0.2 fl oz/cwt, AG-STREPTOMYCIN 0.7 fl oz/cwt, SPINOSAD 0.25 fl oz/cwt

Foliar insect pressure was very light in August and the study was terminated on 21 August and no yields were taken from the trial.

Results

Seed corn maggot adult populations were closely monitored prior to planting by pan traps and sweep sampling tall grassy areas adjacent to the field. Peak seed corn maggot adult numbers were collected on 18 July (3-4 adults per sweep).

Seed corn maggot populations were moderate at planting and at plant emergence stands were significantly impacted (Table 6). Plant stands ranged from 171.8 to 200.2 plants per row among the treatments. Many of the seed treatments increased plant stands with the A9765 treatment providing the least stand loss. However, all the seed treatments performed well with similar stands. As seen with the first planting in June, Spinosad again did not provide any added protection with numbers similar to the untreated plots.

Potato leafhopper adults were collected in low numbers from the plots during August (Table 7) and the resulting nymph numbers were also low among the treatments (Table 8). Since both numbers of adults and nymphs were so low among the plots conclusions can not be drawn from the data.

Soybean aphids were rarely found among the treatments and there were no significant differences among treatments during any of the sampling dates (Table 9).

Table 6. Seed corn maggot damage on Hystyle variety snap beans treated with systemic insecticides (18 July planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Final stand	Damaged plants
Untreated	---	171.8 d	1.8 b
Control	---	189.3 abc	1.4 bc
A9765 5FS	1.28	200.2 a	0.8 c
A14379 2.4FS	3.0	188.8 bc	1.1 bc
A14379 2.4FS	3.0	180.9 cd	1.9 b
Lorsban 50WP	2.0	185.9 bc	1.1 bc
Gaucho 4FS	2.0	194.1 ab	1.5 bc
Warrior 1CS	3.2 fl. oz/a	185.9 bc	1.5 bc
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	194.9 ab	1.2 bc
Force 2.5FS	0.5	188.7 bc	1.6 bc
Control	---	173.4 d	3.1 a
Spinosad 4SC	0.25	172.1 d	3.4 a
LSD		11.4	0.97
S.D.		7.90	0.67
C.V.		4.26	39.69
F		5.529	5.636
Prob (F)		0.0001	0.0001

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).

*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Table 7. Potato leafhopper adults sampled from Hystyle variety snap beans treated with systemic insecticides (18 July planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Mean adults per 25 sweeps		
		10 August	15 August	21 August
Untreated	---	0.8 a	0.5 a	0.3 cd
Control	---	0.3 a	0.5 a	0.8 bcd
A9765 5FS	1.28	0.3 a	0.0 a	0.0 d
A14379 2.4FS	3.0	0.5 a	0.0 a	0.5 bcd
A14379 2.4FS	3.0	0 a	0.3 a	0.3 cd
Lorsban 50WP	2.0	0.3 a	0.5 a	1.0 abc
Gaucho 4FS	2.0	0.0 a	0.8 a	1.5 ab
Warrior 1CS	3.2 fl. oz/a	2.0 a	1.8 a	2.0 a
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	0.0 a	0.0 a	0.5 bcd
Force 2.5FS	0.5	0.3 a	0.8 a	0.8 bcd
Control	---	0.3 a	0.5 a	0.3 cd
Spinosad 4SC	0.25	1.5 a	0.5 a	0.5 cd
LSD		0.44	0.39	0.38
S.D.		0.31	0.27	0.27
C.V.		25.85	22.65	21.1
F		1.849	1.557	2.402
Prob (F)		0.0849	0.1585	0.0256

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Table 8. Potato leafhopper nymphs sampled from Hystyle variety snap beans treated with systemic insecticides (18 July planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Mean nymphs per 25 leaves		
		10 August	15 August	21 August
Untreated	---	0.3 a	0.0 a	0.0 a
Control	---	0.0 a	0.0 a	0.0 a
A9765 5FS	1.28	0.3 a	0.0 a	0.0 a
A14379 2.4FS	3.0	0.0 a	0.0 a	0.0 a
A14379 2.4FS	3.0	0.0 a	0.0 a	0.0 a
Lorsban 50WP	2.0	0.3 a	0.0 a	0.0 a
Gaucho 4FS	2.0	0.0 a	0.0 a	0.0 a
Warrior 1CS	3.2 fl. oz/a	0.0 a	0.0 a	0.0 a
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	0.0 a	0.0 a	0.0 a
Force 2.5FS	0.5	0.0 a	0.0 a	0.0 a
Control	---	0.0 a	0.0 a	0.3 a
Spinosad 4SC	0.25	0.0 a	0.0 a	0.0 a
LSD		0.15	0.00	0.09
S.D.		0.10	0.00	0.06
C.V.		9.99	0.00	5.93
F		0.835	0.000	1.000
Prob (F)		0.6076	1.0000	0.4671

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Table 9. Soybean aphids sampled from Hystyle variety snap beans treated with systemic insecticides (18 July planting). Arlington, WI 2006.

*Insecticide treatment	Rate (oz/cwt seed)	Mean aphids per 25 leaves		
		10 August	15 August	21 August
Untreated	---	0.0 a	0.3 a	0.0 a
Control	---	0.0 a	0.0 a	0.0 a
A9765 5FS	1.28	0.0 a	0.0 a	0.0 a
A14379 2.4FS	3.0	0.0 a	0.0 a	0.3 a
A14379 2.4FS	3.0	0.0 a	0.0 a	0.3 a
Lorsban 50WP	2.0	0.0 a	0.0 a	0.3 a
Gaucho 4FS	2.0	0.0 a	0.0 a	0.0 a
Warrior 1CS	3.2 fl. oz/a	0.0 a	0.3 a	0.0 a
A14379 2.4FS + Warrior 1CS	3.0 + 3.2 fl oz/a	0.0 a	0.3 a	0.0 a
Force 2.5FS	0.5	0.0 a	0.0 a	0.3 a
Control	---	0.0 a	0.3 a	0.0 a
Spinosad 4SC	0.25	0.0 a	0.3 a	0.3 a
LSD		0.00	0.20	0.20
S.D.		0.00	0.14	0.14
C.V.		0.00	13.27	13.27
F		0.00	0.593	0.593
Prob (F)		1.0000	0.8205	0.8205

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Treatments were also treated with various fungicides, refer to treatment list on page 149-150 for a complete list of seed treatments.

Section II. Insect Control on other Crops.

Part 2. Insect Control on Bell Pepper.

A. European corn borer control on bell peppers with foliar insecticides. Arlington, WI.

In 2006, an experiment was established at the Entomology Research Farm to evaluate efficacy of registered and experimental insecticides in the control of European corn borer (ECB) on bell pepper.

Midway variety bell peppers were planted on 7 June into plots consisting of one 30' row. Plots were separated by 18' of alleyway between replicates. The study was replicated four times and arranged in a randomized complete block experimental design. Treflan was applied preplant incorporated at 2.0 pt./a on 7 June for weed control. Hand weeding and mechanical cultivation provided additional weed control.

All test materials were applied using a CO_2 backpack sprayer operating at 25 psi while delivering 28.77 gpa through two TeeJet XR8003 flat fan nozzles spaced at 18".

The following insecticides were evaluated for ECB control on pepper:

Capture 2E (0.04 lb. a.i./A),
Mustang Max 0.8EC (0.025 lb. a.i./a),
Warrior 1CS (0.025 lb. a.i./a),
Baythroid 2E (0.044 lb. a.i./a),
Asana XL 0.66E (0.05 lb. a.i./a),
Proaxis 4SC (0.1 lb. a.i./a)
Spintor 2SC (0.094 lb. a.i./a),
Avaunt 30WG (0.0656 lb.a.i./a)
Orthene 97SP (0.5 and 1.0 lb. a.i./a)
Sevin XLR 4SC (2 lb. a.i./a)

Insecticide applications were made on 19 August, three days after egg mass pinning (24 August) and 3 days post egg mass pinning (18 August).

At the time of infestation, five consecutive plants in each plot were infested with wax paper strips each containing 10 blackhead stage ECB egg masses. Egg masses were placed on the plants during optimal environmental conditions to enhance larval survival (late evening).

Plots were harvested and evaluated on 31 August (19 days post application) and included inspection of the infested plants fruit, recording damage and presence of live larvae.

Results

Total fruit from the plots was similar among treatments and numbers ranged from 28.8 to 43.8 fruit per treatment (5 plants) (Table 1). Fruit damage was similar among treatments, which were not significantly different than those found in the untreated plots. Damaged among the treatments was similar and there were a few significant differences, indicating the larvae had time to feed prior to the insecticide application 3 days after infestation. There were also significant differences among small larval numbers from the first pinning. Small larval numbers were higher among the treatments than were found in the untreated plots. There were no significant differences among the low numbers of large larvae.

Total fruit from the late pinning plots (24 August) ranged from 33.0 to 45.8 per treatment (5 plants) (Table 2). Egg mass pinning 3 days after the insecticide applications resulted in significant differences among damaged fruit. The pyrethroids, Spintor and both rates of Orthene had significantly less damaged fruit than the untreated plots. Small and large larval numbers were low in the late pinning evaluation and there were no significant differences among treatments.

Table 1. Damage and European Corn Borer Larvae found in Midway variety bell peppers treated with various foliar insecticides (Early pinning). Arlington Research Farm, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean fruit			Mean ECB larvae per plot	
		Total	Dam.	% Dam.	Small	Large
Capture 2E	0.04	28.8 a	4.0 cd	17.9 a	5.0 cde	2.0 a
Mustang Max	0.025	39.0 a	7.5 abc	22.1 a	10.3 abc	0.8 a
Warrior	0.025	35.0 a	8.8 ab	24.4 a	11.8 ab	1.5 a
Baythroid 2E	0.04	31.3 a	5.8 bcd	19.1 a	5.5 bcd	0.3 a
Asana XL 0.66EC	0.05	43.8 a	8.0 ab	19.7 a	6.0 a-d	1.0 a
Proaxis 4SC	0.1	37.5 a	8.5 ab	24.0 a	4.5 cde	0.8 a
Spintor 2SC	0.094	34.5 a	10.3 a	30.2 a	11.3 abc	2.0 a
Avaunt 30WG	0.066	42.3 a	7.3 abc	17.0 a	8.3 a-d	1.0 a
Assail 30WG	0.094	33.8 a	6.0 bcd	23.4 a	6.8 a-d	2.8 a
Orthene 97SP	0.485	32.8 a	6.0 bcd	17.6 a	2.8 de	0.8 a
Orthene 97SP	1.0	36.5 a	2.5 d	6.8 a	0.5 e	0.5 a
Sevin XLR 4SC	2.0	32.8 a	7.8 abc	27.6 a	14.3 a	1.0 a
Untreated	---	33.3 a	6.5 abc	19.8 a	2.8 de	0.8 a
LSD		13.37	3.89	12.93	1.23	0.68
S.D.		9.35	2.72	9.05	0.86	0.48
C.V.		26.38	39.9	43.63	32.9	34.18
F		0.834	2.266	1.625	3.019	0.761
Prob. (F)		0.6161	0.029	0.128	0.0051	0.6846

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
ECB egg masses infested on August 18.

Table 2. Damage and European Corn Borer Larvae found in Midway variety bell peppers treated with various foliar insecticides (Late pinning). Arlington Research Farm, Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean fruit			Mean ECB larvae per plot	
		Total	Dam.	% Dam.	Small	Large
Capture 2E	0.04	33.0 a	0.8 c	2.8 c	0.8 a	0.3 a
Mustang Max	0.025	38.5 a	2.0 c	6.0 c	0.3 a	0.5 a
Warrior	0.025	33.3 a	1.0 c	2.9 c	0.5 a	0 a
Baythroid 2E	0.04	40.5 a	2.3 bc	5.8 c	1.0 a	0.3 a
Asana XL 0.66EC	0.05	37.0 a	1.0 c	2.6 c	0.5 a	0.0 a
Proaxis 4SC	0.1	38.3 a	3.0 bc	7.6 bc	2.0 a	0.0 a
Spintor 2SC	0.094	34.3 a	3.0 bc	9.0 abc	3.3 a	1.0 a
Avaunt 30WG	0.066	34.8 a	1.3 c	3.3 c	1.3 a	0.8 a
Assail 30WG	0.094	38 a	5.3 ab	15.3 ab	5.5 a	0.8 a
Orthene 97SP	0.485	38.5 a	2.5 bc	6.7 bc	1.3 a	0.3 a
Orthene 97SP	1.0	45.8 a	0.3 c	0.6 c	0.0 a	0.3 a
Sevin XLR 4SC	2.0	37.3 a	1.8 c	4.6 c	0.3 a	0.8 a
Untreated	---	37.5 a	6.5 a	17.1 a	8.3 a	1.0 a
LSD		10.05	3.21	8.81	1.12	0.47
S.D.		7.03	2.25	6.16	0.78	0.33
C.V.		18.79	95.83	95.02	52.29	28.24
F		0.92	2.56	2.538	1.551	0.608
Prob. (F)		0.5372	0.0146	0.0154	0.1512	0.8207

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
ECB egg masses infested on August 18.

