HORTICULTURAL REPORT

2013 WEED CONTROL RESEARCH ON FRUIT & VEGETABLE CROPS

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By

Bernard H. Zandstra
Colin J. Phillippo
William R. Chase
Nicole M. Schroeder
Hayley E. Sisson
Nicole M. Rowley

Department of Horticulture
Michigan State University
East Lansing, Michigan

WEED CONTROL IN HORTICULTURAL CROPS – 2013
FORWORD

This report summarizes the results of weed control experiments on horticultural crops in Michigan in 2013. It is intended to inform industry and university research and extension colleagues of our current results.

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For Additional Information, Contact the Following Researchers:

Bernard H. Zandstra, 1066 Bogue St., A440 Plant and Soil Science Building, Michigan State University, East Lansing, Michigan 48824-1325. (517) 355-5191 Ext. 418. zandstra@msu.edu

Colin Phillippo, 1066 Bogue St., A438 Plant and Soil Science Building, Michigan State University, East Lansing, Michigan 48824-1325. (517) 355-5191 Ext. 415. phill394@msu.edu

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METHODS

Chemical Application

Herbicides were applied with a small plot sprayer using carbon dioxide as a source of pressure. Spray volumes are specified in each experiment. All herbicide rates are expressed as pounds of active ingredient per acre.

Visual Evaluations

In most instances, weed control ratings were made on individual weed species. General ratings for broad-leaved weeds and grasses were sometimes used in orchard studies or for late-season assessments.

Weed control and crop injury are rated on a 1 to 10 scale; 1 = no visible injury or reduction in growth; 10 = complete kill of plants. The ratings can be roughly translated into percentages as follows:

10 = 100% kill, all the plants are dead or none are visible.
9 = 90-100% kill or reduction in growth and stand.
8 = 80-90% kill or reduction in growth and stand.
7 = 70-80% kill or reduction in growth and stand.
This is a still commercially acceptable control.
6 = 60-70% kill or reduction in growth and stand.
5 = 50% kill or reduction in growth and stand.
4 = 30-40% kill or reduction in growth and stand.
3 = 20-30% reduction in growth and stand.
2 = 10-20% reduction in growth and stand.
1 = 0-10% reduction in growth, no obvious effect of herbicide.

Experimental Design and Statistical Analysis

Experiments were set up and analyzed in the program Agriculture Research Manager (ARM) version 9.1.0, from Gylling Data Management, Inc. (RR 4 405 Martin Boulevard, Brookings, SD 57006). Unless otherwise specified, the experiments were laid out as randomized complete blocks. The data were subjected to analysis of variance and the means were compared with the LSD test at the 5% level. Since data transformations were not used, the coefficient of variation for skewed ratings or weed densities may be misleading. In some instances, yields for weeded check plots may be low because of severe early weed competition. In these cases, it may be more desirable to compare new herbicides with standard treatments.

WEED LIST

Abbreviations for the common names of weeds correspond to those presented in the NCWSS proceedings volume 28 (1973), 143.

Abbr.	Common Name	Botanical Name
ALFA	alfalfa	*Medicago sativa* L.
ANBG	annual bluegrass	*Poa annua* L.
ANFB	annual fleabane	*Erigeron annuus* (L.) *Pers.*
ATRI	Atriplex	*Atriplex patula L. (Gray)*
BABR	bald brome (upright brome)	*Bromus racemosus* L.
BEGR	Bermudagrass	*Cynodon dactylon* L. *Pers.*
BFTF	birdsfoot trefoil	*Lotus corniculatus* L.
BHPL	buckhorn plantain	*Plantago lanceolata* L.
BLDO	broadleaf dock	*Rumex obtusifolius* L.
BLME	black medic	*Medicago lupulina* L.
BRFB	British fleabane	*Inula britannica* L.
BRPL	broadleaf plantain	*Plantago major* L.
BSPL	blackseed plantain	*Plantago rugelii* Dcne.
BYGR	barnyardgrass	*Echinochloa crus-galli* (L.) Beauv.
CABR	California brome	*Bromus carinatus* L.
CAGE	Carolina geranium	*Geranium carolinianam L.*
CATH	Canada thistle	*Cirsium arvense* (L.) Scop.
CAWE	carpetweed	*Mollugo verticillata* L.
CLGC	clammy groundcherry	*Physalis heterophylla* Nees.
COBD	common burdock	*Arctium minus (Hill) Bernh.*
COBU	cocklebur	*Xanthium strumarium* L.
COCW	common chickweed	*Stellaria media* (L.) Cyrillo
COGR	common groundsel	*Senecio vulgaris* L.
COLQ	common lambsquarters	*Chenopodium album* L.
COMA	common mallow	*Malva neglecta Wallr.*
COMU	common mullien	*Verbascum Thapsus* L.
COMW	common milkweed	*Asclepias syriaca* L.
COPU	common purslane	*Portulaca oleracea* L.
COPW	common pokeweed	*Phytolacca americana* L.
CORW	common ragweed	*Ambrosia artemisiifolia* L.
CRWS	creeping woodsorrel	*Oxalis corniculata* L.
CUDO	curly dock	*Rumex crispus* L.
CWBS	catchweed bedstraw	*Galium aparine* L.
DAND	dandelion	*Taraxacum officinale* Weber
DOBG	downy bromegrass	*Bromus tectorum* L.
EBNS	eastern black nightshade	*Solanum ptycanthum* Dun.
FAPA	fall panicum	*Panicum dichotomiflorum* Michx.
FIBW	field bindweed	*Convolvulus arvensis* L.
FIPA	field pansy	*Viola rafinesquii* Greene
FIPC	field pennycress	*Thlaspi arvense* L.
FISB	field sandbur	*Cenchrus incertus* M.A.Curtis
FIVI	field violet	*Viola arvensis* Murray
GALI	galinsoga	*Galinsoga quadriradiata* Ruiz & Pav.
GIRW	giant ragweed	*Ambrosia trifida* L.
GOGR	goosegrass	*Eleusine indica* (L.) Gaertn.
GORO	goldenrod	*Solidago nemoralis* Ait.
GIFT	giant foxtail	*Setaria faberi* Hermm.
GRFT	green foxtail	*Setaria viridis* (L.) Beauv.
GFPW	greenflower pepperweed	*Lepidium densiflorum* Schmd.
HABC	hairy bittercress	*Cardamine hirsute* L.

WEED LIST

Abbr.	Common Name	Botanical Name
HANS	hairy nightshade	*Solanum sarrachoides* Sendtner
HAVE	hairy vetch	*Vicia villosa* Roth
HENB	henbit	*Lamium amplexicaule* L.
HEMU	hedge mustard	*Sisymbrium officinale (L.) Scop.*
HOAL	hoary alyssum	*Berteroa incana* (L.) DC.
HONE	horsenettle	*Solanum carolinense* L.
HOWE	horseweed (marestail)	*Conyza canadensis* (L.) Scop.
IRFB	Irish fleabane	*Inula salicina*
JIWE	jimsonweed	*Datura stramonium* L.
LACG	large crabgrass	*Digitaria sanguinalis* (L.) Scop
LATH	ladysthumb	*Polygonum persicaria* L.
MATA	marestail (horseweed)	*Conyza canadensis* (L.) Scop.
MAYC	marsh yellowcress	*Rorippa islandica* (Oeder) Barbs
MECW	mouseear chickweed	*Cerastium vulgatum* L.
MECR	mouseear cress	Arabidopsis thaliana(L.) Heynh
MONO	monolepis	*Monolepis nuttaliane* Greene
MUTH	musk thistle	*Carduus nutans* L.
MWCH	mayweed chamomile	*Anthemis cotula* L.
NLLQ	narrowleaf lambsquarters	*Chenopodium desiccatum* A. Nels
OEDA	oxeye daisy	*Chrysanthemum leucanthemum* L.
ORGR	orchardgrass	*Dactylis glomerata* L.
PAWE	pineappleweed	*Matricaria matricariodes* (Less)C.L.Porter
PEST	perennial sowthistle	*Sonchus arvensis L.*
PESW	Pennsylvania smartweed	*Polygonum pennsylvanicum* L.
PERG	perennial ryegrass	*Lolium perenne* L.
POAM	Powell amaranth	*Amaranthus powellii S. Wats*
POIV	poison ivy	*Rhus radicans* L.
PRKW	prostrate knotweed	*Polygonum aviculare* L.
PRLE	prickly lettuce	*Lactuca serriola* L.
PRPW	prostrate pigweed	*Amaranthus blitoides* S. Wats.
PUDN	purple deadnettle	*Lamium purpureum* L.
PUSW	purslane speedwell	*Veronica serpyllifolia* L.
PUVI	puncturevine	*Tribulus terrestris* L.
QUGR	quackgrass	*Agropyron repens* (L.) Beauv.
RECL	red clover	*Trifolium pratense* L.
REFE	red fescue	*Festuca rubra* L.
RESO	red sorrel	*Rumex acetosella* L.
ROCI	rough cinquefoil	*Potentilla norvegica L.*
ROFB	rough fleabane	*Erigeron strigosus* Muhl. ex Willd.
RRPW	redroot pigweed	*Amaranthus retroflexus* L.
RSFI	redstem filaree	*Erodium cicutarium* (L.) L'Hér. ex Ait.
RUTH	Russian thistle	*Salsola iberica* L.
SFGE	smallflower geranium	*Geranium pusillum*
SHPU	shepherdspurse	*Capsella bursa-pastoris* (L.) Medic.
SPKW	spotted knapweed	*Centaurea biebersteinii* DC.
SPSP	spotted spurge	*Euphorbia maculata L.*
STGR	stinkgrass	*Eragrostis cilianensis* (All.) E. Mosher
SWSW	swamp smartweed	*Polygonum coccineum* Muhl. ex Willd.
TAFE	tall fescue	*Festuca arundinacea* Schreb.
TLSW	thymeleaf sandwort	*Arenaria serpyllifolia* L.
TRCV	trailing crownvetch	*Coronilla caria L.*
TUPW	tumble pigweed	*Amaranthus albus* L.
VELE	velvetleaf	*Abutilon theophrasti* Medic.

WEED LIST

Abbr.	Common Name	Botanical Name
VICR	Virginia creeper	*Parthenocissus quinquefolia* (L.) Planch.
VIPW	Virginia pepperweed	*Lepidium virginicum* L.
VOAS	volunteer asparagus	*Asparagus officinalis* L.
WESA	western salsify	*Tragopogon dubius* Scop.
WHCA	white campion	*Silene latifolia Poir.*
WHCL	white clover	*Trifolium repens* L.
WIBW	wild buckwheat	*Polygonum convolvulus* L.
WICA	wild carrot	*Daucus carota* L.
WICH	wild chamomile	*Matricaria chamomilla* L.
WIGR	witchgrass	*Panicum capillare* L.
WIMU	wild mustard	*Sinapis arvensis* L.
WIRA	wild radish	*Raphanus raphanistrum* L.
WLDGRP	wild grape	*Vitis* sp.
WLDRASP	wild raspberry	*Rubus* sp.
YEFC	yellow fieldcress (kiek)	*Rorippa sylvestris* L.
YEFT	yellow foxtail	*Setaria glauca* (L.) Beauv.
YEHW	yellow hawkweed	*Hieracium caespitosum Dumort.*
YENS	yellow nutsedge	*Cyperus esculentus* L.
YERO	yellow rocket	*Barbarea vulgaris* R. Br.