B. Aphid control on bell peppers with foliar insecticides. Arlington, WI.

The green peach aphid and other aphid species commonly infest peppers in Wisconsin. Aphids overwinter in the egg stage on various woody perennial hosts. After several generations on these hosts in the spring winged aphids leave in search of summer hosts such as pepper. Summer generations develop rapidly and colonization of large areas is possible.

High aphid populations can cause damage either by depositing honeydew on the fruit or through virus transmission, potato virus Y, which can greatly impact yield.

In 2006, an experiment was established at the Arlington Entomology Research Farm to evaluate efficacy of registered and experimental insecticides in the control of aphids on bell pepper.

Midway variety bell peppers were planted on 7 June into plots consisting of one 25' row. Plots were separated by 18' of alleyway between replicates. The study was replicated four times and arranged in a randomized complete block experimental design. Treflan was applied preplant incorporated at 2.0 pt./a on 7 June for weed control. Hand weeding and mechanical cultivation provided additional weed control.

Aphid populations did not reach treatable levels on peppers in 2005 and no treatments were applied in this study.

Section II. Insect Control on other Crops.

Part 3. Control of Lepidopteran Larvae on Cabbage with Foliar Insecticides. Arlington.

Several lepidopteran species are serious insect pests on Wisconsin commercial cabbage production. Larvae of the diamondback moth (DBM), *Plutela xylostella* (L.), the imported cabbage worm (ICW), *Artogiea rapae* (L.), and the cabbage looper (CL), *Trichoplusia ni* (Hubner), require control annually by growers.

Diamondback larvae are spring and summer pests on cabbage, frequently requiring control in both seedbeds and on early transplants. Historically, registered insecticides have effectively controlled DBM larvae, however insecticide resistance in Wisconsin has become an issue in recent years due to importation of resistant larvae on southern transplants. Imported cabbage worm larvae occur in June, July, and August and can cause severe foliage and head damage. Larvae require control on both fresh market and kraut cabbage and on other commercial crucifers such as broccoli and cauliflower. Imported cabbage worm larvae are effectively controlled by a wide range of registered insecticides. The cabbage looper is a migratory pest. Cabbage looper adults migrate into Wisconsin from the south and give rise to two or three larval generations per season. Peak cabbage looper larval activities occur in mid August and into the fall and the larvae are difficult to control. Uncontrolled cabbage looper larvae can cause severe economic losses.

Megaton variety cabbage transplants (80 day maturity), donated by Flannery Farms Inc. Bear Creek, WI, was planted on 30 May 2006. Treatments consisted of two 50’ rows on 3’ centers with plants 16” apart within rows. Treatments were arranged in a randomized complete block experimental design consisting of four replicates. Twelve-foot alleyways separated all plots. Plots were treated with 4 ounces per acre of Spartan (sulfentrazone) and 1.3 pints Dual II Magnum (metolachlor) pretransplant on 30 May 2006 that was immediately incorporated. Mechanical cultivation and hand weeding also aided in weed control.

Treatments consisted of the following materials:

Registered:
- Asana XL 0.66EC (0.05 lb. a.i./a),
- Capture 2EC (0.04 lb. a.i./a),
- Mustang Max 0.8EC (0.025 lb. a.i./a),
- Proaxis 5SC (0.148 lb. a.i./a),
- Warrior 1CS (0.03 lb. a.i./a),
- Avaunt 30WDG (0.065 lb. a.i./a) tank mixed with MSO (0.5% v/v),
- Spintor 2SC (0.094 lb. a.i./a),
- Success 2SC (0.089 lb a.i./a) tank mixed with MSO (0.5% v/v)

Experimental:	DPX E2Y45 (0.044, 0.066 and 0.088 lb. a.i./a) tank mixed with MSO (0.5% v/v), BAS 320I (0.214 and 0.25 lb. a.i./a) tank mixed with Penetrator Plus (0.5% v/v).

All materials were applied using a tractor mounted boom sprayer operating at 40 psi while delivering 25 gpa through four TeeJet (8004VS XR) flat fan nozzles spaced at 18". All materials were tank mixed with Activator 90 at the rate of 8-oz/100 gallon (unless specified). Treatments were applied on 15 August. Insect counts were taken from 5 destructively sampled cabbage heads per plot during sampling.

Results

Lepidopteran larval numbers were low in the study during early August (Tables 1, 2 and 3). All three lepidopteran pests were found in the plots during sampling but imported cabbage worm numbers were higher than cabbage looper and diamondback moth numbers (Tables 1-3).

Imported cabbageworm larval numbers peaked in the untreated plots at 37.5 larvae per 5 heads on 17 August (Table 1). Many of the treatments significantly reduced larval numbers by 2 days and by 7 days post application, however, Asana BAS 320I and DPX E2Y45 had larval numbers as high as the untreated plots. At 7 days post application larval numbers had declined throughout the study and many of the treatments continued to reduce larval numbers in comparison to the untreated plots. On 29 August larval numbers had significantly declined throughout the study but small and large larval numbers remained significantly highest in the untreated plots.

Cabbage looper larval numbers peaked in the untreated plots at 8.3 larvae per 5 plants on 29 August (Table 2). Cabbage looper larvae proved to be harder to control than either Diamondback moth or imported cabbage worm larvae. Small and large larval numbers among the treatments were not significantly different from the untreated plots at 2 days post treatment. Small larval pressure continued at 7 days post treatment but treatment differences were noted. All of the materials with the exception of BAS 320I were significantly reducing small larval numbers. Large larvae were also being effectively controlled by most of the insecticides 7 days post treatment. Similar larval trends were observed at 14 days post treatment but treatment differences were less pronounced due to declining larval numbers throughout the study. Small and large cabbage looper numbers increased 4 days post treatment (2^{nd} application, 26 August) in the untreated plots. All of the materials evaluated, with the exception of BAS 320I (0.143 lb. a.i./a), effectively reduced small and large larval numbers by 4 days post treatment.

Diamondback moth larval numbers were low throughout the study on 17 August and there were no significant differences among treatments (Table 3). At 7 days post application (21 August) diamondback larval numbers remained low and there continued to be no significant differences among treatments. Diamondback moth larval numbers remained at low levels on 29 August and there were only 2 total larvae found per sample in the untreated plots.

Table 1. Imported cabbage worm larvae sampled from Megaton variety cabbage treated with foliar insecticides. Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 5 heads								
		17 August			21 August			29 August		
		Small	Large	Total	Small	Large	Total	Small	Large	Total
Capture 2EC	0.04	2.5 a	5.0 h	7.5 g	0.8 de	1.0 f	1.8 f	0.0 d	0.0 d	0.0 c
Mustang Max 0.8EC	0.025	4.3 a	12.0 c-g	16.3 c-f	0.8 cde	4.5 b-e	5.3 c-f	0.3 d	0.3 d	0.5 c
Asana XL 0.66EC	0.05	4.5 a	19.8 abc	24.3 a-d	2.3 cde	5.0 b-e	7.3 bcd	0.0 d	0.0 d	0.0 c
Proaxis 5SC	0.148	4.8 a	17.8 b-f	22.5 c-f	0.5 e	3.3 c-f	3.8 c-f	0.3 d	1.3 cd	1.5 c
Warrior 1CS	0.03	3.0 a	10.3 d-h	13.3 d-g	1.5 cde	7.0 abc	8.5 bc	0.0 d	0.3 d	0.3 c
*Avaunt 30 WG	0.065	4.8 a	8.0 gh	12.8 efg	0.5 e	1.5 ef	2.0 ef	0.0 d	0.0 d	0.0 c
Spintor 2SC	0.07	3.8 a	9.0 fgh	12.8 fg	0.5 e	3.3 c-f	3.8 def	0.3 d	1.3 cd	1.5 c
Untreated	---	9.5 a	27.0 ab	36.5 ab	8.5 a	11.0 a	19.5 a	2.0 b	4.3 b	6.3 b
*E2Y45 1.67SC	0.044	6.0 a	14.5 c-g	20.5 c-f	3.3 bc	5.3 bcd	8.5 bc	0.3 d	1.0 cd	1.3 c
*E2Y45 1.67SC	0.066	4.8 a	15.8 b-f	20.5 c-f	2.5 cde	3.8 c-f	6.3 b-e	0.5 cd	0.3 d	0.8 c
*E2Y45 1.67SC	0.088	5.0 a	19.3 abc	24.3 a-d	1.0 cde	4.0 cde	5.0 c-f	0.0 d	0.3 d	0.3 c
**BAS 320I 2SC	0.214	10.3 a	18.0 a-d	28.3 abc	2.0 cde	5.0 bcd	7.0 bcd	0.5 cd	1.0 cd	1.5 c
**BAS 320I 2SC	0.25	4.8 a	16.8 b-f	21.5 b-f	3.0 bcd	8.5 ab	11.5 ab	1.8 bc	2.0 c	3.8 b
*Success 2SC	0.089	7.5 a	9.5 e-h	17.0 c-g	1.0 cde	2.0 def	3.0 def	0.0 d	0.3 d	0.3 c
Untreated	---	8.5 a	29.0 a	37.5 a	6.5 ab	10.5 a	17.0 a	4.5 a	7.8 a	12.3 a
LSD		0.96	1.08	1.31	0.7	0.84	0.96	0.44	0.52	0.58
S.D.		0.67	0.76	0.92	0.49	0.59	0.67	0.3	0.37	0.41
C.V.		26.63	19.2	19.95	29.07	25.02	24.59	25.37	26.56	27.01
F		1.472	4.22	3.395	4.255	3.811	5.618	4.823	7.308	11.319
Prob (F)		0.1501	0.0001	0.0005	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Tank mixed with MSO at 0.5% v/v.
**Tank mixed with Penetrator Plus at 0.5% v/v.

Table 2. Cabbage looper larvae sampled from Megaton variety cabbage treated with foliar insecticides. Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 5 heads								
		17 August			21 August			29 August		
		Small	Large	Total	Small	Large	Total	Small	Large	Total
Capture 2EC	0.04	0.5 a	0.0 a	0.5 a	0.0 d	0.5 bc	0.5 de	0.0 a	0.0 c	0.0 b
Mustang Max 0.8EC	0.025	1.3 a	0.5 a	1.8 a	0.3 cd	1.0 bc	1.3 cde	0.3 a	1.3 b	1.5 b
Asana XL 0.66EC	0.05	2.3 a	1.0 a	3.3 a	0.8 bcd	0.5 bc	1.3 cde	0.0 a	0.0 c	0.0 b
Proaxis 5SC	0.148	1.0 a	0.8 a	1.8 a	0.3 cd	0.5 bc	0.8 cde	0.3 a	0.0 c	0.3 b
Warrior 1CS	0.03	0.8 a	1.3 a	2.0 a	0.8 bcd	1.0 bc	1.8 cd	0.0 a	0.0 c	0.0 b
*Avaunt 30 WG	0.065	1.8 a	0.3 a	2.0 a	0.3 cd	0.5 bc	0.8 cde	0.0 a	0.0 c	0.0 b
Spintor 2SC	0.07	1.5 a	0.0 a	1.5 a	0.3 cd	0.5 bc	0.8 cde	0.3 a	0.5 bc	0.8 b
Untreated	---	3.3 a	1.0 a	4.3 a	2.8 a	1.5 b	4.3 ab	0.5 a	0.3 bc	0.8 b
*E2Y45 1.67SC	0.044	2.5 a	0.3 a	2.8 a	0.5 bcd	1.0 bc	1.5 cde	0.0 a	0.0 c	0.0 b
*E2Y45 1.67SC	0.066	1.5 a	1.0 a	2.5 a	0.0 d	0.8 bc	0.8 cde	0.0 a	0.0 c	0.0 b
*E2Y45 1.67SC	0.088	2.5 a	1.3 a	3.8 a	0.0 d	0.0 c	0.0 e	0.0 a	0.0 c	0.0 b
**BAS 320I 2SC	0.214	4.0 a	0.5 a	4.5 a	1.8 ab	0.8 bc	2.5 bc	0.3 a	0.3 bc	0.5 b
**BAS 320I 2SC	0.25	3.5 a	1.5 a	5.0 a	1.0 a-d	1.0 bc	2.0 bcd	0.0 a	0.5 bc	0.5 b
*Success 2SC	0.089	7.8 a	1.3 a	9.0 a	0.5 bcd	0.3 bc	0.8 cde	0.0 a	0.0 c	0.0 b
Untreated	---	3.8 a	0.8 a	4.5 a	1.5 abc	3.8 a	5.3 a	5.3 a	3.0 a	8.3 a
LSD		0.83	0.58	0.95	0.46	0.49	0.58	0.57	0.37	0.61
S.D.		0.58	0.4	0.66	0.32	0.34	0.41	0.4	0.26	0.43
C.V.		33.65	32.36	35.09	25.6	25.8	26.45	35.56	22.28	34.35
F		1.296	0.525	1.139	2.093	2.324	3.453	1.829	3.708	4.231
Prob (F)		0.2386	0.9208	0.3494	0.025	0.0125	0.0004	0.0547	0.0002	0.0001

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Tank mixed with MSO at 0.5% v/v.
**Tank mixed with Penetrator Plus at 0.5% v/v.

Table 3. Diamondback moth larvae sampled from Megaton variety cabbage treated with foliar insecticides. Arlington, WI 2006.

Treatment	Rate (lb. a.i./a)	Mean larvae per 5 heads								
		17 August			21 August			29 August		
		Small	Large	Total	Small	Large	Total	Small	Large	Total
Capture 2EC	0.04	0.0 a	1.0 a	1.0 a	0.0 a	0.8 a	0.8 a	0.0 a	0.0 b	0.0 b
Mustang Max 0.8EC	0.025	0.0 a	1.0 a	1.0 a	0.0 a	1.5 a	1.5 a	0.0 a	0.5 b	0.5 b
Asana XL 0.66EC	0.05	0.8 a	1.0 a	1.8 a	0.0 a	2.3 a	2.3 a	0.3 a	0.5 b	0.8 b
Proaxis 5SC	0.148	0.0 a	0.8 a	0.8 a	0.0 a	0.0 a	0 a	0.0 a	0.0 b	0.0 b
Warrior 1CS	0.03	1.0 a	0.3 a	1.3 a	0.3 a	0.0 a	0.3 a	0.0 a	0.0 b	0.0 b
*Avaunt 30 WG	0.065	1.3 a	0.3 a	1.5 a	0.3 a	0.3 a	0.5 a	0.0 a	0.3 b	0.3 b
Spintor 2SC	0.07	0.0 a	0.3 a	0.3 a	0.0 a	0.3 a	0.3 a	0.0 a	0.0 b	0.0 b
Untreated	---	0.8 a	1.8 a	2.5 a	0.0 a	0.5 a	0.5 a	0.3 a	0.0 b	0.3 b
*E2Y45 1.67SC	0.044	0.5 a	0.5 a	1.0 a	0.0 a	0.8 a	0.8 a	0.3 a	0.0 b	0.3 b
*E2Y45 1.67SC	0.066	0.5 a	1.5 a	2.0 a	0.0 a	0.3 a	0.3 a	0.0 a	0.3 b	0.3 b
*E2Y45 1.67SC	0.088	0.0 a	2.3 a	2.3 a	0.0 a	0.5 a	0.5 a	0.0 a	0.3 b	0.3 b
**BAS 320I 2SC	0.214	0.0 a	2.0 a	2.0 a	0.3 a	2.0 a	2.3 a	0.0 a	0.8 b	0.8 b
**BAS 320I 2SC	0.25	0.8 a	2.0 a	2.8 a	0.3 a	2.5 a	2.8 a	0.0 a	0.5 b	0.5 b
*Success 2SC	0.089	1.0 a	3.5 a	4.5 a	0.0 a	1.0 a	1.0 a	0.0 a	0.3 b	0.3 b
Untreated	---	1.0 a	1.5 a	2.5 a	0.0 a	0.3 a	0.3 a	0.0 a	2.0 a	2.0 a
LSD		0.4	0.71	0.8	0.15	0.55	0.57	0.12	0.3	0.32
S.D.		0.28	0.5	0.56	0.11	0.39	0.4	0.09	0.21	0.22
C.V.		23.54	36.75	36.77	10.24	30.29	30.55	8.48	18.36	19.25
F		1.372	0.73	0.829	0.849	1.577	1.579	0.887	2.804	2.377
Prob (F)		0.1962	0.7504	0.6475	0.6269	0.1124	0.1118	0.5867	0.003	0.0107

Means in a column followed by the same letter do not significantly differ (Least Significant Difference Test, P=0.05).
*Tank mixed with MSO at 0.5% v/v.
**Tank mixed with Penetrator Plus at 0.5% v/v.

Control of Lepidopteran Larvae on Sweet Corn with Foliar Insecticides

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The European corn borer and corn earworm are the most important insect pests of sweet corn in Wisconsin. Both pests cause direct ear damage resulting in yield loss.

The European corn borer (ECB) larvae overwinter in corn stubble and adults emerge in late May and June. Females lay between 500-1000 eggs in their lifespan and eggs are white and are laid in clusters. ECB usually have 2 generations per year in Wisconsin but may have 3 in favorable years. First generation larvae migrate to the whorl and feed on leaf tissue before tunneling into the stalk. Second generation larvae enter the plant near the leaf sheath, or an ear shank, butt, side or tip.

Corn earworms (CEW) do not overwinter in Wisconsin and therefore CEWs are migratory pests in Wisconsin. CEW lay their single eggs on silks and larvae hatch within 2-6 days. Larvae feed down the silk into the developing ear. Once the larvae enter the ear husk, foliar insecticides have little effect.

Supersweet Jubilee Plus variety sweet corn was planted on 16 June 2006. Treatments consisted of six 50' rows on 30" centers. Treatments were arranged in a randomized complete block experimental design consisting of four replicates. 6-foot alleyways separated replications.

Four applications over a 18 day period were evaluated for ECB and CEW larval control. The initial application occurred at row tassel (5 August), the second application occurred at pollen shed (10 August) and the 3rd and 4th applications occurred on 16 August and 23 August.

Treatments consisted of the following materials:

1. Untreated
2. Triplesweet *Bt* hybrid
3. Proaxis 0.5CS (3.8 oz./a) in rotation with Spintor 2SC (3 oz./a)
4. DPX E2Y45 (0.044 lb. a.i./a) mixed with MSO (1% v/v)
5. DPX E2Y45 (0.066 lb. a.i./a) mixed with MSO (1% v/v)
6. DPX E2Y45 (0.088 lb. a.i./a) mixed with MSO (1% v/v)
7. Warrior 1CS (3.22 oz./a)
8. Lannate LV (0.45 lb. a.i./a)
9. Warrior 1CS (3.2 oz./a) mixed with Lannate LV (0.225 lb. a.i./a)
10. Capture 2EC (0.04 lb. a.i./a)
11. Capture 2EC (0.1 lb. a.i./a) 1st 2 applications followed by 2 applications of Warrior 1CS (3.85 oz./a)
12. Warrior 1CS (3.85 oz./a)
13. Mustang Max 0.8EC (0.025 lb. a.i./a)
14. Larvin 3.2F (0.75 lb. a.i./a)
15. Spintor 2SC (0.094 lb. a.i./a)
16. Warrior 1CS (3.85 oz./a) mixed with Larvin 3.2F (0.75 lb a.i./a)

17. Warrior 1CS (3.85 oz./a) mixed with Sevin XLR (2.0 lb a.i./a)
18. Warrior 1CS (3.2 oz./a) mixed with Exponent (0.15 lb. a.i./a)
19. Discipline 2EC (0.04 lb. a.i./a) mixed with Lannate LV (0.225 lb. a.i./a)
20. Warrior 1CS (3.22 oz./a) + PBO (4 oz./a)
21. Untreated

All materials were applied using a Spirit hi-clearance sprayer equipped with TeeJet 80015 XR flat fan nozzles spaced at 20', delivering 12.6 gpa at 2.6 mph and 40 psi. Treatments were applied on 5 August, 10 August, 16 August and 23 August.

The study was evaluated on 5 September by pulling 25 ears from the middle 2 rows of each plot. During evaluation an ear was considered damaged if feeding occurred on 2 or more kernels and an ear was considered infested if larvae were present, regardless of feeding damage.

Results

European corn borer numbers were very low in this trial and that data has not been included in this report. Corn earworm larval pressure was high, resulting in 21.0 and 22.5 damaged ears out of 25 in the untreated plots (84% - 90% damage) (Table 1). Ear infestation was also high in the untreated plots (21.75 and 18.75) with the majority of the larvae found being "Late" followed by "Mid" and finally "Early". Total larval numbers ranged from a high of 37.75 and 32.5 larvae found in the untreated plots to 1.25 larvae found in the Triplesweet *Bt* hybrid treatment.

The pyrethroids did not effectively control CEW larvae. There were few significant differences among the larval numbers observed in the pyrethroid treatments and the untreated plots. Capture, Discipline, Warrior and Mustang Max, alone and in combinations reduced mean ear damage numerically in comparison to the untreated plots but many of these treatments were not significantly different. Spintor at the 6 oz/a rate did not effectively control CEW larvae, however when tank mixed with Proaxis the combination significantly reduced the number of damaged ears (Table 1).

Lannate also provided limited CEW larval control. Combinations of Lannate with Warrior and Capture did not enhance CEW larval control, nor did the combination of Larvin and Warrior.

DPX E2Y45 (5.0 oz./a) provided better CEW larval control and limited ear damage to 20% in the highest rate treatments.

These data indicate that CEW larvae continue to be a difficult insect pest to manage with foliar insecticides in sweet corn.

The author would like to thank Bryan Jenson, IPM Specialist, Department of Entomology, for his assistance in conducting this trial.

Table 1. Corn Earworm larvae sampled from Supersweet Jubilee Plus variety sweet corn treated with foliar insecticides. Arlington, WI. 2006.

Treatment	Rate (oz./a)	Mean ears/25 ear sample		Mean CEW larvae/25 ear sample			
		Damaged	Infested	Early[a]	Mid[b]	Late[c]	Total
Untreated	---	21.00 ab	21.75 a	4.50 bcde	11.00 a	17.00 a	32.50 ab
Triplesweet *Bt* hybrid	---	0.75 g	1.25 i	0.50 de	0.50 g	0.25 h	1.25 k
Proaxis 0.5CS + Spintor 2SC	3.8 + 3.0	0.75 g	10.75 def	3.25 cde	2.75 defg	6.50 cdefg	12.50 fghi
Spintor 2SC	6.0	14.75 bcde	11.50 cdef	3.75 cde	4.25 cdefg	6.25 cdefg	14.25 efgh
DPX E2Y45 + MSO	6.75 +1.0 %	4.75 fg	2.25 hi	0.25 e	1.00 fg	1.00 gh	2.25 jk
DPX E2Y45 + MSO	5.0 +1.0 %	5.00 fg	3.50 ghi	0.50 de	1.25 fg	1.75 fgh	3.50 ijk
DPX E2Y45 + MSO	3.4 + 1.0 %	9.00 ef	8.00 fgh	0.75 de	1.00 fg	1.25 fgh	3.00 jk
[1]Capture 2EC / Warrior 1CS	6.5 / 3.85	13.00 cde	9.75 defg	1.75 de	6.25 bcde	3.25 efgh	11.25 ghij
Capture 2EC	2.56	14.50 bcde	11.50 cdef	1.75 de	5.00 cdef	8.50 bcde	15.25 defgh
Discipline 2EC	2.56	11.75 de	8.25 fgh	1.25 de	2.50 efg	4.25 defgh	8.00 hijk
Mustang Max 0.8EC	4.0	14.75 bcde	11.75 cdef	2.75 de	6.00 bcde	5.25 cdefgh	14.00 fgh

(continued)

Means within a column followed by the same letter are not significantly different (P=0.05, Duncan’s Multiple Range Test)
[1]Capture applied during applications 1 and 2 followed by applications of Warrior.
[a] “”early” corn earworm are larvae up to ½ inch in length
[b] ”mid” corn earworm are larvae between ½ inch and ¾ inch in length
[c] ”late” corn earworm are larvae larger than ¾ inch in length

Table 1. (Continued). Corn Earworm larvae sampled from Supersweet Jubilee Plus variety sweet corn treated with foliar insecticides. Arlington, WI. 2006.