CHEMICAL LIST

COMMON NAME	TRADE NAME	FORMULATION	MANUFACTURER
2,4-D amine	Weedar 64	3.8 L	Nufarm Inc.
acetochlor	Harness	7.0 E	Monsanto
acetochlor	Surpass	6.4 E	Dow Agrosciences
acetochlor	Warrant	3 EC	Monsanto
acifluorfen	Ultra Blazer	2 L	United Phosphorus
atrazine	Aatrex	4 L	Syngenta
atrazine + proxasulfone + fluthiacet-methyl	Anthem ATZ	4.5 SE	FMC
bensulide	Prefar	4 EC	Gowan
bentazon	Basagran	4 L	Arysta
bicyclopyrone	A16003	1.67 SL	Syngenta
bromoxynil	Buctril	4 EC	Bayer CropScience
carfentrazone	Aim	2.0 EC	FMC
chlorimuron-ethyl	Classic	25 WDG	DuPont
clethodim	Intensity One	0.97 EC	CPS
clethodim	Select Max	0.97 EC	Valent
clomazone	Command	3 ME	FMC
clopyralid	Stinger	3 EC	Dow Agrosciences
cloransulam-methyl	Firstrate	84 WDG	Dow Agrosciences
cycloate	Ro-Neet	6 EC	Helm Agro
dicamba	Clarity	4 L	BASF
diclobenil	Casoron G	4 G	Chemtura
diflufenzopyr 21.4% + dicamba 55%	Distinct	76.4 WG	BASF
dimethenamid-p	Outlook	6 EC	BASF
diquat	Reglone	2 EC	Syngenta
diuron	Karmex	80 DF	DuPont
EPTC	Eptam	7 EC	Gowan
ethalfluralin	Curbit	3 EC	CPS
ethalfluralin 1.6 lb ai + clomazone 0.5 lb ai	Strategy	2.1 EC	CPS
ethofumesate	Nortron SC	4 SC	Bayer CropScience
flazasulfuron	Mission	25WG	ISK Bioscience
fluazifop-P	Fusilade DX	2 EC	Syngenta
flucarbazone	Everest	70 WDG	Arysta
flufenacet	Define	60 DF	Bayer CropScience
flufenacet 54.4% + metribuzin 13.6%	Axiom	68 DF	Bayer CropScience
flumetsulam	Python	80 WDG	Dow Agrosciences
flumioxazin	Chateau SW	51 WG	Valent
flumioxazin	Sureguard	51 WDG	Valent
fluthiacet	Cadet	0.91 EC	FMC
fluroxypyr	Starane Ultra	2.8 L	Dow Agrosciences
fomesafen	Reflex	2 EC	Syngenta
fomesafen 10.2% + s-metolachlor 46.4%	Prefix	5.29 L	Syngenta
foramsulfuron	Option	35 WG	Bayer CropScience
glufosinate	Rely 280	2.34 L	Bayer CropScience
glyphosate	Roundup Weath. Max	5.5 L	Monsanto
glyphosate	Touchdown Total	4.17 L	Syngenta
glyphosate	Roundup Original	4 L	Monsanto

CHEMICAL LIST

COMMON NAME	TRADE NAME	FORMULATION	MANUFACTURER
glyphosate	Roundup Ultra	4 L	Monsanto
glyphosate	Roundup Ultramax	5 L	Monsanto
glyphosate	Roundup Powermax	5.5 L	Monsanto
glyphosate	Durango	5.4 L	Dow Agrosciences
halosulfuron	Permit	75 WG	Gowan
halosulfuron	Sandea	75 WG	Gowan
hexazinone	Velpar	2 L	DuPont
hexazinone	Velpar ULV	75 SG	DuPont
hexazinone + sulfometuron	Westar	75 WDG	DuPont
imazamox	Raptor	1 AS	BASF
imazapic	Plateau	70 WG	BASF
imazethapyr	Pursuit	2 EC	BASF
imazosulfuron	V 10142	75 WDG	Valent
indaziflam	Alion	1.67 CS	Bayer CropScience
isoxaben	Gallery, Trellis	75 DF	Dow Agrosciences
linuron	Lorox	50 DF	DuPont
mesotrione	Callisto	4 SC	Syngenta
metribuzin	Sencor	75 DF	Bayer CropScience
napropamide	Devrinol	50 DF	United Phosphorus
norflurazon	Solicam	80 DF	Syngenta
oryzalin	Surflan	4 AS	United Phosphorus
oryzalin	KFD-163-01	3.2 SC	UPI
oxyfluorfen	Goal XL	2 L	Dow Agrosciences
oxyfluorfen	Goaltender	4 SC	Dow Agrosciences
paraquat	Firestorm	3 L	Chemtura
paraquat	Gramoxone SL	2 L	Syngenta
pelargonic acid	Scythe	4.2 EC	Gowan
pendimethalin	Prowl	3.3 EC	BASF
pendimethalin	Prowl H2O	3.8 ACS	BASF
penoxsulam + oxyfluorfen	Pindar GT	4.013 SC	Dow Agrosciences
phenmedipham	Spin-Aid	1.3 L	Bayer CropScience
phenmedipham 0.6 lb ai+ desmedipham 0.6 lb ai+	Betamix	1.3 L	Bayer CropScience
prometryn	Caparol	4 L	Syngenta
pronamide	Kerb	50 WP	Dow Agrosciences
pronamide	Kerb	3.3 SC	Dow Agrosciences
propachlor	Ramrod	4 L	Monsanto
pyraflufen-ethyl	Venue	0.17 SC	Nichino
pyrazon	Pyramin	68 DF	Arysta
pyroxasulfone + fluthiacet-methyl	Anthem	2.15 SE	FMC
pyroxasulfone	Zidua	85 WDG	BASF
quinclorac	Quinstar	3.8 L	BASF
quizalofop p-ethyl	Assure II	0.88 EC	DuPont
quizalofop p-ethyl	Targa	0.88 EC	Gowan
rimsulfuron	Matrix	25 DF	DuPont
rimsulfuron	Pruven	25 DF	MANA
saflufenacil	Treevix	70 WG	BASF
sethoxydim	Poast	1.53 EC	BASF
simazine	Princep	90 DF	Syngenta

CHEMICAL LIST

COMMON NAME	TRADE NAME	FORMULATION	MANUFACTURER
s-metolachlor	Dual Magnum	7.62 EC	Syngenta
s-metolachlor 2.68 lb ai+ mesotrione 0.268 lb ai+ atrazine 1.0 lb ai	Lumax	3.948 L	Syngenta
sulfentrazone + metribuzin	Authority MTZ	45 DF	FMC
s-metolachlor 3.34 lb ai+ mesotrione 0.33 lb ai	Camix	3.67 L	Syngenta
s-metolachlor II	Dual II Magnum	7.64 EC	Syngenta
sulfentrazone	Spartan	4 F	FMC
sulfentrazone 3.15 lb ai+ carfentrazone 0.35 lb i	Spartan Charge	3.5 SE	FMC
sulfosulfuron	Maverick	75 WG	Monsanto
tembotrione	Laudis	3.5 SC	Bayer CropScience
terbacil	Sinbar	80 WDG	TKI
topramezone	Impact	2.8 L	Amvac
triclopyr	Garlon	3 SC	Dow Agrosciences
trifloxysulfuron	Envoke	75 WG	Syngenta
trifluralin	Treflan	4 EC	Dow Agrosciences
triflusulfuron	Upbeet	50 WDG	DuPont

ADJUVANTS

TRADE NAME	ABBREVIATION	DESCRIPTION	MANUFACTURER
Activator 90	NIS	nonionic surfactant	Loveland
Agri-dex	COC	heavy range paraffinic oil	
ammonium nitrate		100% salt	
ammonium sulfate	AMS	spray grade fertilizer	
N-Pak	AMS	AMS liquid	Winfield Solutions
copper sulfate		100% salt	
Freeway		organosilicone surfactant	Loveland
Herbimax	COC	80% paraffin base petroleum oil 20% surfactant	Loveland
LI6193-11	COC		Loveland
MSO		Methylated Seed Oil	Loveland
28% Nitrogen	UAN	28% urea ammonia nitrate solution	
Silwet L-77		organosilicone surfactant	Loveland
Sylgard 309		organosilicone surfactant	DowCorning

ABBREVIATIONS USED IN THE REPORT

A =	Acre
ai =	Active Ingredient
Amt =	Amount
ACS =	Aqueous Capsule Suspension
AS =	Aqueous Solution
ASPA =	Asparagus
CEC =	Caption Exchange Capacity
CRC =	Clarksville Research Center
CS =	Capsule Suspension
CV =	Coefficient of Variability
DF =	Dry Flowable
DS =	Designator
EC =	Emulsifiable Concentrate
EPRE =	Early PRE
EPOS =	Early POST
F =	Flowable
FALL =	Fall Application
FORM =	Formulation
FM =	Formulation
FT =	Distance in FT
g / gr =	Gram
GAL =	Gallon
GPA =	Gallon per acre
GROW STG =	Growth Stage at time of Application
HTRC =	Horticulture Teaching and Research Station
IN =	Inch
KG =	Kilogram
L =	Liquid
LPRE =	Late PRE
LPOS =	Late POST
LO =	Low Odor
LSD =	Least Significant Difference
LB =	Pounds
ME =	Microencapsulated
MKTBL =	Marketable
MPH =	Mile(s) per hour
MSU =	Michigan State University
N =	No
N/A =	Not Applicable/ Not Available
No. =	Number
OM =	Organic Matter
oz =	Ounce
P =	Probability
POH =	Post Harvest
PO1 =	Postemergence 1
PO2 =	Postemergence 2
POT =	Post Transplant
PPI =	Preplant Incorporated
PRE =	Preemergence
PREC. =	Precipitation (inches)
PRT =	Pretransplant
PSI =	Pounds per square inch
PT PR =	Pint Product
QT =	Quart
QT PR =	Quart Product
RCBD =	Randomized Complete Blo Design
RH =	Relative Humidity
REPS =	Replication
SE =	Suspoemulsion
SNBE =	Snapbean
SP =	Soluble Powder
SPRING =	Spring Application
STBE =	Strawberry
SURF =	Surface
T =	Temperature
TRNC =	Trevor Nichols Research Complex
TRT =	Treatment
UNMKTBL =	Unmarketable
VOAS =	Volunteer Asparagus
WDG =	Water Dispersible Granu Water Soluble Granule
WG =	Wettable Powder
WP =	Weight
WT =	Inches
" =	Yes
Y =	

TEMPERATURE AND PRECIPITATION DATA

MSU Horticulture Teaching and Research Center

Recorded at
MSU Horticulture Teaching and Research Center (HTRC)
East Lansing, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	37.6	23.3		**1**	80.9	52.7		**1**	76.3	63.3	0.26
2	38.5	19.6		**2**	78.2	56.5		**2**	67.4	50.1	
3	42.4	23.1		**3**	77.8	56.2		**3**	67.5	40	
4	55.1	25.5		**4**	71	52.1		**4**	71.1	48.1	
5	47.7	32.4		**5**	72.1	48.7		**5**	68.7	50.4	
6	55.4	28.8		**6**	74.8	44.6		**6**	68	54.7	
7	58.1	32.7		**7**	76.2	44.7		**7**	67.2	49.8	
8	61.9	30.6	0.19	**8**	79.3	46.9		**8**	73.4	46.2	
9	48.7	39.6	1.11	**9**	78.7	48.5		**9**	76.3	57.1	
10	41.3	36.3	0.29	**10**	64.3	41.1	0.27	**10**	73.4	59.9	0.86
11	37.1	34.6	1.09	**11**	59.3	36.2	0.05	**11**	79.4	62.1	
12	41.2	32.4	0.27	**12**	45	34.1		**12**	73.6	59.1	0.89
13	39.3	32.5	0.01	**13**	54.1	28.7		**13**	78.4	60.4	1.09
14	48.3	30.3	0.04	**14**	76.2	43.4		**14**	76.9	55.2	0.01
15	66.9	40.6	0.02	**15**	78.4	59.3		**15**	75.9	54.6	
16	56.3	42.8	0.26	**16**	80.8	47.2		**16**	78.6	62.6	0.45
17	57.1	37.9	0.71	**17**	70.2	49.2		**17**	83.8	58	0.13
18	72.6	43.7	0.54	**18**	80	53.8		**18**	70.6	52.9	
19	58.8	30.3	0.81	**19**	84.9	51.1		**19**	75.3	45.9	
20	37.8	26.8		**20**	86.8	63.7		**20**	81.2	51.6	
21	49.2	23.8		**21**	79.9	63	0.03	**21**	84.8	59.6	
22	62	30.6		**22**	76.2	60	0.33	**22**	86.5	67.2	
23	65.1	40.3	0.39	**23**	60.1	43.6	0.42	**23**	87	68.7	
24	44.7	32.9	0.31	**24**	59.9	36.8		**24**	85.5	66.2	0.18
25	49.1	33.5	0.02	**25**	65.5	37.7		**25**	81.1	65.6	0.4
26	60	28.6		**26**	68.1	36.6		**26**	81.2	62.5	
27	67.8	37.2		**27**	59.2	43.1	0.11	**27**	84.3	65.1	0.04
28	57.8	48.3	0.14	**28**	75.4	50.7	1.71	**28**	78.3	62.9	0.2
29	70.9	50.9		**29**	79.5	62.7	0.36	**29**	73.1	62.6	
30	72.7	53.9	0.3	**30**	85.4	64.4	0.02	**30**	77.4	60.2	
				31	77.2	69					

TEMPERATURE AND PRECIPITATION DATA

MSU Horticulture Teaching and Research Center

Recorded at
MSU Horticulture Teaching and Research Center (HTRC)
East Lansing, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	72.4	55.8		**1**	75.7	60.7		**1**	81.9	65.3	
2	72	55.3	0.06	**2**	70.7	54.3		**2**	71.5	58.4	
3	80.9	59.5	0.06	**3**	76.7	53		**3**	73.6	56.6	
4	78	59.5		**4**	73.6	56.2		**4**	78.2	51.5	
5	84.2	62.9		**5**	69.8	50.2		**5**	70.4	50.8	
6	83.3	65.7	0.04	**6**	78.1	61.3	0.01	**6**	75.1	46	
7	81.4	67.3	0.07	**7**	81.4	63	0.19	**7**	79	57.7	0.09
8	80.2	67.4	0.16	**8**	77.2	59		**8**	72.6	57.1	
9	86.3	65.9	0.1	**9**	78.7	53		**9**	81.9	54.4	0.32
10	84.4	66.8		**10**	79.5	58.8		**10**	90.2	70.2	
11	79.6	57.8		**11**	76.9	57.5		**11**	86.3	69.3	
12	80.2	53.1		**12**	71.4	61.8	0.65	**12**	77	55.7	0.06
13	82.5	56.5		**13**	67.8	53.2		**13**	59.8	40.8	
14	88.2	61.6		**14**	70.3	48.6		**14**	66.9	38.1	
15	92.1	67.7	0.44	**15**	72.1	44.9		**15**	59.3	46	0.06
16	89.8	72.2	0.02	**16**	78.8	48.1		**16**	61.9	44.9	0.01
17	90.8	72.2		**17**	78.8	48.6		**17**	67.1	33.4	
18	90.6	71.5		**18**	81.4	51.6		**18**	75.2	44.3	
19	91.1	74.2	0.03	**19**	80.6	53.1		**19**	77.8	57.5	0.01
20	84.4	69.2		**20**	83.4	58.7		**20**	73.2	65.5	0.03
21	82.6	61.7		**21**	84.7	63.5		**21**	66.1	53.8	
22	80.3	65.6	0.24	**22**	78.9	64.2	0.23	**22**	54.6	39.3	
23	79.5	58.4	0.41	**23**	80.6	58.9		**23**	62.1	35	
24	72.7	51.6		**24**	81.4	52.7		**24**	67.4	35.8	
25	77.2	49.3		**25**	83.8	56.6		**25**	73.6	39.3	
26	77.4	57.5	0.05	**26**	83.5	68		**26**	76	38.3	
27	74.1	55.1	0.02	**27**	86.5	69.6	1.71	**27**	76.5	40.7	
28	64.4	49.7	0.05	**28**	82.2	66.7	1.4	**28**	76.6	45.4	
29	68.1	55.7	0.02	**29**	88.4	61.4		**29**	68.4	47.7	0.12
30	79.3	46.9		**30**	85.1	66.5	0.13	**30**	69.8	44.9	
31	67.2	63.1	0.42	**31**	78.3	65.9					

TEMPERATURE AND PRECIPITATION DATA

MSU Clarksville Research Center

Recorded at
MSU Clarksville Research Center (Clarksville)
Clarksville, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	33.8	21.6		**1**	82	56.3		**1**	76	62.1	0.17
2	38	17.5		**2**	79.4	54.5		**2**	62.4	44.5	0.11
3	43.8	17.5		**3**	77.6	54.5		**3**	64.2	37.7	
4	52.9	22.7		**4**	71.5	51		**4**	71.8	44.5	
5	49.2	28		**5**	72.5	48.1		**5**	70.1	53.9	0.01
6	56	30.6		**6**	73.5	46		**6**	66	51.2	0.12
7	55.8	31.6	0.03	**7**	76.6	46		**7**	69.9	46.9	
8	53.7	31.2	0.42	**8**	77.7	48.7		**8**	73.7	46.7	
9	44.8	37.3	1.11	**9**	79.9	49.4		**9**	78.8	55.1	
10	38	34	0.52	**10**	59.1	41.3	0.37	**10**	72.8	59.4	0.29
11	34.6	31.8	1.4	**11**	54.8	35.9	0.03	**11**	78.9	57.2	
12	39.2	30.5	0.27	**12**	42.7	33.5	0.01	**12**	74.9	58.4	0.3
13	36.7	31.4	0.07	**13**	53.3	26		**13**	76	56.2	0.36
14	46.9	28.8	0.05	**14**	74.4	41.1		**14**	77.9	52.2	
15	65.3	38.8	0.63	**15**	76	55.7		**15**	71.8	53.7	
16	52.3	39.9	0.18	**16**	79.9	46.8		**16**	76.7	61.2	0.63
17	50.1	36.9	0.88	**17**	68.1	47.3		**17**	82.2	56.5	0.08
18	64	41.7	1.91	**18**	81.2	52		**18**	69.7	52.5	
19	57.4	29	0.53	**19**	85.4	51.9		**19**	75.9	42.8	0.03
20	36.4	25.3	0.01	**20**	84.7	63.5	0.03	**20**	81.6	50.7	
21	49.7	22.1		**21**	77.7	60.7	0.66	**21**	82	59.7	
22	62.2	29.4		**22**	66.9	57.5	0.79	**22**	84.7	66.5	
23	62.1	40.1	0.49	**23**	58.2	39.6	0.2	**23**	86.7	67.2	
24	44.7	31	0.19	**24**	61.5	33.1		**24**	84.1	67.1	0.32
25	47.8	32	0.13	**25**	63.2	36.8		**25**	78.3	63.7	0.67
26	61.1	32.6		**26**	68.2	39.1		**26**	81.7	62.5	
27	68.6	40.9		**27**	58	46	0.09	**27**	82.5	65.6	
28	59.4	48.7		**28**	73.5	49.4	1.1	**28**	78.1	61.4	0.01
29	71.1	48		**29**	77.6	60.3	0.92	**29**	71.4	58.3	0.01
30	74.9	52.6	0.52	**30**	83.6	66.3		**30**	78.8	56.5	
				31	80.6	64.6	0.02				

3TEMPERATURE AND PRECIPITATION DATA

MSU Clarksville Research Center

Recorded at
MSU Clarksville Research Center (Clarksville)
Clarksville, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	75.2	53.2		**1**	75.5	57.1	0.02	**1**	82.6	60	
2	70.5	52.8	0.09	**2**	71.4	54	0.01	**2**	69.4	56	0.01
3	80.4	56.3		**3**	74.7	53.6		**3**	73.2	52.3	
4	76.7	58.3		**4**	73.5	52.8		**4**	78.8	52	
5	83.2	61.2		**5**	70.1	47		**5**	72.4	47.1	
6	82.9	64.2	0.03	**6**	76.3	60.7		**6**	76.6	45.9	
7	82.8	68.2	0.15	**7**	80.2	61.4	0.19	**7**	77.6	60.8	0.03
8	77.5	67.2	0.01	**8**	76.7	55.3		**8**	75.7	56.2	
9	84.7	64.7	0.13	**9**	78.4	51.5		**9**	82.1	55.5	1.08
10	81.5	59.3		**10**	78.4	54.9		**10**	90	72.2	
11	79.7	55.6		**11**	75.5	55.7		**11**	86.3	65.4	0.03
12	79.7	52.1		**12**	71	60.7	0.85	**12**	74.8	51.6	0.18
13	84.1	57.2		**13**	66.1	48.8		**13**	61.8	41.7	
14	89.2	59.6		**14**	70.1	44.4		**14**	68.3	36.3	
15	93.5	67.1	0.83	**15**	73.8	45.4		**15**	57.4	46.7	0.04
16	88.9	71.1		**16**	78.9	48.7		**16**	62.1	40.8	0.01
17	90.4	71.2		**17**	79.6	50.3		**17**	68.3	34.2	
18	91	70.9		**18**	81	50.3		**18**	76.4	46.2	
19	91	68.3	0.18	**19**	79.9	51.5		**19**	72.8	58.3	0.13
20	82.3	63.8	0.03	**20**	82.8	59.3		**20**	71	60.6	0.01
21	81.8	54.8	0.37	**21**	84.5	63		**21**	63	50.6	
22	81.1	62.6	0.77	**22**	75.4	60.1	0.03	**22**	54.1	38.4	
23	76.5	55.2	0.1	**23**	81.8	51.6		**23**	64.6	35	
24	73.5	46.7		**24**	81.1	50.4		**24**	67.8	37.3	
25	76.5	49.8		**25**	85.1	58.9		**25**	72.5	41.3	
26	74.2	56.8	0.07	**26**	80.6	65.5		**26**	76.8	41.4	
27	69.9	50.3	0.05	**27**	87.6	69.2	0.39	**27**	78.4	42.8	
28	63.7	48.6	0.13	**28**	82.8	66.8	1.69	**28**	78.3	48.5	
29	68.5	53.7	0.03	**29**	85.8	61.1		**29**	69.5	49	0.25
30	77.8	46.5		**30**	85.7	64.9		**30**	70.7	46.8	
31	68.9	60.7	0.34	**31**	78.9	62.9					