Treatment	Rate (oz./a)	Mean ears/25 ear sample		Mean CEW larvae/25 ear sample			
		Damaged	Infested	Early[a]	Mid[b]	Late[c]	Total
Larvin 3.2F	3.0	16.75 abcd	16.50 abcd	7.50 abc	7.25 abc	6.50 cdefg	21.25 cdef
Lannate LV	24.0	20.75 ab	20.00 ab	7.25 bc	7.25 abc	12.25 ab	29.75 abc
Warrior 1CS	3.22	19.25 abc	17.75 abc	4.75 bcde	6.75 bcd	12.25 ab	23.75 bcde
Warrior 1CS + PBO	3.22 + 4	18.25 abcd	16.25 abcd	5.00 bcd	9.75 ab	9.50 bcd	24.25 bcd
Warrior 1CS	3.85	12.50 de	8.75 efg	2.00 de	2.75 defg	4.50 cdefgh	9.25 ghijk
Warrior 1CS + Lannate LV	3.2 + 12.0	17.25 abcd	12.00 cdef	3.50 cde	5.00 cdef	6.00 cdefgh	14.50 efgh
Warrior 1CS + Larvin 3.2F	3.2 + 3.0	15.25 bcde	14.25 bcdef	3.75 cde	5.75 bcde	9.25 bcd	18.75 defg
Warrior 1CS + Sevin XLR	3.85 + 64.0	18.25 abcd	15.25 a-e	4.00 cde	4.75 cdef	10.25 bc	19.00 defg
Warrior 1CS + Exponent	3.2 + 1.9	17.50 abcd	11.25 cdef	3.75 cde	4.25 cdefg	6.00 cdefgh	14.00 fgh
Untreated	---	22.50 a	18.75 ab	8.75 ab	11.00 a	16.00 a	37.75 a

Means within a column followed by the same letter are not significantly different (P=0.05, Duncan’s Multiple Range Test)
[1]Capture applied during applications 1 and 2 followed by applications of Warrior.
[a] “”early” corn earworm are larvae up to ½ inch in length
[b] ”mid” corn earworm are larvae between ½ inch and ¾ inch in length
[c] ”late” corn earworm are larvae larger than ¾ inch in length

Insecticide Efficacy Trial Results
Field Corn 2006:

Corn Rootworm Trials

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<u>Field History:</u> The 2006 corn rootworm larval insecticide efficacy trials were established at the Arlington Agricultural Research Station, in fields 520 and 410. Field 520 was chisel plowed in fall 2005 and cultivated in the spring of 2006. No manure was applied. Soil in the test plot is classified as Plano silt loam (sand: 13%, silt: 68%, clay: 19%). Soil test results from spring 2006 in field 520 are; pH: 7.2; Organic matter: 4.1%; Phosphorus: 132 ppm; Potassium: 430 ppm. Field corn was grown in field 520 during 2005 with glyphosate (Roundup) used for weed control. No supplemental irrigation was applied to the plots.

Two additional corn rootworm insecticide efficacy trials were established in field 520. These trials evaluated the efficacy of Dow AgroSciences Herculex RW and Herculex XTRA hybrids on corn rootworm larval control.

A corn rootworm adult insecticide efficacy trial was established at the Arlington Agricultural Research Station, in field 410. Field 410 was chisel plowed in fall 2005 and cultivated in spring 2006. Manure was applied to the field in April and May. Soil test results from the fall of 2000 in field 410 are; pH: 6.8; Organic matter: 3.5%; Phosphorus: 69 ppm; Potassium: 278 ppm. Soil in the test plot is classified as a Plano silt loam (sand: 13%, silt: 68%, clay: 19%). No supplemental irrigation was applied to the plots.

<u>Treatments, Planting, and Experimental Design:</u>

a. Corn rootworm larval efficacy trials

Twenty nine treatments were evaluated in a large replicated field corn study (Standards trial) for efficacy against corn rootworm larval injury to field corn roots. Treatments included nicotinoid seed treatments (Cruiser and Poncho), two at the corn rootworm rate of 1.25 mg a.i. per kernel and four at a lower secondary insect pest rate of 0.25 mg a.i. per kernel; three synthetic pyrethroid treatments (T-band, T-band spray and/or in-furrow); four organophosphate treatments (T-band and T-band spray); three organophosphate + synthetic pyrethroid treatments (T-band, T-band spray and Smartbox®); two transgenic *Bt* corn rootworm hybrids, (Cry 3Bb1) and (Cry 34/35Ab1), respectively; one pyrazole treatment (microtube); and untreated checks (Table 1).

Two transgenic *Bt* corn rootworm hybrids were used in this trial [Renk RK636YGRW and Herculex RW (Pioneer Hybrid)]. Two non-*Bt* isolines, RK636 and Herculex were used as untreated checks in the trial. RK636 was pretreated with 0.167 oz./cwt. Maxim XL, 0.0425 oz./cwt. Apron XL fungicides upon receipt from Renk Seeds, Sun Prairie, WI and was used in all but the three Herculex treatments. Seed (RK636) was shipped to Bayer CropScience and Syngenta Crop Protection to be treated with the appropriate pesticides. In furrow, T-band, T-

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band spray, microtube and Smartbox® treatments were applied with attachments mounted on the planter.

All the corn rootworm larval trials were planted into an area of field 520 that was trap cropped in 2005. A field corn trap crop was planted June 20, 2005 to provide corn silks and pollen in July and August when western and northern corn rootworm beetle adults were feeding, mating and depositing eggs into the soil, attracting a potentially economically damaging rootworm population to the site where the corn rootworm larval insecticide efficacy trial would be conducted the subsequent (2006) season.

The Standards trial was planted 27 April, 2006 with a two-row John Deere model 7100 planter, modified to accept either cone seeder attachments or standard hopper boxes. This trial was planted with the standard hopper boxes attached. A target seeding rate of 30,200 plants per acre was planted and actual plant populations can be found in Table 2. Plots consisted of four 50-foot rows spaced at 30 inches. Treatments were assigned to plots in a completely randomized block design and replicated 4 times. Twenty-foot alleyways were maintained between replicate blocks.

Two additional corn rootworm transgenic *Bt* hybrids were evaluated [Herculex RW and Herculex XTRA (Dow AgroSciences hybrids)] as separate small trials in field 520. Each trial contained a unique corn hybrid containing the Herculex RW Cry34/35Ab1 gene along with hybrid isolines without the *Bt* trait.

These two trials were also planted into an area of field 520 that was trap cropped the previous year (2005). The trial was planted 6 May, 2006 with a two-row John Deere model 7100 planter with the cone seeders attached. A target seeding rate of 2 seeds per foot was planted and actual plant populations can be found in Table 2. Plots consisted of six 17.5-foot rows spaced at 30 inches. Treatments were assigned to plots in a completely randomized block design and replicated 4 times. Ten-foot alleyways were maintained between replicate blocks. Liberty herbicide was broadcast applied on 2 June, 2006 at the rate of 28 oz/a on the Herculex RW and Herculex XTRA treatments, the hybrid isolines were not treated.

Broadcast soil treatments were also evaluated for corn rootworm control. A six treatment trial included 3 Repel® treatments, a Furadan® treatment and untreated plots. The trial was planted 24 May, 2006 with a 15 foot John Deere 6 row planter. A target seeding rate of 32,000 plants per acre was planted. Plots consisted of four 50-foot rows spaced at 30 inches. Treatments were assigned to plots in a completely randomized block design and replicated 4 times. Ten foot alleyways were maintained between replicate blocks.

b. Corn rootworm adult control

Six treatments were evaluated for efficacy against corn rootworm adults in field corn. Treatments included 2 pyrethroids, an organophosphate, an experimental DPX E2Y45 and an untreated check. The trial was planted 20 June, 2006 with a 6 row John Deere planter. A target seeding rate of 32,000 plants per acre was planted. Plots consisted of six 100-foot rows spaced at 30 inches. Treatments were assigned to plots in a completely randomized block design and replicated 4 times. Ten-foot alleyways were maintained between replicate blocks.
Treatments were applied with a hi-clearance sprayer (Spirit) equipped with 80015 XR flat fan nozzles on 20 inch centers, delivering 12.6 gpa at 2.6 mph and 40 psi.

Table 1. Corn rootworm insecticide efficacy Trial. Insecticidal seed treatment, soil applied insecticides and transgenic *Bt* corn rootworm corn hybrids. Arlington Agricultural Research Station, Arlington, WI. 2006**.**

Trade Name	Active Ingredient (insecticide class)	Rate	Placement
Untreated (RK636)	---	---	---
YieldGard RW + Cruiser 5FS[1]	*Bt* CRW (Cry3Bb1) + thiamethoxam (GMO + nicotinoid)	0.25 mg a.i./kernel	---
Poncho 1250[3]	clothianidin (nicotinoid)	1.25 mg a.i./ kernel	Seed Treatment
Aztec 2.1G	tebupirimphos + cyfluthrin (organophosphate + pyrethroid)	6.7 oz./1000 row ft	In furrow
Aztec 2.1G + Poncho 250	tebupirimphos + cyfluthrin + clothianidin (organophosphate + pyrethroid + nicotinoid)	6.7 oz./1000 row ft + 0.25 mg/kernel	In furrow
Aztec 2.1G	tebupirimphos + cyfluthrin (organophosphate + pyrethroid)	8.0 oz./1000 row ft	In furrow
Aztec 2.1G + Poncho 250[2]	tebupirimphos + cyfluthrin + clothianidin (organophosphate + pyrethroid + nicotinoid)	8.0 oz./1000 row ft + 0.25 mg/kernel	In furrow
Aztec 2.1G	tebupirimphos + cyfluthrin (organophosphate + pyrethroid)	6.7 oz./1000 row ft	T-band
Aztec 2.1G + Poncho 250[2]	tebupirimphos + cyfluthrin + clothianidin (organophosphate + pyrethroid + nicotinoid)	6.7 oz./1000 row ft + 0.25 mg/kernel	T-band
Aztec 2.1G	tebupirimphos + cyfluthrin (organophosphate + pyrethroid)	8.0 oz./1000 row ft	T-band
Aztec 2.1G + Poncho 250[2]	tebupirimphos + cyfluthrin + clothianidin (organophosphate + pyrethroid + nicotinoid)	8.0 oz./1000 row ft + 0.25 mg/kernel	T-band
Untreated (RK636)	---	---	---
A9765	Experimental	1.25 mg a.i./kernel	Seed Treatment
STP15201	Experimental	1.25 mg a.i./kernel	Seed Treatment

(Continued)

Table 1. (Continued). Corn rootworm insecticide efficacy Trial. Insecticidal seed treatment, soil applied insecticides and transgenic *Bt* corn rootworm corn hybrids. Arlington Agricultural Research Station, Arlington, WI. 2006**.**

Trade Name	Active Ingredient (insecticide class)	Rate	Placement
Force 3G	tefluthrin (pyrethroid)	4.0 oz./1000 ft	T-band
Force 3G	tefluthrin (pyrethroid)	4.0 oz./1000 ft	In furrow
Capture 2EC	bifenthrin (pyrethroid)	1.32 oz./1000 ft	T-band spray
Capture 2EC	bifenthrin (pyrethroid)	1.32 oz./1000 ft	In furrow
Capture LFR	bifenthrin (pyrethroid)	0.49 oz./1000 ft	In furrow
Regent 4SC	fipronil (pyrazole)	1.12 oz. a.i./1000 ft	In furrow (Microtube)
Cruiser 5FS	thiamethoxam (nicotinoid)	1.25 mg a.i./ kernel	Seed Treatment
Lorsban 15G	chlorpyrifos (organophosphate)	8.0 oz./1000 ft	T-band
Lorsban 4E	chlorpyrifos (organophosphate)	2.4 oz./1000 ft	T-band spray
Untreated (RK636)	---	---	---
Fortress 5G	chlorethoxyfos (organophosphate)	3.7 oz./1000 ft	In furrow (Smartbox®)
Aztec 4.67G	tebupirimphos + cyfluthrin (organophosphate + pyrethroid)	3.0 oz./1000 ft	In furrow (Smartbox®)
Force 3G (Pioneer hybrid)	tefluthrin (synthetic pyrethroid)	4.0 oz./1000 ft	In furrow
Untreated (Pioneer hybrid)	---	---	---
Herculex RW (Pioneer hybrid)	*Bt* CRW (Cry34/35Ab1)	---	Seed Treatment

[1] Cruiser is at the low rate (0.25 mg a.i./kernel) of thiamethoxam for secondary pest control.
[2] Poncho 250 is a low rate (0.25 mg a.i./kernel) of clothianidin for secondary pest control.
[3] Poncho 1250 is the high rate (1.25 mg a.i./kernel) of clothianidin for corn rootworm control.

Table 2. HerculexRW and Herculex XTRA corn rootworm insecticide efficacy Trial. Arlington Agricultural Research Station, Arlington, WI. 2006**.**

Trade Name	Active Ingredient (insecticide class)	Rate	Placement
HerculexRW + Cruiser 5FS[1]	*Bt* CRW (Cry34/35Ab1) + thiamethoxam (nicotinoid)	0.25 mg a.i./kernel	---
Herculex XTRA + Cruiser 5FS[1]	*Bt* CRW (Cry34/35Ab1) hybrid + thiamethoxam (nicotinoid)	0.25 mg a.i./kernel	---
Untreated (M2784)	---	---	---

[1] Cruiser is at the low rate (0.25 mg a.i./kernel) of thiamethoxam for secondary pest control.

Table 3. Herculex RW and Herculex XTRA corn rootworm insecticide efficacy Trial. Arlington Agricultural Research Station, Arlington, WI. 2006**.**

Trade Name	Active Ingredient (insecticide class)	Rate	Placement
Herculex RW + Cruiser 5FS[1]	*Bt* CRW corn hybrid + thiamethoxam (nicotinoid)	0.25 mg a.i./kernel	---
Herculex XTRA + Cruiser 5FS[1]	*Bt* CRW corn hybrid + thiamethoxam (nicotinoid)	0.25 mg a.i./kernel	---
Untreated (M2E522)	---	---	---

[1] Cruiser is at the low rate (0.25 mg a.i./kernel) of thiamethoxam for secondary pest control.

Table 4. Corn rootworm insecticide efficacy Trial 1. Stand counts of insecticidal seed treatment, soil applied insecticide, transgenic *Bt* corn rootworm hybrid and check treatment plots. Arlington Agricultural Research Station, Arlington, WI.

Treatment	Placementt	Rate	Stand counts [No. Plants/50 feet][2]
			9 June[1]
Untreated (RK636)	---	---	76.0 bcd
YieldGard RW (+ Cruiser 5FS)	---		77.0 bcd
Poncho 1250	Seed Treatment	1.25 mg a.i./ kernel	78.0 bcd
Aztec 2.1G	In furrow	6.7 oz./1000 ft	76.0 bcd
Aztec 2.1G (+ Poncho 250)	In furrow	6.7 oz./1000 ft	79.0 bcd
Aztec 2.1G	In furrow	8.0 oz./1000 ft	101.0 a
Aztec 2.1G (+ Poncho 250)	In furrow	8.0 oz./1000 ft	79.0 bcd
Aztec 2.1G	T-band	6.7 oz./1000 ft	77.0 bcd
Aztec 2.1G (Poncho 250)	T-band	6.7 oz./1000 ft	76.0 bcd
Aztec 2.1G	T-band	8.0 oz./1000 ft	77.0 bcd
Aztec 2.1G (+ Poncho 250)	T-band	8.0 oz./1000 ft	80.0 bc
Untreated (RK636)	---	---	75.0 cd
A9765	Seed Treatment	1.25 mg a.i./kernel	80.0 b
STP15201	Seed Treatment	1.25 mg a.i./kernel	79.0 bcd
Force 3G	T-band	4.0 oz./1000 ft	76.0 bcd
Force 3G	In furrow	4.0 oz./1000 ft	74.0 d

(Continued)

[1] $P = 0.0001$; $F = 4.959$; $df = 34, 139$; $LSD = 5.5$
[2]Means within the same column followed by the same letter do not significantly differ at $\alpha = 0.05$ (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Table 4. (Continued). Corn rootworm insecticide efficacy Trial 1. Stand counts of insecticidal seed treatment, soil applied insecticide, transgenic *Bt* corn rootworm hybrid and check treatment plots. Arlington Agricultural Research Station, Arlington, WI.

Treatment	Placement	Rate	Stand counts [No. Plants/50 feet][2] 9 June[1]
Capture 2EC	T-band spray	1.32 oz./1000 ft	76.0 bcd
Capture 2EC	In furrow spray	1.32 oz./1000 ft	75.0 bcd
Capture LFR	In furrow	0.49 oz./1000 ft	74.0 d
Regent 4SC	In furrow (Microtube)	1.12 oz. a.i./1000 ft	78.0 bcd
Cruiser 5FS	Seed Treatment	1.25 mg a.i./ kernel	78.0 bcd
Lorsban 15G	T-band	8.0 oz./1000 ft	76.0 bcd
Lorsban 4E	T-band spray	2.4 oz./1000 ft	76.0 bcd
Untreated (RK636)	---	---	76.0 bcd
Fortress 5G	In furrow (Smartbox)	3.7 oz./1000 ft	76.0 bcd
Aztec 4.67G	In furrow (Smartbox)	3.0 oz./1000 ft	78.0 bcd
Force 3G (Pioneer hybrid)	In furrow	4.0 oz./1000 ft	80.0 bc
Untreated (Pioneer hybrid)	---	---	80.0 b
Herculex RW (Pioneer hybrid)		---	78.0 bcd

[1] P = 0.0001; F = 4.959; df = 34, 139; LSD = 5.5
[2]Means within the same column followed by the same letter do not significantly differ at α = 0.05 (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Table 5. Herculex RW and Herculex XTRA corn rootworm efficacy trial . **Node-Injury Root Ratings.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	**Placement**	**Rate**	**Stand counts [No. Plants/17.5 feet]**
Herculex RW (2G777) (+ Cruiser 5FS 0.25 mg/kernel)	---	---	31.63 a
Herculex XTRA (2G777) + (Cruiser 5FS 0.25 mg/kernel)	---	---	32.25 a
Untreated (M2784)	---	---	32.46 a

[1] P = 0.8209; F = 0.204; df = 2, 11; LSD = 3.321
[2]Means within the same column followed by the same letter do not significantly differ at α = 0.05 (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Table 6. Herculex RW and Herculex XTRA corn rootworm efficacy trial . **Node-Injury Root Ratings.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	**Placement**	**Rate**	**Stand counts [No. Plants/17.5 feet]**
Herculex RW (2D545) (+ Cruiser 5FS 0.25 mg/kernel)	---	---	35.42 a
Herculex XTRA (2E526) (+ Cruiser 5FS 0.25 mg/kernel)	---	---	35.54 a
Untreated (M2784)	---	---	34.29 a

[1] P = 0.5423; F = 0.679; df = 2, 11; LSD = 2.891
[2]Means within the same column followed by the same letter do not significantly differ at α = 0.05 (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Root Evaluation for Corn Rootworm Larval Injury: The Iowa State University Node-Injury root rating scale was used to evaluate the level of root protection between treatments [Oleson and Tollefson, http://www.ent.iastate.edu/pest/rootworm/nodeinjury/nodeinjury.html]. This root rating system evaluates damage based on each node, and equivalency of roots pruned to within ~ 1.5 inches of the stalk. Damage may be sustained entirely on one node or on a combination of nodes. Using this system, economic root injury ranges between 0.0 and 3.0. For example, a rating of 1.25 represents the equivalent of one entire node pruned (number to the left of the decimal), plus 25% of an additional partial node (number to the right of the decimal). Root ratings between 0.25 and 0.75 fall within the economic injury range. We use a root rating cut-off at or above 0.50 (some pruning has occurred, but never the equivalent of an entire node) to determine whether a product has provided adequate root protection. The closer a root rating is to 0.25 or below, the more effective it is.

Root ratings were taken on July 24, 2006. Five plants were evaluated per plot. Plants were cut to within 12 inches of the ground, dug up, tagged and removed. Roots were soaked and then washed with a high pressure water stream to remove soil prior to node injury rating.

Harvest and Yield: Preharvest data include: total stand from the center two rows of each 50 foot plot length; number of stalks lodged between the ear and the first root node; and number of root lodged plants (Table 4).

Rows 2 and 3 were harvested and yield data obtained using a Massey Ferguson 2 row plot harvester.

Statistical Analysis: All data (stand counts, lodging, node-injury root rating and yield) were subjected to analysis of variance using ARM7 (Gylling Data Management, Inc. 2004) at α = 0.05. Means separation (Least Significant Difference Test) was used to rank results.

Corn Rootworm Trial Results:

Table 7. Corn rootworm insecticide efficacy Trial 1. **Node-Injury Root Ratings.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Placement	Rate	Node-Injury Rating
Untreated (RK636)	---	---	2.73 a
Untreated (RK636)	---	---	2.61 ab
A9765	Seed Treatment	1.25 mg a.i./kernel	2.26 a-e
Untreated (RK636)	---	---	2.16 a-f
Cruiser 5FS	Seed Treatment	1.25 mg a.i./ kernel	1.98 b-g
Untreated (Pioneer hybrid)	---	---	1.85 c-h
Poncho 1250[2]	Seed Treatment	1.25 mg a.i./ kernel	1.84 d-h
STP15201	Seed Treatment	1.25 mg a.i./kernel	1.65 e-i
Fortress 5G	In furrow (Smartbox)	3.7 oz./1000 ft	1.48 g-j
Force 3G (Pioneer hybrid)	In furrow	4.0 oz./1000 ft	1.54 f-j
Capture LFR	In furrow	0.49 oz./1000 ft	1.28 h-k
Capture 2EC	In furrow spray	1.32 oz./1000 ft	1.10 i-l
Regent 4SC	In furrow (Microtube)	1.12 oz. a.i./1000 ft	1.05 i-l
Force 3G	T-band	4.0 oz./1000 ft	1.01 i-l
Force 3G	In furrow	4.0 oz./1000 ft	0.98 jkl
Aztec 2.1G	T-band	6.7 oz./1000 ft	0.95 jkl

(Continued)

[1] P = 0.0001; F = 11.86; df = 34, 139; LSD = 0.7
[2]Means within the same column followed by the same letter do not significantly differ at α = 0.05 (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Table 7. (Continued). Corn rootworm insecticide efficacy Trial 1. **Node-Injury Root Ratings.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	**Placement**	**Rate**	**Node-Injury Rating**
Aztec 2.1G (+ Poncho 250)	T-band	6.7 oz./1000 ft	0.93 jkl
Aztec 2.1G (+ Poncho 250)	T-band	8.0 oz./1000 ft	0.80 klm
Aztec 2.1G (+ Poncho 250)	In furrow	6.7 oz./1000 ft	0.80 klm
Aztec 4.67G	In furrow (Smartbox®)	3.0 oz./1000 ft	0.80 klm
Capture 2EC	T-band spray	1.32 oz./1000 ft	0.77 klm
Lorsban 4E	T-band spray	2.4 oz./1000 ft	0.65 k-n
Aztec 2.1G	In furrow	8.0 oz./1000 ft	0.63 k-n
Aztec 2.1G	T-band	8.0 oz./1000 ft	0.63 k-n
Aztec 2.1G (+ Poncho 250)	In furrow	8.0 oz./1000 ft	0.55 lmn
Aztec 2.1G	In furrow	6.7 oz./1000 ft	0.53 lmn
Lorsban 15G	T-band	8.0 oz./1000 ft	0.52 lmn
YieldGard RW (+ Poncho 250)	---	---	0.24 mn
Herculex RW (Pioneer hybrid)		---	0.01 n

Means within the same column followed by the same letter do not significantly differ at α = 0.05. [1] P = 0.0001; F = 11.86; df = 34, 139; LSD = 0.7 (ARM 7).