TEMPERATURE AND PRECIPITATION DATA

MSU Southwest Michigan Research and Extension Center

Recorded at
MSU Southwest Michigan Research and Extension Center (Benton Harbor)
Benton Harbor, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	36.3	23.5		**1**	83.1	60.3		**1**	76.8	59.8	0.21
2	38.6	24.8		**2**	70	40.8		**2**	62.5	43.8	0.02
3	40.6	20.2		**3**	67.3	39.8		**3**	62.7	39	
4	53.3	21.7		**4**	73.6	58.4		**4**	73.8	42.4	
5	48.2	29.6		**5**	74	51.1		**5**	75.7	57.3	
6	65.4	29.4		**6**	76.5	50.8		**6**	69.6	52.4	
7	62.6	38.2		**7**	75.5	46.1		**7**	69.3	49.3	
8	65	37.9	0.22	**8**	73.8	51.1		**8**	72.3	43.5	
9	71.9	38.1	0.02	**9**	81	44.9	0.12	**9**	81.8	59.1	
10	48.8	38.5	0.35	**10**	60.3	42	0.18	**10**	73.1	57.8	0.21
11	42.8	38.3	0.61	**11**	54.3	34.8	0.02	**11**	82.1	57.2	
12	45.9	36.1	0.06	**12**	46.4	32.3		**12**	85.8	62.1	0.13
13	42.1	34.5		**13**	58.8	29.6		**13**	67.9	55.3	0.06
14	60.3	30.5		**14**	77.2	48.3		**14**	74.9	50.3	
15	66.3	43.7	0.5	**15**	78.2	56		**15**	73.5	52.8	0.07
16	48.6	39.2	0.14	**16**	76.8	48.6		**16**	80.3	63.5	0.04
17	54.5	39.9	0.62	**17**	77.9	56.3		**17**	86.5	58.7	0.24
18	69.7	45.1	1.37	**18**	81.5	55.6		**18**	76.1	56.3	
19	48.5	31.6	0.05	**19**	87.7	59.4		**19**	74.6	49.3	
20	39.5	28.6		**20**	88.7	69.4		**20**	85.6	50.1	
21	51.9	25.8		**21**	81.1	61.9	0.55	**21**	85.9	65.7	0.37
22	65.1	34.4		**22**	72.5	60	0.05	**22**	84.5	65.5	
23	65.1	36.3	0.54	**23**	61.7	41	0.07	**23**	87.5	64.5	
24	44.9	34.7	0.09	**24**	51.4	35.3		**24**	85.7	65.9	0.01
25	48.6	35.9	0.02	**25**	63	34.5		**25**	86.3	65.3	0.56
26	65.6	34.8		**26**	70	38.3		**26**	83.9	65	0.54
27	69.2	43.1		**27**	61.7	51.9	0.1	**27**	83.7	62.3	0.2
28	59.4	47.4	0.09	**28**	78.2	54.7	0.69	**28**	77.5	62.3	0.01
29	72.3	41		**29**	82.7	61.7	0.06	**29**	73.4	60.9	0.05
30	81.3	55	0.25	**30**	85.2	68.9	0.06	**30**	76.5	60.9	
				31	76.2	64.5	0.27				

TEMPERATURE AND PRECIPITATION DATA

MSU Southwest Michigan Research and Extension Center

Recorded at
MSU Southwest Michigan Research and Extension Center (Benton Harbor)
Benton Harbor, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	76.9	55		**1**	75.5	57.7	0.01	**1**	80.3	67.2	
2	65	56.5	0.9	**2**	78.6	54.4	0.46	**2**	74.1	55	0.04
3	77.4	59.3	0.01	**3**	75	58.1	0.01	**3**	70.9	53	
4	79.4	58.2		**4**	71.9	53.6		**4**	76.9	51.8	
5	84	59.3	0.01	**5**	73.8	49		**5**	76.1	55	
6	82.9	66.6		**6**	81	61.9	0.27	**6**	82	51.6	
7	85.5	67.4		**7**	83.1	64.3		**7**	86.2	61.5	0.05
8	80.1	71.4	0.01	**8**	78.4	59.8		**8**	79.5	63.9	
9	86.4	66.6	0.02	**9**	78.7	56.3		**9**	91.3	62.4	
10	80.1	60.2		**10**	80.2	62.1		**10**	94.1	73.1	
11	76.5	56		**11**	77.7	56		**11**	89.7	67.3	
12	80.8	52		**12**	82.6	63.4	0.41	**12**	78.6	59.1	
13	85.8	58.4		**13**	66.7	54.2	0.01	**13**	62	46.3	
14	90.2	66.4		**14**	68	45.2		**14**	67.8	39.8	
15	91.1	70.1	0.16	**15**	74	45.5		**15**	58.3	49.2	0.17
16	91	71.4	0.01	**16**	79.9	51.2		**16**	65.3	48.7	
17	90.4	71.6		**17**	80.3	55.2		**17**	70.3	43.8	
18	94	72.2		**18**	81.4	54.6		**18**	80.4	54.4	
19	94.4	74.4		**19**	82.6	55.6		**19**	73.1	64.5	0.46
20	86.4	69.2		**20**	85.7	60.9		**20**	75.1	62.8	0.03
21	87.6	61.9	0.09	**21**	88	64.5		**21**	64.1	55.6	0.04
22	85.3	65.6		**22**	76.7	64.5	0.96	**22**	63.3	44.8	
23	78.1	58.2		**23**	80.8	58.9		**23**	67.7	41.4	
24	71.2	48.2		**24**	83.2	53.5		**24**	70.3	46.3	
25	77.2	49.2		**25**	86.9	59.1		**25**	73	45.8	
26	76.2	58.4		**26**	86.1	65.4		**26**	79.2	45.1	
27	68.8	56.1	0.02	**27**	91.9	73.8		**27**	79.7	53.6	
28	65.4	53	0.39	**28**	82.9	67.2		**28**	81	54.3	
29	68.3	52.9		**29**	85.4	62.2		**29**	72.2	49.6	0.22
30	78.5	51		**30**	92.3	65		**30**	71.3	45.4	
31	69.3	62	0.04	**31**	81.3	64.4					

TEMPERATURE AND PRECIPITATION DATA

Fremont

Recorded at
City of Fremont
Fremont, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	30.2	24.9		**1**	81.7	59.3		**1**	72.9	62.4	0.12
2	38.1	16.5	0.01	**2**	81.6	48.4	0.16	**2**	62.8	39.8	0.01
3	44.1	18.2		**3**	77.4	44.7	0.01	**3**	67	36.8	
4	49.7	24.5		**4**	74.5	55.6		**4**	71.3	42.8	
5	48.1	27.6		**5**	74.6	51.5		**5**	66.6	55.7	0.01
6	55.2	31.6	0.02	**6**	78.2	45.4		**6**	71.6	53	0.03
7	53.1	30.6	0.2	**7**	77.6	47.3		**7**	76.8	46.1	
8	46.7	31.4	0.69	**8**	78.2	53.1		**8**	73.3	48.2	
9	42.5	38.2	0.9	**9**	78	47.2		**9**	78.9	54.7	
10	42.2	35.6	0.79	**10**	58.8	44.7	0.71	**10**	73.3	60.4	0.24
11	37.1	32.9	1.05	**11**	49.7	36.4	0.02	**11**	78.1	54	
12				**12**	44.4	30.6		**12**	75.3	57.6	0.54
13	38.6	31.5	0.01	**13**	53.1	24.2		**13**	72.2	56.9	0.52
14	45.1	26.6	0.03	**14**	69.6	43.8		**14**	79	50.2	
15	58.4	42.8	0.41	**15**	75.8	54.5		**15**	74.2	50.2	
16	50	36.1	0.2	**16**	80	42.8		**16**	76.7	58.9	0.88
17	48.4	36.6	0.49	**17**	61.8	49.4		**17**	81.6	55.8	0.12
18	58.3	41	1.35	**18**	79.9	53.3		**18**	73.4	53.5	
19	54	30.7	0.06	**19**	84.1	55.9		**19**	75	44.4	
20	37.7	24.1		**20**	81.9	66.1	0.14	**20**	81.4	48.1	
21	49.8	20.7		**21**	75.8	60.9	0.42	**21**	81.9	60.7	
22	63	34.2		**22**	66.6	58.3	1	**22**	83.9	66.7	
23	58	34.4	0.37	**23**	58.7	39.6	0.73	**23**	83.8	66.4	
24	46.8	32.4	0.01	**24**	61.8	34.3		**24**	83.1	67.2	
25	48.6	32.7	0.15	**25**	65.1	36.5		**25**	77.6	64.9	0.14
26	63.4	29.9		**26**	67.5	40		**26**	82.9	61.8	
27	69.2	42.5		**27**	60.8	46.9		**27**	83.5	64.3	
28	64.9	44.4		**28**	70.8	50.8	0.74	**28**	79.2	60.1	0.22
29	69.1	43	0.02	**29**	74.6	58.4		**29**	71.5	59.4	0.16
30	76.3	55	0.41	**30**	83.1	65.5		**30**	81.2	58.7	
				31	78	64.6					

TEMPERATURE AND PRECIPITATION DATA

Fremont

Recorded at
City of Fremont
Fremont, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	79.2	52.4		**1**	76.7	56.2		**1**	81.7	58.7	0.01
2	63.8	56.3	0.14	**2**	74.7	54.6	0.01	**2**	68.7	58.1	
3	76.2	55.1	0.43	**3**	76.5	51.1		**3**	72.3	50.1	
4	75.5	60.4		**4**	74.2	51.2		**4**	77.6	49.7	
5	81.8	59.2		**5**	69.8	45.5		**5**	74.8	45.1	0.01
6	83.7	60.5		**6**	74.5	62.9		**6**	76.3	43.8	
7	82	68.3		**7**	78.4	60.5	0.35	**7**	78.9	60.5	0.06
8	74.9	67.8	0.06	**8**	79.1	52.1		**8**	76.5	59.4	
9	83.2	64.7	0.05	**9**	77.2	50.2		**9**	81.7	57.5	0.33
10	76.4	58.3		**10**	76.3	50.9		**10**	87.4	72.7	0.02
11	82.9	52.9		**11**	73.8	51.9		**11**	82	62.5	
12	83.7	54.5		**12**	76.4	59.5		**12**	74	54.4	
13	84.8	56.4		**13**	68.3	47.8	0.01	**13**	65.9	44.3	
14	88.7	61		**14**	71.1	43.3		**14**	65.7	35.9	
15	94.6	66.7		**15**	76.7	42.5		**15**	60.5	50.9	
16	88.9	70.9		**16**	82.7	46.7		**16**	64.2	43	
17	92	69.1		**17**	82.8	49.1		**17**	66.6	35.9	
18	91.1	69.9		**18**	81.8	50.4		**18**	74.8	46.1	
19	90.5	75		**19**	79.9	48.7		**19**	74	62	
20	82.7	61.8		**20**	82.7	55.4		**20**	70.4	59.6	
21	82	56.8		**21**	85.4	61.1	0.1	**21**	62.1	51.2	
22	82.5	62.5		**22**	76.5	60.4	0.22	**22**	54.6	40.4	
23	76	53.8		**23**	84.1	50.1		**23**	63.3	34.9	
24	76.4	43.9		**24**	81.8	52.1		**24**	68	40.2	
25	76.2	46.1		**25**	83	58.7		**25**	71.8	43.7	
26	70.1	58.6	0.41	**26**	82.5	71		**26**	76.9	43.7	
27	65.6	53.3		**27**	85.2	69.8	0.27	**27**	76.5	44.7	
28	64.9	50.3	0.25	**28**	88.1	70.2	0.03	**28**	76.7	50.9	
29	67.5	51.5	0.03	**29**	87.8	64		**29**	71.3	48.8	0.47
30	79.4	44.8		**30**	83.8	64.4	0.01	**30**	68.7	41.5	
31	68.9	60.2	0.67	**31**	82.7	61.4					

TEMPERATURE AND PRECIPITATION DATA

Grand Junction

Recorded at
MBG Marketing
Grand Junction, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	37.3	24.9		**1**	87.5	60.4		**1**	80.9	61.7	0.39
2	40.6	19.9		**2**	82.5	45.6		**2**	63.1	45.5	0.02
3	44.4	18.4		**3**	80	43.6		**3**	67.1	37.1	
4	53.9	19.9		**4**	78.1	57		**4**	75.7	42.7	
5	48.5	31.9		**5**	77.2	52		**5**	76.6	58.3	
6	62.9	33.1		**6**	80.2	45		**6**	69	55	0.07
7	63	33.9	0.01	**7**	80.5	46.3		**7**	73.9	46.9	
8	64.5	32.3	0.34	**8**	80.3	47.8		**8**	77.4	43.7	
9	56.9	39.3	0.19	**9**	81.8	45.6	0.04	**9**	82.8	55.1	
10	45.7	39.1	0.31	**10**	61.3	47.4	0.34	**10**	72.3	59.6	0.51
11	40.9	36.9	1.26	**11**	56.2	35.9	0.04	**11**	83	57.1	0.01
12	45.2	37.8	0.17	**12**	48.4	32.6		**12**	81.9	62.9	0.47
13	41.9	36.1		**13**	57.9	29.2		**13**	75.9	56	0.01
14	59	29.3	0.03	**14**	78.7	48.4		**14**	80.4	51.9	
15	67.5	46.3	0.42	**15**	79.4	53.4		**15**	76.6	52.8	
16	51.2	38.9	0.08	**16**	80.6	44.9		**16**	82.2	61.8	0.68
17	54	38.1	1.04	**17**	72.3	54.5		**17**	88.2	56.6	
18	64.6	47.3	2.16	**18**	83.3	55.2		**18**	74.7	54	
19	54.5	33.3	0.18	**19**	90.2	57		**19**	78.5	45.6	
20	40	26.2	0.02	**20**	91.7	66.8		**20**	86.1	47.5	
21	54.6	21.5		**21**	83.7	63.7	0.31	**21**	87.4	64.7	
22	66.9	33.6		**22**	73.4	58.2	0.43	**22**	87.3	66.2	
23	66.6	39.5	0.46	**23**	59.1	42.2	0.33	**23**	92.2	65.9	
24	45.9	34.8	0.1	**24**	56.5	33.9		**24**	90.4	70.1	
25	51.1	35.3	0.03	**25**	68.9	36.5		**25**	85.4	66.7	1.49
26	66.5	31.1		**26**	73	38.4		**26**	84.5	67.2	0.62
27	71.5	38.8		**27**	60.1	53.3	0.02	**27**	83.9	64.4	
28	64.3	48.3		**28**	78.1	54.8	1.05	**28**	80.2	63.7	
29	74.8	40.5		**29**	80.9	63	0.05	**29**	78.1	60.4	0.51
30	83.1	58.8	0.02	**30**	87.4	68.4		**30**	81.3	61.4	
				31	79.3	65.5	0.34				

TEMPERATURE AND PRECIPITATION DATA

Grand Junction

Recorded at
MBG Marketing
Grand Junction, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	78.4	51.3		**1**	78.7	57.8		**1**	84	68	
2	65.4	56.5	0.37	**2**	77.4	56.3	0.39	**2**	76.5	59.8	
3	81	58.4		**3**	79.5	55.9		**3**	74.8	52.3	
4	82	60.9		**4**	77	53		**4**	79.4	52.2	
5	86	60.9		**5**	73.8	48.4		**5**	75.6	52	
6	85	66.1		**6**	80.6	63.9	0.01	**6**	81.9	48.6	
7	87.6	70.3		**7**	85.1	64.3	1.25	**7**	87.4	62.3	0.03
8	81	71.5	0.01	**8**	80	59.3		**8**	80.5	63.9	
9	89.2	68.7		**9**	82	54.2		**9**	89.2	60.7	0.15
10	83.2	59.3		**10**	82.2	58.4		**10**	93.9	71.3	
11	81.7	54.6		**11**	81	56.4		**11**	89.1	68.7	
12	84.2	52.8		**12**	79.6	64.3	1.48	**12**	80.6	58	
13	87.3	56.4		**13**	70.1	51.7		**13**	66.5	44.9	
14	91.3	62.6		**14**	71.8	43.6		**14**	71.4	36.6	
15	95.3	68.7	0.03	**15**	76.6	46		**15**	59.2	46.8	0.27
16	93.3	72.2		**16**	80.5	51		**16**	64.8	45.6	
17	94.4	71.7		**17**	82.1	50.7		**17**	71	39.5	
18	95.3	72.5		**18**	83.3	51.4		**18**	80.9	54.4	
19	96.4	74.8	0.08	**19**	84	54.5		**19**	74.4	61	0.53
20	88.4	68.6	0.01	**20**	87	59.4		**20**	74.9	63	
21	86.8	61.3	0.72	**21**	89	63.2		**21**	68	54.7	
22	86.3	65.9	0.07	**22**	80.2	64.5	0.9	**22**	62.9	44.7	
23	80.5	57.8		**23**	81.6	58		**23**	66.5	36.4	
24	75.4	47		**24**	83.9	52.2		**24**	70.3	40.9	
25	79.9	49.6		**25**	88.1	59.6		**25**	72.4	42	
26	76	56.8	0.01	**26**	85.8	64.2		**26**	77.9	41.4	
27	71.5	56.3		**27**	92.5	74.4		**27**	80.3	43.1	
28	68.6	54.4	0.75	**28**	84.4	67.5	0.01	**28**	82.7	54	
29	69.8	53.1		**29**	87.8	62.5		**29**	71.3	50.6	0.23
30	81.2	48.1		**30**	92.5	65.9	0.36	**30**	74.1	43.7	
31	72.9	63.3	0.17	**31**	82.8	64.8					

TEMPERATURE AND PRECIPITATION DATA

Hart

Recorded at
Asparagus Research Farm
Hart, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	32	25.4		**1**	80.9	58.5		**1**	73.5	58.2	0.15
2	35.9	21.9		**2**	69.2	41.9	0.01	**2**	59	38.1	0.01
3	40.5	16.9		**3**	65	40.7	0.12	**3**	65.9	37.9	
4	50.5	25.2		**4**	76.3	53		**4**	67.3	42.9	
5	43	27.1		**5**	75.8	49.5		**5**	65.5	53.8	0.04
6	55.6	29.2	0.03	**6**	78	46.1		**6**	69.2	53.1	
7	52.3	31	0.07	**7**	75.4	44.3		**7**	73.1	46.8	
8	43.8	29.8	0.2	**8**	75.7	48.9		**8**	72	48.2	
9	43.1	35.5	0.86	**9**	77.3	43.8		**9**	78.8	51.9	
10	44.3	33.1	1.16	**10**	50.5	43.1	0.66	**10**	73.2	52.9	0.1
11	38.3	32.5	0.4	**11**	48	33.9	0.28	**11**	77.9	49.5	
12				**12**	44.3	29		**12**	76.2	57.8	0.42
13				**13**	51.4	24		**13**	67.6	54	0.02
14				**14**	69.3	42.8		**14**	72.7	46.3	
15				**15**	73	54		**15**	75.5	47.4	
16				**16**	75.8	48.3		**16**	77	57.2	0.52
17	49.3	32.5	0.39	**17**	58.3	51.1	0.04	**17**	79.8	54.5	0.03
18	59	40.6	1.04	**18**	77.1	52.1		**18**	74.9	55	
19				**19**	85.8	58		**19**	72.3	49.2	
20				**20**	82.4	66.1		**20**	81.8	50.7	
21	49.7	22.3		**21**	75.2	58.4	0.6	**21**	79.5	64	
22	62.9	35		**22**	63.7	49	1.31	**22**	85.5	64.4	
23				**23**	52.5	38.3	0.06	**23**	84	63.8	
24	45.1	32.4		**24**	52.5	33.9		**24**	81.5	66.7	
25	48.5	34.9	0.01	**25**	63.6	33.9		**25**	77.5	64.2	0.15
26	61.6	31		**26**	66.9	38.5		**26**	82.7	60.8	
27	65.9	45.3		**27**	62.6	44.4		**27**	80.5	61.5	0.08
28	67.3	43.5		**28**	71	51.7	0.34	**28**	77.1	57.7	
29	70.9	40		**29**	77.2	52.8	0.01	**29**	76.7	60.7	
30	78.4	55.5	0.21	**30**	83.5	66.7		**30**	82.7	55.5	
				31	77.9	63.7	0.01				

TEMPERATURE AND PRECIPITATION DATA

Hart

Recorded at
Asparagus Research Farm
Hart, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	83.5	47.9		**1**	73.8	57.8	0.01	**1**	80.8	58.7	
2	73.4	53.3	0.57	**2**	74	57.9		**2**	67.2	58.3	
3	77.4	56.7	0.06	**3**	75.6	50.2		**3**	69.4	50.9	
4	76.2	59.2		**4**	70.6	49.3		**4**	73.6	52.9	
5	82.8	61.6		**5**	69.2	46.3		**5**	71.2	44.8	
6	84.7	58.8		**6**	76.6	63.2		**6**	77.2	45.8	
7	84.5	67.4		**7**	76.5	59.7	0.51	**7**	80.2	64.5	0.02
8	77.3	64	0.19	**8**	76.1	51		**8**	75.9	60.3	
9	82.6	63.9	0.21	**9**	76.9	49.6		**9**	81.6	57.8	0.92
10	75.7	57.4		**10**	72.8	51		**10**	87.4	74.1	
11	76.6	52.2		**11**	72.7	49.4	0.01	**11**	83.7	63.5	0.12
12	79.8	52.8		**12**	76.2	57.8		**12**	72.7	53.9	
13	84.8	56.8		**13**	67.4	47.6		**13**	62.9	40.6	
14	89.7	60.4		**14**	66.5	37.6		**14**	66.2	34.5	
15	90.2	65.7		**15**	75.1	42.7		**15**	60.5	51.6	0.22
16	90.4	68.1		**16**	81.2	49.1		**16**	59.9	37.6	
17	92.7	74.7		**17**	79.8	50.3		**17**	66.2	39.5	
18	93.1	71.8		**18**	79.6	51.4		**18**	74.9	48.9	
19	91.4	70.3		**19**	81.1	48.6		**19**	75	64.1	0.9
20	80.4	59.2		**20**	84.6	60.6		**20**	70.9	60.7	
21	83.6	55.3		**21**	85.5	64.6	0.5	**21**	62.1	51.7	
22	83.2	60		**22**	74.5	55.7	0.07	**22**	55.4	43	
23	76.8	48.5		**23**	78.4	50		**23**	63	35.9	
24	72.1	41		**24**	81	54		**24**	67.8	43	
25	77	43.3		**25**	83.4	59.5		**25**	71.6	42.3	
26				**26**	85.1	69.5	0.11	**26**	73.4	42.1	
27	62.6	53.2		**27**	85.4	70.1	1.03	**27**	76.6	49.6	
28	64	52.1	1.03	**28**	82	66.5		**28**	77.1	53.7	
29	68.1	50.7	0.07	**29**	86.7	66.8		**29**	71.8	43.3	0.2
30	78.4	46.1		**30**	83.8	65		**30**	68.6	39.3	
31	72	59.3	0.34	**31**	80.7	61.2					