Table 8. Herculex RW and Herculex XTRA corn rootworm efficacy trial . **Node-Injury Root Ratings.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Placement	Rate	Node-Injury Rating
Untreated (M2784)	---	---	2.69 a
Herculex XTRA (2G777) (+ Cruiser 5FS 0.25 mg/kernel)	---	---	0.03 b
Herculex RW (2G777) (+ Cruiser 5FS 0.25 mg/kernel)	---	---	0.00 b

[1] P = 0.0001; F = 555.951; df = 2, 11; LSD = 0.226
[2]Means within the same column followed by the same letter do not significantly differ at α = 0.05 (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Table 9. Herculex RW and Herculex XTRA corn rootworm efficacy trial . **Node-Injury Root Ratings.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Placement	Rate	Node-Injury Rating
Untreated (M2784)	---	---	2.25 a
Herculex RW (2D545) (+ Cruiser 5FS 0.25 mg/kernel)	---	---	0.01 b
Herculex XTRA (2E526) (+ Cruiser 5FS 0.25 mg/kernel)	---	---	0.00 b

[1] P = 0.0001; F = 118.69; df = 2, 11; LSD = 0.412
[2]Means within the same column followed by the same letter do not significantly differ at α = 0.05 (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Table 10. Broadcast soil applied corn rootworm insecticide efficacy trial . **Node-Injury Root Ratings.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Rate	Node-Injury Rating
Repel + LI700	20 oz/a + 1 pt/100 gal	1.58 a
Untreated	---	1.41 a
Repel + LI700	10 oz/a + 1 pt/100 gal	1.04 a
Repel = LI700	5 oz/a + 1 pt/100 gal	0.41 a
Furadan 4F	1 qt/a	0.39 a

[1] P = 0.1325; F = 2.184; df = 5, 19; LSD = 1.151
[2]Means within the same column followed by the same letter do not significantly differ at α = 0.05 (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Table 11. Corn rootworm insecticide efficacy Trial 1. **Preharvest and yield data.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Placement	Rate	Preharvest data			Yield (Bu/A)[4]
			Stand[1] (plants /50 ft.)	Lodging		
				Stalk[2]	Root[3]	
Untreated (RK636)	---	---	82.0 hij	61.4 ab	13.1 a	175.7 a
YieldGard RW + Cruiser 5FS	Seed Treatment	0.25 mg a.i/kernel	92.9 ab	0.9 g	3.5 h-k	194.3 a
Poncho 1250	Seed Treatment	1.25 mg a.i./ kernel	88.0 b-i	34.4 d	9.8 a-e	188.3 a
Aztec 2.1G	In furrow	6.7 oz./1000 ft	83.4 d-j	1.3 g	3.1 ijk	192.7 a
Aztec 2.1G + Poncho 250	In furrow	6.7 oz./1000 ft	84.5 c-j	0.6 g	6.3 b-j	198.4 a
Aztec 2.1G	In furrow	8.0 oz./1000 ft	99.1 a	1.4 g	9.9 a-d	201.6 a
Aztec 2.1G + Poncho 250	In furrow	8.0 oz./1000 ft	86.3 b-j	0.8 g	4.9 d-k	195.4 a
Aztec 2.1G	T-band	6.7 oz./1000 ft	84.6 c-j	8.0 efg	7.3 b-i	195.7 a
Aztec 2.1G + Poncho 250	T-band	6.7 oz./1000 ft	88.1 b-i	4.0 fg	8.3 a-h	198.6 a
Aztec 2.1G	T-band	8.0 oz./1000 ft	85.4 c-j	1.4 g	7.0 b-j	204.7 a
Aztec 2.1G + Poncho 250	T-band	8.0 oz./1000 ft	88.8 b-g	0.6 g	10.5 abc	194.4 a
Untreated (RK636)	---	---	81.5 ij	53.4 bc	9.8 a-e	170.0 a
A9765	Seed Treatment	1.25 mg a.i./kernel	82.1 g-j	52.1 bc	8.6 a-g	188.6 a
STP15201	Seed Treatment	1.25 mg a.i./kernel	87.9 b-j	16.5 ef	8.4 a-h	191.6 a

(Continued)

[1] P = 0.0007; F = 2.313; df = 34, 139; LSD = 6.74
[2] P =0.0001; F = 20.375; df = 34, 139; LSD = 13.72
[3] P = 0.0001; F = 2.929; df = 34, 139; LSD = 5.02
[4] P = 0.0844; F = 1.438; df = 34; 139; LSD =19.64
Means within the same column followed by the same letter do not significantly differ at α = 0.05.

Table 11. (Continued). Corn rootworm insecticide efficacy Trial 1. **Preharvest and yield data.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Placement	Rate	Preharvest data			Yield (Bu/A)[4]
			Stand[1] (plants /50 ft.)	Lodging		
				Stalk[2]	Root[3]	
Force 3G	T-band	4.0 oz./1000 ft	88.0 b-i	1.8 g	7.4 b-i	189.9 a
Force 3G	In furrow	4.0 oz./1000 ft	86.3 b-j	2.8 g	7.5 b-i	187.7 a
Capture 2EC	T-band spray	1.32 oz./1000 ft	91.0 bc	0.8 g	5 d-k	200.2 a
Capture LFR	In furrow	0.49 oz./1000 ft	89.1 b-f	0.8 g	4 f-k	202.2 a
Regent 4SC	In furrow (Microtube)	1.12 oz. a.i./1000 ft	88.8 b-g	0.6 g	3.6 g-k	200.6 a
Cruiser 5FS	Seed Treatment	1.25 mg a.i./ kernel	83.4 d-j	0.8 g	3.9 g-k	197 a
Lorsban 15G	T-band	8.0 oz./1000 ft	82.8 f-j	40.8 cd	8.1 a-i	196.2 a
Lorsban 4E	T-band spray	2.4 oz./1000 ft	84.8 c-j	0.4 g	3.5 h-k	194.6 a
Untreated (RK636)	---	---	85.8 c-j	0.8 g	3.9 g-k	200.6 a
Fortress 5G	In furrow (Smartbox)	3.7 oz./1000 ft	83.1 e-j	63.4 ab	11.3 ab	186.8 a
Aztec 4.67G	In furrow (Smartbox)	3.0 oz./1000 ft	83.9 d-j	20.0 e	9.6 a-e	197.5 a
Force 3G (Pioneer hybrid)	In furrow	4.0 oz./1000 ft	85.6 c-j	1.0 g	4.9 d-k	201.2 a
Untreated (Pioneer hybrid)	---	---	81.3 j	0.9 g	0.3 k	218.7 a
Herculex RW (Pioneer hybrid)	---	---	89.8 b-e	74.0 a	2.0 jk	194.9 a

[1] P = 0.0007; F = 2.313; df = 34, 139; LSD = 6.74
[2] P =0.0001; F = 20.375; df = 34, 139; LSD = 13.72
[3] P = 0.0001; F = 2.929; df = 34, 139; LSD = 5.02
[4] P = 0.0844; F = 1.438; df = 34; 139; LSD =19.64
Means within the same column followed by the same letter do not significantly differ at $\alpha = 0.05$.

Table 12. Herculex RW and Herculex XTRA corn rootworm efficacy. **Preharvest and yield data.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Rate	Preharvest data			Yield (Bu/A)[4]
		Stand[1] (plants /50 ft.)	Lodging		
			Stalk[2]	Root[3]	
Herculex RW (2G777) + (Cruiser 5FS 0.25 mg/kernel)	---	30.1 a	0.6 b	0.5 a	222.9 a
Herculex XTRA (2G777) + (Cruiser 5FS 0.25 mg/kernel)	---	31.8 a	0.9 b	0.8 a	241.0 a
Untreated (M2784)	---	32.8 a	23.1 a	0.8 a	209.4 a

([1] P = 0.3385; F = 1.305; df = 2, 11; LSD = 4.01) ([2] P = 0.0089; F = 11.499; df = 2, 11; LSD = 13.18) ([3] P = 0.7703; F = 0.273; df = 2, 11; LSD = 0.96) ([4] P = 0.0070; F = 12.712; df = 2, 11; LSD = 15.36).
Means within the same column followed by the same letter do not significantly differ at $\alpha = 0.05$.

Table 13. Herculex RW and Herculex XTRA corn rootworm efficacy. **Preharvest and yield data.** Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	Rate	Preharvest data			Yield (Bu/A)[4]
		Stand[1] (plants /50 ft.)	Lodging		
			Stalk[2]	Root[3]	
Herculex RW (2D545) + (Cruiser 5FS 0.25 mg/kernel)	---	41.4 a	0.5 b	1.8 a	255.3 a
Herculex XTRA (2E526) + (Cruiser 5FS 0.25 mg/kernel)	---	37.3 b	0.0 b	1.0 a	230.8 a
Untreated (M2784)	---	34.1 b	19.1 a	2.9 a	218.2 a

([1] P = 0.0091; F = 11.386; df = 2, 11; LSD = 3.73) ([2] P = 0.0006; F = 33.565; df = 2, 11; LSD = 6.51) ([3] P = 0.3684; F = 1.185; df = 2, 11; LSD = 3.0) ([4] P = 0.0766; F = 4.064; df = 2, 11; LSD = 32.40).
Means within the same column followed by the same letter do not significantly differ at $\alpha = 0.05$.

<u>Results Summary</u>:

a. Corn rootworm larval efficacy trials

Node-injury root ratings are listed for the 2006 trials (Tables 7-10) with root damage in descending order within the column. Root rating scores were statistically significant among treatments, detecting a difference among treatments at the 5 percent probability level. Corn rootworm pressure was high with node-injury scores of 2.73, 2.61, and 2.16 in the untreated check plots. In all Tables the more effective treatments are listed towards the bottom of the table, with the lower node-injury root rating scores. Root ratings below a level of 0.50 generally provide acceptable root protection, while root ratings under 0.25 are well below the level of economic root damage. Statistically speaking, the transgenic *Bt* CRW hybrids (YieldGard RW, Herculex RW and Herculex XTRA) provided the highest level of corn rootworm larvae control with average node-injury ratings between 0.00-0.24. Lorsban 4E (T-band spray); Aztec 2.1G at 6.7 oz./1000 ft (In furrow); Aztec 2.1G at 8.0 oz./1000 ft (In furrow and T-band); Aztec 2.1G at 8.0 oz./1000 ft + Poncho 250 (In furrow); and Lorsban 15G (T-band) provided the best root protection with root ratings of less than 0.75 in this particular trial. The broadcast soil applied treatments did not provide significant larval protection and larval numbers were not significantly different among the treatments (Table 10).

Keep in mind that corn rootworm insecticides, whatever the class, vary between years in terms of root rating results and yield. In years of heavy corn rootworm pressure, any given product can be overwhelmed by the larval population, resulting in root damage. As you evaluate corn rootworm trials within one state over the years, and compare product performance between states within the same year, look for consistency of results. That is, “how often did a particular control option result in satisfactory root protection?”. Also keep in mind that poor root protection may not result in reduced yields if the environment conditions are favorable for corn growth. It is during poor growing conditions that root pruning adds to crop stress and impacts yield.

It is also important to note that these are small plot data and tend to yield higher under research station conditions. While small plot yields are not necessarily representative of commercial field expectations, it is the difference between treatments that we are interested in.

In addition to corn rootworm larval feeding (a function of larval population, planting date, weather and timing of the larval hatch), corn yield is influenced by hybrid root structure, soil type, soil fertility and nutrient availability, moisture, temperature, and other factors. Over time as we continue to include yield data in the UW corn rootworm trials, we’ll be able to accumulate data on how often a particular control option results in a statistically significant higher yield than the untreated control, even when control options do not differ in yield from each other. Yield data over time, along with the more tangible root rating injury data, rootworm pressure and general growing conditions in a given year, provides supplemental information on which to evaluate and select a corn rootworm control product in fields where larval hatch is a concern.

b. Corn rootworm adult control

Corn rootworm adult numbers per plant for the 2006 trial are listed in Table 15 with adult numbers in descending order within the column. Adult numbers were statistically significant among treatments, detecting a difference among treatments at the 5 percent probability level. Corn rootworm adult numbers averaged 3.0 per plant in the untreated check plots. Statistically speaking, both rates of DPX E3Y45, Capture and Warrior significantly reduced corn rootworm adult numbers when compared to Lorsban 4E and the untreated plots.

Table 15. Corn rootworm adult foliar insecticide efficacy trial. Arlington Agricultural Research Station, Arlington, WI 2006**.**

Treatment	**Rate**	**Mean CRW Adults per plant[1,2]**
Untreated	---	3.0 a
Lorsban 4E	2 pt/a	2.3 a
DPX E2Y45 35WG	4.02 oz/a	0.8 b
DPX E2Y45 35WG	3.02 oz/a	0.7 b
Capture 2EC	6.4 oz/a	0.0 b
Warrior 1CS	3.84 oz/a	0.0 b

[1] P = 0.0001; F = 7.75; df = 35; LSD = 0.3
[2]Means within the same column followed by the same letter do not significantly differ at $\alpha = 0.05$ (ARM 7, Gylling Data Management Inc. Brookings, SD, 2004).

Insecticide Efficacy Trial Results-Soybean 2006

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Field History: Soybean aphid insecticidal seed treatment and foliar efficacy trials were conducted at the Arlington Agricultural Research Station in field 520. Soil in the test plot is classified as a Plano silt loam (sand: 13%, silt: 68%, clay: 19%). Soil test results from spring 2006 in field 520 are; pH: 7.2; Organic matter: 4.1%; Phosphorus: 132 ppm; Potassium: 430 ppm. No manure was applied to field 520 between the 2005 and 2006 seasons. Field corn was grown in field 520 during 2005 with glyphosate (Roundup) used for weed control. No supplemental irrigation was applied to the plots during 2006.

Treatments, Planting, and Experimental Design:

Soybean trials for seed treatment and foliar insecticide residual activity against soybean aphid were conducted in field 520. The cultivar planted in the foliar trial was Northrup King NK S19-R5RR and it was planted on 6 May, 2005 at the rate of 225,000 seeds per acre. Three seed treatment trials (Syngenta, Bayer, and Valent) were planted on 16 May, 2006 and a second planting of the Valent seed treatments occurred on 3 June, 2006.

The foliar trial was planted with a John Deere model 7100 4 row planter with 30 inch row spacing at a depth of 1 inch. The 2006 herbicide program included Dual II Magnum at 1.5 pt./A and Sencor at 0.33 lb./A applied pre emergence on 6 May, 2006. Replicate dimensions were 10 ft. (4 rows wide) by 50 feet long. Alley buffers were maintained between replications.

Foliar insecticide efficacy trials were staked one day prior to foliar insecticide application and aphid counts were taken from these plots (see below), but the field was not designed to obtain small plot yield data at harvest and none were taken.

Insecticidal seed treatment trials were planted with a John Deere model 7100 2 row cone planter with 30 inch row spacing at a depth of 1 inch. The 2006 herbicide program for all insecticide seed treatment trials included Dual II Magnum at 1.5 pt./A and Sencor at 0.33 lb./A applied pre emergence. Replicate dimensions were 10 ft. (4 rows wide) by 30 feet long. Alley buffers were maintained between replications.

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a. Foliar Insecticide Trial (residual activity)

The foliar insecticide trial, designed to evaluate residual activity as measured by aphid counts at successive intervals post treatment, included 30 treatments (6 pyrethroids, 4 nicotinoids, and 2 organophosphates) (Table 1) in a completely randomized block design with four replications per treatment. Plots were designated by stake markers 8 August 2006, one day prior to treatment when mean aphid counts had reached 51.35 aphids/plant. Each replicate was 10 ft wide by 50 ft long. Plots were sprayed 9 August 2006 with a CO2 pressurized backpack sprayer operating at 30 psi while delivering 26 gpa through 6 flat fan nozzles (TeeJet 8002VS) on a 10 foot boom. Aphid counts were taken 2, 7, and 19 days post treatment. Whole plant counts were taken on 10 randomly selected plants from the middle of each plot, and mean aphids per plot determined across sampling dates. No yields were taken from the plots.

b. Nicotinoid Insecticidal Seed Treatment Trials

Seed treatment trials were also conducted in Field 520, with both aphid counts and yield data as response variables, and studies were designed to investigate how long systemic activity of seed treatments extends into the growing season from a given planting date.

Valent Seed Treatment Trials (both planting dates)
Twenty treatments were included:

1.	Untreated	
2.	Cruiser 5FS	50 GA/100Kg seed
3.	V10112 1.77SC	35 GA/100Kg seed
4.	V10112 1.77SC	50 GA/100Kg seed
5.	V10112 1.77SC	100 GA/100Kg seed
6.	V10112 1.77SC	125 GA/100Kg seed
7.	V10170 2.32SC	50 GA/100Kg seed
8.	V10170 2.32SC	100 GA/100Kg seed
9.	V-10194	85 GA/100Kg seed
10.	V-10194	100 GA/100Kg seed
11.	Untreated	
12.	Cruiser 5FS	50 GA/100Kg seed
13.	V-10195	25 GA/100Kg seed
14.	V-10195	50 GA/100Kg seed
15.	V-10195	75 GA/100Kg seed
16.	V-10195	25 GA/100Kg seed
	+ V10170 2.32SC	50 GA/100Kg seed
17.	V-10195	50 GA/100Kg seed
	+ V10170 2.32SC	50 GA/100Kg seed
18.	V-10195	25 GA/100Kg seed
	+ V10112 1.77SC	50 GA/100Kg seed
19.	V-10195	50 GA/100Kg seed
	+ V10112 1.77SC	50 GA/100Kg seed
20.	V-10195	50 GA/100Kg seed
	+ V10112 1.77SC	75 GA/100Kg seed

Syngenta Seed Treatment Trial
Three treatments were included on 2 soybean varieties (low and high soybean aphid resistance):

1. Untreated
2. A9765 5FS 50 GA/100Kg seed
3. STP15255 62.5 GA/100Kg seed

Bayer Seed Treatment Trials (both planting dates)
Four treatments were included:

1. Untreated
2. Cruiser 5FS 50 GA/100Kg seed
3. Gaucho 4FS 62.5 GA/100Kg seed
4. Gaucho 62.5 GA/100 Kg seed
   Baythroid XL 2.0 oz./A

A Baythroid application was made to treatment 4 on 9 August 2006. (Note: The Baythroid application was intended to be made when aphid numbers exceeded 250 per plant in treatment 4 but numbers peaked below 250 per plant and were declining in the plots).

To assess early through mid-season systemic activity of the seed treatments for soybean aphid, aphid counts were taken from each plot beginning on 20 June with the initial aphid colonization in the plots occurring the first week of July and counts continuing at weekly intervals through 15 August, when untreated check plot populations were declining. Whole plant aphid counts were taken on 10 randomly selected plants from the middle two rows of each of the untreated plots while 20 trifoliate leaves were collected from each treatment. Mean aphids/plot was determined across sampling dates. Yield data will be recorded at harvest.

Statistical Analysis: Aphid count (foliar and seed treatment trials) and yield data (seed treatment trials) were subjected to analysis of variance using ARM 7 (Gylling Data Management, Inc. 2004) at $\alpha = 0.05$, with treatment the classification variable and aphids/plot and yield (bu/A) as response variables. Means separation (Least Significant Difference Test) was used to rank response variables. During June and July when trifoliate counts were used whole plant counts from the respective untreated plots was not included in the statistical analysis.

Table 1. Efficacy trial for foliar insecticide residual activity against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. 2006**.**

Treatment	Rate (oz/a)	Mean aphids per 10 plants		
		11 August	16 August	28 August
Untreated	---	118.0 abc	70.5 ab	26.0 ab
Warrior 1CS	3.2	32.5 g-l	19.8 d-i	9.0 d-i
Mustang Max 0.8E	4.0	118.5 ab	34.3 c-g	41.8 a
Mustang Max 0.8E + Lorsban 4E	3.0 + 4.0	17.5 jkl	6.3 ij	0.0 j
F-6133 1.25EC	5.12	23.5 i-l	6.0 ij	0.0 j
F1785 50WG	1.43	115.0 a-d	17.8 d-i	13.5 b-i
Baythroid 1EC	2.05	78.0 b-f	35.8 b-f	5.0 f-j
Baythroid 1EC	2.82	62.3 c-h	85.3 a	17.0 a-g
Baythroid 1EC + Lorsban 4E	2.05 + 1.01	88.5 b-f	43.5 b-e	8.5 c-i
Trimax Pro 4.44SC + NIS	1.01 + 0.25%	34.3 g-l	21.5 d-i	12.5 b-i
Trimax Pro 4.44SC + NIS	1.36 + 0.25%	23.8 h-l	13.8 d-j	5.0 f-j
Untreated	---	108.5 a-d	39.0 b-f	14.8 a-f
Imidacloprid 1.6F	3.76	55.8 d-i	11.5 f-j	22.3 a-d
Bayer 1 2 SC	4.0	72.0 b-g	28.8 c-g	12.3 b-h
Untreated	---	158.8 a	57.3 abc	29.0 ab
LSD (P=0.05)		3.02	2.62	1.86
Standard deviation		2.13	1.85	1.32
C.V.		30.46	40.9	44.22
F		6.222	4.423	3.74
Probability (F)		0.0001	0.0001	0.0001

(Continued)

Mean separation determined after data transformation (Square root (X + 1). df = 119.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 1. (Continued). **Efficacy trial for foliar insecticide residual activity against soybean aphid.** Arlington Agricultural Research Station, Arlington, WI. 2006**.**

Treatment	Rate (oz/a)	Mean aphids per 10 plants		
		11 August	16 August	28 August
Bayer 2 2SC	6.0	95.8 a-e	12.8 g-j	5.0 f-j
Centrics 25WG	1.02	116.5 abc	39.3 bcd	25.8 abc
Centrics 25WG	1.63	51.3 e-j	20.8 d-i	19.5 a-e
Centrics 25WG	3.2	45.0 f-j	1.5 j	2.8 g-j
Proaxis 0.5SC	3.2	51.3 e-j	65.8 abc	3.5 f-j
Asana XL 0.66EC	6.4	51.8 e-j	8.0 g-j	12.3 b-i
Asana XL 0.66EC	9.6	42.3 f-j	23.8 d-i	3.5 g-j
Asana XL 0.66EC + Lorsban 4E	6.4 + 8.0	8.0 l	7.0 hij	2.5 hij
Lorsban 4E	16.0	10.0 kl	1.0 j	7.3 e-j
Orthene 97SP	0.5 lb./a	39.8 f-k	17.5 d-i	7.3 e-j
Orthene 97SP	0.75 lb./a	29.5 g-l	13.5 d-j	9.0 d-i
Orthene 97SP + Lorsban 4E	0.5 lb./a + 4.0	7.5 l	16.3 e-j	10.3 e-j
Orthene 97SP + Lorsban 4E	0.75 lb./a + 4.0	10.5 kl	8.0 ij	2.3 ij
Orthene 97SP	1.0 lb./a	23.3 i-l	27.5 c-h	2.3 ij
V10191 1.84SL	52.0	57.0 e-i	20.0 d-i	0.0 j
LSD (P=0.05)		3.02	2.62	1.86
Standard deviation		2.13	1.85	1.32
C.V.		30.46	40.9	44.22
F		6.222	4.423	3.74
Probability (F)		0.0001	0.0001	0.0001

Mean separation determined after data transformation (Square root (X + 1). df = 87.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 2. Valent Seed Treatment (16 May 2006 planting). Nicotinoid seed treatment trial on soybean for efficacy against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. University of Wisconsin, 2006.

Treatment	Rate (g. a.i./100 kg seed)	Mean aphids per 20 trifoliate leaves/*Mean aphids per 10 plants								
		20 Jun	28 Jun	6 Jul	13 Jul	19 Jul	27 Jul	1 Aug	*9 Aug	*15 Aug
Untreated	---	0.0	0.0	*3.0	*9.0	*50.0	*63.0	*113.0	265.0 a	113.0 a
Cruiser 5FS	50	0.0 a	0.0 a	0.0 a	0.0 e	13.0 a	33.0 a-e	59.0 a	155.0 bc	59.0 c-f
V10112 1.77SC	35	0.0 a	0.0 a	4.0 a	2.0 cde	23.0 a	43.0 ab	62.0 a	157.0 bc	103.0 ab
V10112 1.77SC	50	0.0 a	0.0 a	4.0 a	2.0 cde	22.0 a	44.0 ab	41.0 a	129.0 bc	46.0 f
V10112 1.77SC	100	0.0 a	0.0 a	4.0 a	3.0 b-e	9.0 a	17.0 f	54.0 a	109.0 c	83.0 abc
V10112 1.77SC	125	0.0 a	0.0 a	0.0 a	1.0 cde	34.0 a	28.0 b-f	49.0 a	137.0 bc	52.0 def
V10170 2.32SC	50	0.0 a	0.0 a	4.0 a	5.0 a-d	19.0 a	31.0 a-e	61.0 a	111.0 c	85.0 a-d
V10170 2.32SC	100	0.0 a	0.0 a	0.0 a	4.0 b-e	17.0 a	19.0 ef	48.0 a	144.0 bc	55.0 c-f
V-10194	85	0.0 a	0.0 a	6.0 a	1.0 cde	20.0 a	30.0 a-f	47.0 a	120.0 bc	63.0 c-f
V-10194	100	0.0 a	0.0 a	1.0 a	4.0 b-e	41.0 a	36.0 abc	62.0 a	132.0 bc	86.0 a-d
LSD (P=0.05)		0.0	0.2	1.5	1.2	1.8	1.4	2.0	2.7	1.9
S.D.		0.0	0.2	1.1	0.8	1.2	1.0	1.4	1.9	1.3
C.V.		0.00	14.64	61.01	48.54	26.84	17.96	19.78	16.25	16.25
F		0.000	1.222	0.696	2.127	1.565	1.978	0.871	1.876	2.620
Probability (F)		1.0000	0.2777	0.7994	0.0171	0.1041	0.0279	0.6127	0.0353	0.0027

(Continued)

Mean separation determined after data transformation (Square root (X + 1). df = 79.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 2. (Continued). Valent Seed Treatment (16 May 2006 planting). Nicotinoid seed treatment trial on soybean for efficacy against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. University of Wisconsin, 2006.