TEMPERATURE AND PRECIPITATION DATA

Hudsonville

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	36.1	24.2		**1**	85.3	59.9		**1**	76.9	62.6	0.26
2	38	18.9		**2**	82	54.6		**2**	62.9	45.2	0.1
3	45.9	21.7		**3**	78.2	50.6		**3**	63.8	37	
4	51.8	24.3		**4**	74.1	54.7		**4**	74.2	43.5	
5	47.9	29		**5**	74.4	52.7		**5**	69.8	57.8	0.01
6	58.4	33.8		**6**	74.2	45.3		**6**	64.4	54.5	0.07
7	57.9	30.9	0.05	**7**	78.1	47.6		**7**	75	50.1	
8	55.1	31.5	0.31	**8**	79.2	51.1		**8**	74.9	49.1	
9	47.4	37.3	1.03	**9**	80.2	47	0.02	**9**	79.9	55.2	0.55
10	42	37.5	0.3	**10**	56.6	45.3	0.33	**10**	74	61.6	0.12
11	38.4	34.7	0.98	**11**	52.5	36.5	0.02	**11**	78.2	54.9	
12	41.1	33.2	0.19	**12**	45.5	34.7		**12**	78.5	61.1	0.69
13	39.8	34.4	0.03	**13**	53.8	28.5		**13**	76.4	59.8	0.29
14	51.4	28.7	0.05	**14**	72.6	46.1		**14**	77.7	52.1	
15	65	45.3	0.55	**15**	75.5	52.2		**15**	73.2	51.4	
16	48.6	39.7	0.24	**16**	78.3	44.1		**16**	77.3	61.6	0.88
17	50	41.1	0.86	**17**	69.5	52.7		**17**	81.3	57	
18	62.7	44.6	1.97	**18**	79.6	54.6		**18**	71.6	53	
19	55.3	32.3	0.15	**19**	85.2	56		**19**	76.3	47	
20	37.1	27.4		**20**	85.7	67.8		**20**	83.3	48.1	
21	51	22.9		**21**	78.9	61.9	0.3	**21**	82.5	62.5	
22	64.1	35		**22**	70	54.7	0.4	**22**	85.5	66.6	
23	63.7	39	0.32	**23**	54.7	41.4	0.33	**23**	85.5	67.1	
24	44	32.9	0.11	**24**	55.7	34.5		**24**	82.8	68.7	
25	48.3	35.1	0.14	**25**	65	34.9		**25**	80.3	65.3	0.35
26	64.9	34.1		**26**	67.7	40.1		**26**	83.3	65.8	
27	69.5	42.8		**27**	58.1	50.6	0.05	**27**	82	64.4	0.01
28	63.8	48.6		**28**	75.1	52	0.86	**28**	77.5	62.1	
29	69.5	43.9		**29**	78.7	62	0.13	**29**	74.2	60.7	
30	78.3	55.3	0.3	**30**	85.1	68.4		**30**	80.8	61.8	
				31	78.3	65.3	0.1				

TEMPERATURE AND PRECIPITATION DATA

Hudsonville

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	77.6	55.7		**1**	75.2	58.2	0.01	**1**	83.1	63.8	
2	65.4	57.6	0.24	**2**	72.2	57.2	0.02	**2**	70.9	58.4	
3	79.9	59.2		**3**	76	54.9		**3**	73.6	49.6	
4	77.7	61.2		**4**	73.3	50.2		**4**	78.7	54	
5	82.9	61		**5**	71.9	47.1		**5**	74.6	51.3	
6	83.8	65		**6**	76.5	63.6		**6**	80.1	46.6	
7	83.2	69		**7**	80.5	61.8	0.12	**7**	81.6	63.6	
8	78.7	69.3	0.01	**8**	79.5	56.8		**8**	77	62.5	
9	84	64.3	0.01	**9**	78.7	51.9		**9**	84.5	59.9	1.63
10	80	59.2		**10**	79.1	57.4		**10**	90.7	74.6	
11	81.8	53.3		**11**	77.2	54.2		**11**	86.6	65.4	
12	82.1	56.7		**12**	75.6	62.8	1.21	**12**	77.5	55.6	
13	84.4	55.7		**13**	68.5	49.6		**13**	66.7	45.8	
14	88.7	62.5		**14**	70.4	42.3		**14**	68.3	38.4	
15	93.7	67.4		**15**	74.5	45.8		**15**	58.3	50.3	0.05
16	88.6	71.5		**16**	78.8	50.2		**16**	61.2	45.2	
17	90.3	71.3		**17**	81	49.7		**17**	68.1	39.5	
18	90.6	71.4		**18**	83.1	50.8		**18**	77.8	53.8	0.01
19	91.1	71.8	0.38	**19**	80.1	48.8		**19**	75	62.5	0.63
20	83.6	65.5		**20**	82.9	60.6		**20**	73.3	60.7	
21	83.9	60.9	0.55	**21**	85	62.9		**21**	65.9	52.5	
22	82.8	64.9	0.01	**22**	75.7	62.3	0.41	**22**	56.3	43.5	
23	77.7	56.1	0.03	**23**	82.9	52.1		**23**	63.2	36.6	
24	75.6	45.7		**24**	82	52.5		**24**	67.4	41.1	
25	76	48.6		**25**	84.6	60.4		**25**	71.7	44.5	
26	74.5	59.3	0.25	**26**	82.8	68.5		**26**	74.2	42.7	
27	68.1	54.6		**27**	89	72.3	0.08	**27**	77.2	44.8	
28	64.5	53.1	0.61	**28**	84.1	68.1	0.11	**28**	78.5	52.5	
29	68	53.2	0.05	**29**	87.2	62.7		**29**	72	50.3	0.29
30	77.6	46.4	0.07	**30**	87.5	63.7		**30**	71.7	46.1	
31	70.1	61.3	0.04	**31**	81	61.2					

TEMPERATURE AND PRECIPITATION DATA

Imlay City

Recorded at
Lapeer USDA/NRCS Office
Lapeer, Michigan
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	38.1	22.6	0.01	**1**	80.4	50.8		**1**	80	63.9	0.08
2	43.3	18.5		**2**	77.9	52.4		**2**	67.3	49.7	0.04
3	42.8	18.4		**3**	74.6	53.5		**3**	67.2	38.7	
4	57	27.8		**4**	70.3	53.7		**4**	69.5	41.1	
5	46.3	26.9		**5**	72.1	41.1		**5**	69.2	48.6	0.01
6	45.3	23		**6**	75.4	40		**6**	63.1	49.4	0.02
7	56.1	30.6		**7**	76	43.7		**7**	61.5	48.2	
8	56.2	26.7	0.33	**8**	81.2	45.7		**8**	72.2	50	
9	47.6	37.9	1.81	**9**	83.5	43.9		**9**	75.6	50.3	
10	39.5	35.2	0.8	**10**	63.3	38.7	0.35	**10**	68	56.6	1.18
11	37	32.6	0.63	**11**	63.1	34.9	0.04	**11**	80.3	59.9	
12	44.5	32.3	0.39	**12**	50.4	31.6	0.01	**12**	77.5	56.7	0.04
13	43.5	34	0.1	**13**	56.1	27.3		**13**	76.1	59.3	0.65
14	45.3	29.1		**14**	61.7	40.1		**14**	74.4	52.9	
15	68.5	37		**15**	80.3	50.3	0.03	**15**	78.2	49	
16	62	41	0.05	**16**	80.5	42		**16**	80.7	62.8	0.32
17	55	35.1	0.58	**17**	67.4	37.4		**17**	81.5	55.7	0.39
18	76.2	42.7	0.61	**18**	77.2	51.5		**18**	67.9	47.4	0.2
19	58.5	30.7	0.73	**19**	87.6	48.8		**19**	74.9	41.3	
20	40.1	26.3	0.03	**20**	88.6	57.6	0.36	**20**	81.2	46.9	
21	47.2	22		**21**	83.8	59.7	0.01	**21**	82.8	52.3	
22	59.1	31.8		**22**	79.7	59.8	0.09	**22**	89.7	66.3	
23	67.2	42.1	0.25	**23**	61.5	37.8	0.31	**23**	88.2	65.9	
24	52	33.5	0.74	**24**	55.1	34.7		**24**	85.7	67.6	0.06
25	52.2	32.7	0.09	**25**	63.2	30.5		**25**	79.1	-37.6	0.2
26	59.7	27.4		**26**	68	31.3		**26**	84.5	64	
27	70.7	35.5		**27**	68.8	33.6		**27**	83.4	64.4	1.42
28	59.2	39.2	0.14	**28**	70.1	49.5	1.04	**28**	75.7	62.3	1.06
29	70.4	51.4	0.01	**29**	81.8	60.5	1.49	**29**	73.2	61.1	
30	71.3	54.4	0.19	**30**	86.7	59.3	0.05	**30**	77	56.2	
				31	82.6	67.6	0.06				

TEMPERATURE AND PRECIPITATION DATA

Imlay City

Recorded at
Lapeer USDA/NRCS Office
Lapeer, Michigan
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	70.4	54.6	0.01	**1**	78.2	58.1	0.06	**1**	77.8	56.8	0.05
2	76	58.4		**2**	75.6	50.1		**2**	73.2	55	
3	82.9	55.7		**3**	77.4	50.5		**3**	75.2	52	
4	80.2	63.4		**4**	72.4	49.5		**4**	81.7	48.7	
5	85.3	62.7		**5**	73.7	46.7	0.01	**5**	71.4	43.5	
6	85.1	63.6		**6**	77.3	58.5	0.01	**6**	75.8	38.8	
7	80.5	68.5	0.11	**7**	83.4	62	0.73	**7**	77.2	52.2	0.04
8	83.6	67.8	0.61	**8**	77.3	57		**8**	72.3	47.6	
9	86.4	67.5	0.06	**9**	80.2	51		**9**	77.5	44.5	
10	87	61.5		**10**	76.7	52.1		**10**	94	69.7	
11	77.5	54.2		**11**	77.8	52.1		**11**	90.5	68	
12	82.3	49.9		**12**	72.5	54.1		**12**	79.3	55.7	0.02
13	82.9	54.3		**13**	68.2	50.6		**13**	58.2	35.5	0.05
14	88.5	58.4		**14**	72.8	45.9		**14**	69.9	31.8	
15	89.8	65		**15**	73.8	42.1		**15**	62.2	42.4	0.08
16	94.7	68		**16**	80.5	45.2		**16**	62.2	35.7	0.01
17	93.8	69		**17**	81	45.3		**17**	67.9	30.1	0.01
18	92.8	69.2		**18**	82.9	47.5		**18**	77.1	35.5	
19	90	75.5		**19**	83.2	48.8	0.01	**19**	79.8	50.8	0.02
20	84.5	61.8	0.34	**20**	86.5	51.1		**20**	80.2	65	0.08
21	81.2	55		**21**	86.3	56.1		**21**	67	50.4	0.03
22	82.9	62.5		**22**	84.5	62.5		**22**	58.7	37.3	
23	79.4	59.3	0.2	**23**	81.2	48.7		**23**	59.5	36.4	
24	71	49.1		**24**	83.9	45.4		**24**	68.8	30.8	
25	77.6	44.5		**25**	86.4	50.5		**25**	75.7	33.7	
26	78.8	51.6		**26**	85.6	68.4	0.04	**26**	78.5	36.3	
27	76.4	52.4	0.71	**27**	82	68.1	0.36	**27**	77.3	38.6	
28	66.9	46.5	0.11	**28**	84.1	63.4		**28**	77.1	42.7	
29	70.7	54	0.11	**29**	89.9	58.6		**29**	63	56.6	0.18
30	79.2	46.8		**30**	86.4	60.8	0.54	**30**	72.2	45.9	
31	69.3	58.9	0.47	**31**	78.4	63.8					