Treatment	Rate (g. a.i./100 kg seed)	Mean aphids per 20 trifoliate leaves/*Mean aphids per 10 plants								
		20 Jun	28 Jun	6 Jul	13 Jul	19 Jul	27 Jul	1 Aug	9 Aug	15 Aug
Untreated	---	0.0 a	0.0 a	4.0 a	1.0 cde	18.0 a	22.0 def	43.0 a	127.0 bc	60.0 c-f
Cruiser 5FS	50	0.0 a	1.0 a	3.0 a	8.0 ab	29.0 a	28.0 a-f	41.0 a	161.0 bc	49.0 ef
V-10195	25	0.0 a	0.0 a	4.0 a	3.0 b-e	28.0 a	32.0 a-e	56.0 a	128.0 bc	77.0 b-e
V-10195	50	0.0 a	0.0 a	4.0 a	5.0 abc	22.0 a	45.0 a	46.0 a	109.0 bc	59.0 c-f
V-10195	75	0.0 a	0.0 a	1.0 a	1.0 cde	27.0 a	28.0 b-f	64.0 a	156.0 bc	48.0 ef
V-10195 + V-10170 2.32SC	25 + 50	0.0 a	0.0 a	0.0 a	0.0 de	19.0 a	32.0 a-e	63.0 a	109.0 bc	88.0 abc
V-10195 + V-10170 2.32SC	50 + 50	0.0 a	0.0 a	6.0 a	0.0 de	22.0 a	28.0 b-f	46.0 a	150.0 bc	55.0 c-f
V-10195 + V-10112 1.77SC	25 + 50	0.0 a	0.0 a	4.0 a	0.0 de	21.0 a	26.0 c-f	74.0 a	178.0 b	67.0 b-f
V-10195 + V-10112 1.77SC	50 + 50	0.0 a	1.0 a	8.0 a	9.0 a	21.0 a	34.0 a-d	57.0 a	140.0 bc	70.0 b-f
V-10195 + V-10112 1.77SC	50 + 75	0.0 a	0.0 a	3.0 a	6.0 a-d	17.0 a	31.0 a-e	67.0 a	129.0 bc	54.0 c-f
LSD (P=0.05)		0.0	0.2	1.5	1.2	1.8	1.4	2	2.7	1.9
S.D.		0.0	0.2	1.1	0.8	1.2	1.0	1.4	1.9	1.3
C.V.		0.00	14.64	61.01	48.54	26.84	17.96	19.78	16.25	16.25
F		0.000	1.222	0.696	2.127	1.565	1.978	0.871	1.876	2.620
Probability (F)		1.0000	0.2777	0.7994	0.0171	0.1041	0.0279	0.6127	0.0353	0.0027

Mean separation determined after data transformation (Square root (X + 1). df = 79.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 2. Valent Seed Treatment (3 June 2006 planting). Yields from nicotinoid seed treatment trial on soybean for efficacy against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. 2006**.**

Treatment	Rate (g. a.i./100 kg seed)	Yield (Bu/A)
Untreated	---	59.6 a
Cruiser 5FS	50	60.8 a
V10112 1.77SC	35	65.4 a
V10112 1.77SC	50	52.0 a
V10112 1.77SC	100	56.0 a
V10112 1.77SC	125	64.2 a
V10170 2.32SC	50	66.2 a
V10170 2.32SC	100	62.4 a
V-10194	85	62.0 a
V-10194	100	58.1 a
Untreated	---	63.0 a
Cruiser 5FS	50	66.4 a
V-10195	25	57.3 a
V-10195	50	62.3 a
V-10195	75	65.5 a
V-10195 + V-10170 2.32SC	25 + 50	65.6 a
V-10195 + V-10170 2.32SC	50 + 50	70.1 a
V-10195 + V-10112 1.77SC	25 + 50	69.3 a
V-10195 + V-10112 1.77SC	50 + 50	68.0 a
V-10195 + V-10112 1.77SC	50 + 75	70.4 a
LSD (P=0.05)		12.66
Standard deviation		8.95
C.V.		14.16
F		1.192
Probability (F)		0.2963

Mean separation determined after data transformation (Square root (X + 1). df = 87.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 3. Valent Seed Treatment (3 June 2006 planting). Nicotinoid seed treatment trial on soybean for efficacy against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. University of Wisconsin, 2006.

Treatment	Rate (g. a.i./100 kg seed)	Mean aphids per 20 trifoliate leaves/*Mean aphids per 10 plants							
		28 Jun	6 Jul	14 Jul	19 Jul	27 Jul	1 Aug	*9 Aug	*15 Aug
Untreated	---	*0.0	*9.8	*6.8	*48.8	*41.5	*164.5	223.8 a	217.8 a
Cruiser 5FS	50	0.0 a	3.0 a	2.3 a	11.0 a	9.8 a	62.0 fgh	138.5 def	93.3 bcd
V10112 1.77SC	35	0.0 a	5.0 a	7.3 a	34.5 a	18.0 a	86.5 a-f	123.3 f	94.0 bcd
V10112 1.77SC	50	0.0 a	3.0 a	1.3 a	23.5 a	27.0 a	51.0 gh	166.8 b-f	90.0 bcd
V10112 1.77SC	100	0.0 a	2.0 a	1.8 a	21.0 a	20.3 a	75.5 b-h	155.5 b-f	82.5 d
V10112 1.77SC	125	0.0 a	4.0 a	4.8 a	30.0 a	8.5 a	94.5 abc	202.5 ab	137.0 b
V10170 2.32SC	50	0.0 a	4.0 a	6.0 a	22.5 a	12.8 a	64.3 d-h	175.3 a-e	112.8 bcd
V10170 2.32SC	100	0.0 a	1.0 a	2.8 a	15.3 a	18.5 a	49.8 h	193.5 abc	89.5 bcd
V-10194	85	0.0 a	2.0 a	2.0 a	37.0 a	12.5 a	69.0 c-h	175.5 a-e	94.3 bcd
V-10194	100	0.0 a	1.0 a	6.0 a	19.5 a	17.3 a	77.3 b-g	146.5 c-f	94.8 bcd
LSD (P=0.05)		0.07	0.78	1.29	1.77	1.59	1.78	1.98	2.36
S.D.		0.05	0.55	0.91	1.25	1.13	1.26	1.40	1.67
C.V.		4.73	36.49	40.61	26.09	28.34	14.53	10.56	16.50
F		1.000	1.046	1.145	1.210	1.199	2.797	2.170	2.392
Probability (F)		0.4744	0.4283	0.3380	0.2864	0.2949	0.0018	0.0128	0.0059

(Continued)

Mean separation determined after data transformation (Square root (X + 1). df = 79.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 3. (Continued). Valent Seed Treatment (3 June 2006 planting). Nicotinoid seed treatment trial on soybean for efficacy against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. University of Wisconsin, 2006.

Treatment	Rate (g. a.i./100 kg seed)	Mean aphids per 20 trifoliate leaves/*Mean aphids per 10 plants							
		28 Jun	6 Jul	13 Jul	19 Jul	27 Jul	1 Aug	9 Aug	15 Aug
Untreated	---	0.0 b	1.0 a	4.8 a	14.5 a	19.0 a	55.5 gh	175.8 a-e	117.3 bcd
Cruiser 5FS	50	0.0 b	3.0 a	8.5 a	26.3 a	13.0 a	83.8 a-f	186.8 abc	130.5 bc
V-10195	25	0.0 b	1.0 a	3.0 a	19.8 a	8.0 a	75.3 b-h	199.5 ab	85.8 cd
V-10195	50	0.0 b	0.0 a	5.3 a	30.5 a	14.3 a	88.5 a-f	202.0 ab	105.8 bcd
V-10195	75	0.0 b	3.0 a	9.8 a	17.3 a	14.5 a	73.0 b-h	134.3 ef	90.3 bcd
V-10195 + V-10170 2.32SC	25 + 50	0.0 b	0.0 a	7.5 a	20.0 a	17.8 a	62.5 e-h	177.3 a-e	75.5 d
V-10195 + V-10170 2.32SC	50 + 50	0.0 b	2.0 a	1.5 a	28.3 a	12.5 a	92.3 a-d	187.0 a-d	90.8 bcd
V-10195 + V-10112 1.77SC	25 + 50	0.0 b	3.0 a	8.0 a	29.3 a	25.3 a	105.0 ab	190.8 abc	98.0 bcd
V-10195 + V-10112 1.77SC	50 + 50	0.0 b	2.0 a	5.0 a	21.0 a	16.3 a	89.3 a-e	193.3 abc	105.8 bcd
V-10195 + V-10112 1.77SC	50 + 75	0.0 b	1.0 a	7.0 a	31.0 a	20.8 a	111.5 a	209.0 ab	103.5 bcd
LSD (P=0.05)		0.07	0.78	1.29	1.77	1.59	1.78	1.98	2.36
S.D.		0.05	0.55	0.91	1.25	1.13	1.26	1.40	1.67
C.V.		4.73	36.49	40.61	26.09	28.34	14.53	10.56	16.50
F		1.000	1.046	1.145	1.210	1.199	2.797	2.170	2.392
Probability (F)		0.4744	0.4283	0.3380	0.2864	0.2949	0.0018	0.0128	0.0059

Mean separation determined after data transformation (Square root (X + 1). df = 79.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 4. Syngenta Seed Treatment (16 May 2006 planting). Nicotinoid seed treatment trial on soybean for efficacy against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. University of Wisconsin, 2006.

Treatment	Rate (g. a.i./100 kg seed)	Mean aphids per 20 trifoliate leaves/*Mean aphids per 10 plants							
		28 Jun	6 Jul	13 Jul	19 Jul	27 Jul	1 Aug	*9 Aug	*15 Aug
Low Resistant Soybean Variety									
Untreated	---	0.0 a	0.0 a	0.8 a	3.8 a	11.8 bc	48.5 a	135.5 a	69.0 a
A9765 5FS	50	0.0 a	0.0 a	0.0 a	4.3 a	8.0 bc	42.8 a	83.3 b	51.5 a
STP15255	62.5	0.0 a	0.0 a	0.0 a	0.8 a	11.5 ab	37.0 a	70.8 b	58.0 a
High Resistant Soybean Variety									
Untreated	---	0.0 a	0.0 a	0.3 a	1.5 a	23.3 a	57.3 a	88.0 b	78.0 a
A9765 5FS	50	0.0 a	0.0 a	1.3 a	0.8 a	3.0 c	31.3 a	61.5 b	49.3 a
STP15255	62.5	0.0 a	0.0 a	0.3 a	0.0 a	3.5 bc	50.8 a	61.5 b	57.3 a
LSD (P=0.05)		0.00	0.00	0.50	1.20	1.48	1.90	1.92	1.59
S.D.		0.00	0.00	0.33	0.79	0.98	1.26	1.27	1.06
C.V.		0.00	0.00	29.05	54.05	32.01	19.06	14.17	13.61
F		0.000	0.000	0.758	1.111	4.654	1.400	4.826	1.817
Probability (F)		1.0000	1.0000	0.5934	0.3954	0.0092	0.2800	0.0079	0.1700

Mean separation determined after data transformation (Square root (X + 1). df = 23.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).

Table 5. Bayer Seed Treatment (16 May 2006 planting). Nicotinoid seed treatment trial on soybean for efficacy against soybean aphid. Arlington Agricultural Research Station, Arlington, WI. University of Wisconsin, 2005.

Treatment	Rate (g. a.i./100 kg seed)	Mean aphids per 20 trifoliate leaves/*Mean aphids per 10 plants								
		20 Jun	28 Jun	6 Jul	13 Jul	19 Jul	27 Jul	1 Aug	9 Aug	15 Aug
Untreated	---	0.0 a	0.0 a	0.0 a	5.5 a	21.8 a	38.3 a	158.8 a	349.3 a	198.0 a
Cruiser 5FS + Apron Maxx	50	0.0 a	0.0 a	0.8 a	2.0 a	10.0 a	9.3 b	37.8 b	139.8 b	107.3 b
Gaucho 4FS	62.5	0.0 a	0.0 a	0.0 a	2.3 a	6.3 a	10.8 b	35.0 b	159.8 b	73.8 b
Gaucho 4FS + Baythroid XL (foliar)	62.5 + 2 oz/a	0.0 a	0.0 a	0.5 a	2.8 a	3.8 a	12.3 b	53.0 b	138.0 b	102.8 b
LSD (P=0.05)		0.0	0.0	0.52	1.57	1.93	1.24	2.24	3.15	3.01
Standard deviation		0.0	0.0	0.33	0.98	1.21	0.78	1.40	1.97	1.88
C.V.		0.00	0.00	29.40	53.50	39.54	19.19	18.02	14.42	17.53
F		0.000	0.000	0.617	0.518	3.471	12.393	19.798	11.629	5.575
Probability (F)		1.0000	1.0000	0.6213	0.6802	0.0640	0.0015	0.0003	0.0019	0.0194

Mean separation determined after data transformation (Square root (X + 1). df = 19.
Means within a column followed by a different letter are significantly different at P<0.05 and Least Significant Difference test (ARM 7, Gylling Data Management, Inc.).