TEMPERATURE AND PRECIPITATION DATA

Momence

Recorded at
Stelle, Illinois Climate Network Station
Stelle, Illinois
2013

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	48	25.3	0	**1**	82.1	52	0	**1**	74.5	60.7	0.42
2	45.8	20.1	0	**2**	66.5	43.2	0.01	**2**	63.9	49	0
3	48.6	22.2	0	**3**	66.4	41.3	0.13	**3**	66	42.6	0
4	59.1	22.9	0	**4**	70	49.2	0.01	**4**	72.2	47.4	0
5	52.6	30.5	0	**5**	73.7	48.4	0	**5**	77.2	53.7	0
6	72	32.7	0.05	**6**	74.9	50.4	0	**6**	72.8	54.9	0.03
7	66.9	41.6	0.01	**7**	77.5	53.3	0	**7**	72	52.2	0
8	74.1	43.4	0.22	**8**	81	48.6	0	**8**	78.8	46.5	0
9	78.8	46.1	0.06	**9**	71.1	57.5	0.22	**9**	80	57.4	0.02
10	56.1	40.5	2.23	**10**	60.8	45.6	0.01	**10**	80.3	60.8	0
11	54.1	38.8	0.21	**11**	64.7	39	0	**11**	88.1	56.8	0
12	41.9	36.3	0.01	**12**	58.4	34.8	0	**12**	94	65.4	0.02
13	48.3	34.8	0	**13**	67.4	35.6	0	**13**	78.2	57.2	0.12
14	73.1	40.9	0	**14**	92.5	51.6	0	**14**	78.7	53.1	0
15	62.9	45.7	0.71	**15**	84.1	58.2	0.03	**15**	80.9	61.2	0.02
16	53.5	42.8	0.63	**16**	82.7	53.5	0	**16**	82.6	65.2	0
17	57.6	42.4	0.48	**17**	79.9	57.7	0.24	**17**	88.5	60.3	0
18	66.5	39.3	1.36	**18**	77.9	57	0.01	**18**	76.2	56.3	0
19	39.5	33.2	0	**19**	87.5	58.7	0.01	**19**	80.7	54.4	0
20	45.8	31.2	0	**20**	91	64.1	1.34	**20**	88.8	62.4	0
21	53.1	30.1	0	**21**	79.5	61.8	0.13	**21**	87.9	62.9	0.05
22	65.4	34.2	0	**22**	72.2	59.9	0.03	**22**	76.6	62.4	0.36
23	59.7	38.4	0.49	**23**	60.2	39.4	0.02	**23**	85.8	62.3	0.06
24	48.7	34.9	0.05	**24**	61.9	36.5	0	**24**	87	65.6	0.36
25	51.7	34.1	0	**25**	58.4	43.5	0.05	**25**	86.7	66.9	0.04
26	65.8	33.1	0	**26**	62.4	42.2	1.06	**26**	82.2	67	0.05
27	66.9	38.5	0.03	**27**	68.9	57.1	0.91	**27**	87.8	66.5	0
28	63.9	50.3	0.12	**28**	76.6	62.9	0.61	**28**	82.4	64.3	0.05
29	72.6	43.6	0	**29**	83.2	63.5	0.51	**29**	70.7	59.1	1.48
30	83	56	0	**30**	83.8	63.6	0.33	**30**	77.5	59.7	0
				31	76.5	64.1	0.79				

TEMPERATURE AND PRECIPITATION DATA

Momence

Recorded at
Stelle, Illinois Climate Network Station
Stelle, Illinois
2013

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	75.8	56.7	0	**1**	80.1	58	0	**1**	83.9	64.1	0
2	70.1	60.1	0	**2**	83.6	59.1	0.78	**2**	80.3	57.4	0
3	72	56.3	0.09	**3**	80.3	57.6	0.02	**3**	74.7	51.9	0
4	79.9	53.1	0	**4**	80.2	53.6	0	**4**	81.2	50.1	0
5	81.6	54.9	0	**5**	75.9	55	0.1	**5**	79.8	56.3	0
6	77.8	63.1	0	**6**	82.5	69.5	0	**6**	86.5	55.4	0
7	86.3	65.5	0	**7**	83.1	66.7	0.03	**7**	87.7	57.8	0.01
8	86.3	70.1	0.12	**8**	79.5	62	0	**8**	86.1	67	0
9	86.1	74.1	0	**9**	80.6	66.8	0	**9**	96.7	65.4	0
10	85.6	60.5	0	**10**	81.7	58.8	0	**10**	96.2	64.3	0
11	79.3	56.7	0	**11**	81.4	55.4	0	**11**	94.2	67.7	0.61
12	83.4	52.5	0	**12**	83	58	0	**12**	83.9	57.8	0.06
13	84	61.7	0	**13**	72.8	49.1	0	**13**	69	45	0
14	88.9	63.2	0	**14**	72.7	47.8	0	**14**	71.1	41.3	0
15	89.9	71.6	0	**15**	76.7	46.9	0	**15**	69.9	46.9	0.2
16	90	68.8	0	**16**	80.2	53.9	0	**16**	68.2	45.1	0
17	92.7	67	0	**17**	79.3	53.8	0	**17**	73.1	44.4	0
18	92.2	69.4	0	**18**	83.5	55.5	0	**18**	85	57	0
19	93.4	72	0	**19**	83.8	54.9	0	**19**	92	69.3	0.06
20	86.9	67.4	0.23	**20**	85.4	57.9	0	**20**	75.4	53	0.1
21	81.3	64.5	0.03	**21**	88.4	57.3	0	**21**	69.6	45.1	0
22	86	69.3	0.02	**22**	73.9	63.7	1.77	**22**	71.1	42.4	0
23	82.8	57	0	**23**	83.6	60.1	0	**23**	73.9	44	0
24	74.6	52.9	0	**24**	84.4	57.4	0	**24**	76.5	45.3	0
25	80	49.2	0	**25**	86.7	57.5	0	**25**	79.2	50.1	0
26	71.4	56.9	0.01	**26**	88	60.4	0	**26**	81.4	50.8	0
27	69.7	50.3	0	**27**	90.5	67.7	0	**27**	82.7	49.2	0
28	73	47.4	0	**28**	87.3	68.4	0	**28**	84.6	48.1	0.01
29	78.3	44.8	0	**29**	86.7	66.9	0	**29**	70.4	45.6	0.22
30	67.6	57.1	0.34	**30**	93.8	62.2	0.31	**30**	76.9	41.5	0
31	74.6	64.3	0.61	**31**	85.2	65.3	0				

Weed Control in Asparagus - Hart - 2013

Project Code: 120-13-1 **Location: Hart, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Asparagus **Variety: Jersey Supreme**
Planting Method: Crowns **Planting Date: 2011**
Spacing: 1 ft **Row Spacing: 4.5 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 4 ft wide x 50 ft long

Soil Type: Spinks Loamy Fine Sand **OM: 1%** **pH: 5.2**
Sand: 86% **Silt: 8%** **Clay: 6%** **CEC: 4.0**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/1/13	12:30 pm	76/70	F	Dry	5-7 SW	42	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/1	ASPARAGUS		Dormant	
5/1	No weeds present			
6/6	HAVE = hairy vetch			
6/6	HOWE = horseweed			
6/6	SFGE = small flower geranium			
6/6	FISB = field sandbur			
6/6	POAM = powell amaranth			
6/6	RUTH = Russian thistle			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Harvest: 5/11-6/13/13. 22 harvests.

Weed Control in Asparagus - Hart - 2013

Weed Control in Asparagus - Hart - 2013

Trial ID: 120-13-01 Location: Hart Research Station
Protocol ID: 120-13-01 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 6/Jun/13 RATING 1-10	HAVE 6/Jun/13 RATING 1-10	HOWE 6/Jun/13 RATING 1-10	SFGE 6/Jun/13 RATING 1-10	ASPA 28/Jun/13 RATING 1-10	FISB 28/Jun/13 RATING 1-10
1	terbacil	80	WDG	1	lb ai/a	PRE	1.0	10.0	10.0	10.0	2.0	10.0
2	diuron	80	DF	1.6	lb ai/a	PRE	1.0	10.0	10.0	10.0	1.7	10.0
	metribuzin	75	DF	1.6	lb ai/a	PRE						
3	indaziflam	1.67	SC	0.085	lb ai/a	PRE	1.3	6.0	6.3	10.0	1.0	10.0
4	clomazone	3	ME	2	lb ai/a	PRE	1.0	9.7	7.7	10.0	1.0	10.0
5	flazasulfuron	25	WG	.047	lb ai/a	PRE	1.7	9.7	10.0	10.0	1.3	10.0
6	isoxaben	75	DF	1.5	lb ai/a	PRE	1.0	1.7	2.3	10.0	2.0	10.0
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE						
7	pyroxasulfone	85	WDG	0.32	lb ai/a	PRE	1.0	9.3	7.3	10.0	1.3	10.0
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	1.7	9.3	10.0	10.0	1.7	6.3
9	mesotrione	4	SC	.241	lb ai/a	PRE	1.3	10.0	10.0	9.3	1.0	8.0
	pendimethalin	3.8	CS	1.9	lb ai/a	PRE						
10	Untreated						1.3	6.3	1.7	7.0	1.0	1.0
LSD (P=.05)							0.89	3.81	2.95	2.82	1.01	2.70
Standard Deviation							0.52	2.22	1.72	1.64	0.59	1.57
CV							42.16	27.12	22.79	17.06	42.15	18.45

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HAVE 28/Jun/13 RATING 1-10	HOWE 28/Jun/13 RATING 1-10	POAM 28/Jun/13 RATING 1-10	RUTH 28/Jun/13 RATING 1-10	ASPA 22/Aug/13 RATING 1-10	FISB 22/Aug/13 RATING 1-10
1	terbacil	80	WDG	1	lb ai/a	PRE	9.3	10.0	5.7	10.0	1.3	9.3
2	diuron	80	DF	1.6	lb ai/a	PRE	10.0	10.0	7.0	10.0	1.3	10.0
	metribuzin	75	DF	1.6	lb ai/a	PRE						
3	indaziflam	1.67	SC	0.085	lb ai/a	PRE	5.7	3.3	9.3	7.7	1.3	10.0
4	clomazone	3	ME	2	lb ai/a	PRE	9.0	4.7	8.3	10.0	1.7	10.0
5	flazasulfuron	25	WG	.047	lb ai/a	PRE	9.7	10.0	10.0	10.0	1.0	10.0
6	isoxaben	75	DF	1.5	lb ai/a	PRE	1.0	3.0	9.3	7.0	1.3	7.7
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE						
7	pyroxasulfone	85	WDG	0.32	lb ai/a	PRE	5.0	3.7	10.0	7.7	1.3	10.0
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	9.0	10.0	1.0	2.3	2.0	5.0
9	mesotrione	4	SC	.241	lb ai/a	PRE	10.0	10.0	9.0	10.0	1.3	6.3
	pendimethalin	3.8	CS	1.9	lb ai/a	PRE						
10	Untreated						6.0	1.3	1.0	1.0	1.0	1.0
LSD (P=.05)							4.47	3.90	2.66	4.61	0.85	3.18
Standard Deviation							2.60	2.27	1.55	2.68	0.49	1.85
CV							34.89	34.42	21.97	35.48	36.18	23.38

Weed Control in Asparagus - Hart - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HOWE	POAM	RUTH	ASPA
Pest Code										
Crop Code										
Rating Date							22/Aug/13	22/Aug/13	22/Aug/13	
Rating Type							RATING	RATING	RATING	TOTAL
Rating Unit							1-10	1-10	1-10	KG/PLOT
1	terbacil	80	WDG	1	lb ai/a	PRE	10.0	2.7	10.0	3.707
2	diuron	80	DF	1.6	lb ai/a	PRE	10.0	4.0	10.0	3.759
	metribuzin	75	DF	1.6	lb ai/a	PRE				
3	indaziflam	1.67	SC	0.085	lb ai/a	PRE	4.3	8.3	8.7	3.940
4	clomazone	3	ME	2	lb ai/a	PRE	6.0	7.7	10.0	3.589
5	flazasulfuron	25	WG	.047	lb ai/a	PRE	10.0	8.7	10.0	3.322
6	isoxaben	75	DF	1.5	lb ai/a	PRE	3.3	7.7	3.7	3.328
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE				
7	pyroxasulfone	85	WDG	0.32	lb ai/a	PRE	3.3	9.0	8.3	3.458
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	10.0	1.0	2.7	3.369
9	mesotrione	4	SC	.241	lb ai/a	PRE	9.3	5.3	9.3	3.420
	pendimethalin	3.8	CS	1.9	lb ai/a	PRE				
10	Untreated						8.0	2.3	7.3	4.072
LSD (P=.05)							3.06	2.48	3.41	0.89743
Standard Deviation							1.79	1.45	1.99	0.52314
CV							24.02	25.51	24.86	14.54

Weed Control in Asparagus - HTRC - 2013

Project Code: 120-13-2 **Location: East Lansing, MI**
Block 115-116

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Asparagus **Variety: Millenium**
Planting Method: Transplant **Planting Date: 2009** **Harvest Date: 5/6-6/14/13**
Spacing: 1 ft **Row Spacing: 6 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 50 ft long

Soil Type: Capac Loam **OM: 2.1%** **pH: 6.8**
Sand: 54% **Silt: 32%** **Clay: 14%** **CEC: 4.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/23/13	9:50 am	59/45	F	Moist	5-7 S	50	95% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/23	ASPA = asparagus			
4/23	HOWE = horseweed	1-2″	Rosette	Few
4/23	WICA = wild carrot	1-2″	Seedling	Few
4/23	DAND = dandelion	3-6″	Rosette	Moderate
4/23	ANBG = annual bluegrass	2-3″	Foliar	Moderate
	COLQ = common lambsquarters			
	LATH = ladysthumb			
	WIRA = wild radish			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. There were 23 harvests; all spears 6″ or taller were harvested each time. Spears less than 1/4″ in diameter were discarded.

Weed Control in Asparagus - HTRC - 2013

Weed Control in Asparagus - HTRC - 2013

Trial ID: 120-13-2 Location: HTRC block 115-116
Protocol ID: 120-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 20/May/13 RATING 1-10	HOWE 20/May/13 RATING 1-10	WICA 20/May/13 RATING 1-10	ASPA 31/May/13 RATING 1-10	COLQ 31/May/13 RATING 1-10
1	terbacil	80	WDG	1.2	lb ai/a	PRE	1.0	10.0	10.0	1.0	10.0
2	diuron	80	DF	4	lb ai/a	PRE	1.0	10.0	7.0	1.0	10.0
3	clomazone	3	ME	1	lb ai/a	PRE	1.3	4.3	9.7	2.0	10.0
4	clomazone	3	ME	2	lb ai/a	PRE	1.7	4.3	7.7	1.7	10.0
5	flumioxazin	51	WDG	.192	lb ai/a	PRE	2.0	1.3	7.0	2.3	10.0
6	sulfentrazone	4	F	0.375	lb ai/a	PRE	1.0	8.7	9.0	1.7	10.0
7	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.0	1.0	4.0	1.0	10.0
8	norflurazon	80	DF	4	lb ai/a	PRE	1.0	7.3	6.3	1.0	10.0
9	mesotrione	4	SC	.241	lb ai/a	PRE	1.0	10.0	8.7	1.3	10.0
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE					
10	halosulfuron	75	WG	.047	lb ai/a	PRE	1.3	10.0	10.0	1.3	10.0
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE					
11	pyroxasulfone	85	WDG	0.32	lb ai/a	PRE	1.7	5.0	4.0	1.7	10.0
12	Untreated						1.0	1.0	7.3	1.3	4.0
LSD (P=.05)							1.28	3.62	6.43	0.87	2.54
Standard Deviation							0.75	2.14	3.80	0.51	1.50
CV							60.3	35.16	50.29	35.48	15.79

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HOWE 31/May/13 RATING 1-10	WICA 31/May/13 RATING 1-10	ASPA 12/Jun/13 RATING 1-10	COLQ 12/Jun/13 RATING 1-10	HOWE 12/Jun/13 RATING 1-10	LATH 12/Jun/13 RATING 1-10
1	terbacil	80	WDG	1.2	lb ai/a	PRE	10.0	10.0	1.0	10.0	10.0	10.0
2	diuron	80	DF	4	lb ai/a	PRE	10.0	7.3	1.0	9.3	10.0	9.0
3	clomazone	3	ME	1	lb ai/a	PRE	3.7	8.3	1.0	10.0	2.7	10.0
4	clomazone	3	ME	2	lb ai/a	PRE	3.0	4.7	1.0	10.0	2.0	10.0
5	flumioxazin	51	WDG	.192	lb ai/a	PRE	1.7	7.0	1.0	10.0	1.0	10.0
6	sulfentrazone	4	F	0.375	lb ai/a	PRE	7.3	7.7	1.0	10.0	6.7	10.0
7	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.0	1.7	1.3	10.0	1.0	10.0
8	norflurazon	80	DF	4	lb ai/a	PRE	6.0	6.3	1.0	9.3	4.7	10.0
9	mesotrione	4	SC	.241	lb ai/a	PRE	10.0	9.0	1.0	10.0	9.7	10.0
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE						
10	halosulfuron	75	WG	.047	lb ai/a	PRE	9.0	9.0	1.0	9.7	7.0	10.0
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE						
11	pyroxasulfone	85	WDG	0.32	lb ai/a	PRE	5.0	7.0	1.3	10.0	6.0	10.0
12	Untreated						1.0	3.3	1.7	1.0	1.0	4.0
LSD (P=.05)							3.35	6.48	0.70	0.78	3.49	2.62
Standard Deviation							1.98	3.83	0.41	0.46	2.06	1.55
CV							35.05	56.5	37.29	5.02	40.14	16.46

Weed Control in Asparagus - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA 12/Jun/13 RATING 1-10	WIRA 12/Jun/13 RATING 1-10	ASPA TOTAL #/PLOT	ASPA TOTAL KG/PLOT
1	terbacil	80	WDG	1.2	lb ai/a	PRE	10.0	10.0	545.0	9.699
2	diuron	80	DF	4	lb ai/a	PRE	6.3	10.0	452.7	7.497
3	clomazone	3	ME	1	lb ai/a	PRE	6.3	9.0	433.7	7.180
4	clomazone	3	ME	2	lb ai/a	PRE	7.0	10.0	415.3	7.101
5	flumioxazin	51	WDG	.192	lb ai/a	PRE	7.0	10.0	269.0	4.727
6	sulfentrazone	4	F	0.375	lb ai/a	PRE	7.0	9.0	509.3	8.838
7	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	3.0	5.7	478.3	8.335
8	norflurazon	80	DF	4	lb ai/a	PRE	6.7	10.0	537.0	8.977
9	mesotrione	4	SC	.241	lb ai/a	PRE	8.7	10.0	526.3	9.415
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE				
10	halosulfuron	75	WG	.047	lb ai/a	PRE	8.7	10.0	485.7	8.388
	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE				
11	pyroxasulfone	85	WDG	0.32	lb ai/a	PRE	7.0	9.3	401.0	6.690
12	Untreated						7.0	2.3	531.7	9.497
LSD (P=.05)							7.38	2.00	199.54	3.9318
Standard Deviation							4.36	1.18	117.84	2.3218
CV							61.78	13.44	25.32	28.92

IR-4 Asparagus Clomazone Crop Safety and Efficacy - HTRC - 2013

Project Code: IR4-120-13-3 **Location: East Lansing, MI**
Block 115-116

Personnel: Bernard H. Zandstra, Nicole Schroeder
Crop: Asparagus **Variety: Millennium**
Planting Method: Crowns **Planting Date: 2008** **Harvest Date: See data**
Spacing: 1 ft **Row Spacing: 6 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 4**
Plot Size: 5.5 ft wide x 45 ft long

Soil Type: Capac Loam **OM: 2.1%** **pH: 6.8**
Sand: 54% **Silt: 32%** **Clay: 14%** **CEC: 4.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/29/13	9:00 am	58/51	F	Wet	1-2 S	86	85% Cloudy	N

Crop and Weed Information at Application

	Height or Diameter	Growth Stage	Density

HOWE = horseweed
WICA = wild carrot
WIRA = wild radish
BHPL = buckhorn plantain
COLQ = common lambsquarters
CORW = common ragweed
LATH = ladysthumb

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

IR-4 Asparagus Clomazone Crop Safety and Efficacy – HTRC - 2013

IR4 Asparagus- Clomazone Efficacy HTRC 2013

Trial ID:	IR4-120-13-03	Location:	East Lansing, MI
Protocol ID:	IR4-120-13-03	Investigator:	Dr. Bernard Zandstra
Study Director:	Nicole Schroeder		

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								HOWE		HOWE	WICA	
Crop Code							ASPA		ASPA			ASPA
Rating Date							13/May/13	13/May/13	20/May/13	20/May/13	20/May/13	28/May/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Handweed						1.0	6.5	1.3	4.3	5.0	1.3
2	diuron	80	DF	1.2	lb ai/a	PRE	1.0	10.0	1.0	10.0	9.5	1.3
3	clomazone	3	ME	1	lb ai/a	PRE	1.0	8.8	2.5	6.3	9.5	1.8
4	clomazone	3	ME	2	lb ai/a	PRE	1.0	9.0	1.5	8.3	9.5	1.5
LSD (P=.05)							0.00	3.22	2.20	4.28	3.87	1.31
Standard Deviation							0.00	2.02	1.38	2.68	2.42	0.82
CV							0.0	23.54	88.12	37.26	28.91	57.09

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code							HOWE	WICA	WIRA		BHPL	COLQ
Crop Code										ASPA		
Rating Date							28/May/13	28/May/13	28/May/13	12/Jun/13	12/Jun/13	12/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Handweed						3.5	1.3	5.5	1.0	10.0	1.0
2	diuron	80	DF	1.2	lb ai/a	PRE	8.8	6.3	9.5	1.0	10.0	7.8
3	clomazone	3	ME	1	lb ai/a	PRE	3.8	7.3	9.0	1.3	10.0	10.0
4	clomazone	3	ME	2	lb ai/a	PRE	7.3	7.5	10.0	1.5	10.0	10.0
LSD (P=.05)							4.62	3.22	3.26	0.93	0.00	3.60
Standard Deviation							2.89	2.02	2.04	0.58	0.00	2.25
CV							49.69	36.23	24.01	49.12	0.0	31.3

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code							CORW	HOWE	LATH	WICA	WIRA	
Crop Code												ASPA
Rating Date							12/Jun/13	12/Jun/13	12/Jun/13	12/Jun/13	12/Jun/13	6/May/13
Rating Type							RATING	RATING	RATING	RATING	RATING	COUNT
Rating Unit							1-10	1-10	1-10	1-10	1-10	#
1	Handweed						1.5	6.0	1.0	1.5	2.8	1.3
2	diuron	80	DF	1.2	lb ai/a	PRE	9.3	9.5	7.5	3.8	9.3	1.0
3	clomazone	3	ME	1	lb ai/a	PRE	6.5	4.8	10.0	3.5	6.8	2.3
4	clomazone	3	ME	2	lb ai/a	PRE	10.0	6.5	10.0	5.3	10.0	3.8
LSD (P=.05)							2.62	5.41	3.49	4.44	3.16	3.90
Standard Deviation							1.64	3.38	2.18	2.78	1.97	2.44
CV							24.0	50.6	30.59	79.4	27.46	118.28

IR-4 Asparagus Clomazone Crop Safety and Efficacy - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 6/May/13 WEIGHT G/PLOT	ASPA 8/May/13 COUNT #	ASPA 8/May/13 WEIGHT G/PLOT	ASPA 9/May/13 COUNT #	ASPA 9/May/13 WEIGHT G/PLOT	ASPA 10/May/13 COUNT #
	Pest Code											
	Crop Code											
	Rating Date						6/May/13	8/May/13	8/May/13	9/May/13	9/May/13	10/May/13
	Rating Type						WEIGHT	COUNT	WEIGHT	COUNT	WEIGHT	COUNT
	Rating Unit						G/PLOT	#	G/PLOT	#	G/PLOT	#
1	Handweed						29.8	5.3	103.3	4.0	74.5	10.5
2	diuron	80	DF	1.2	lb ai/a	PRE	23.0	7.3	147.8	9.5	149.3	12.5
3	clomazone	3	ME	1	lb ai/a	PRE	49.3	7.3	145.5	9.8	186.0	12.0
4	clomazone	3	ME	2	lb ai/a	PRE	91.3	5.8	114.0	8.8	164.3	13.5
LSD (P=.05)							96.01	7.90	167.02	8.23	145.77	15.18
Standard Deviation							60.02	4.94	104.42	5.14	91.14	9.49
CV							124.24	77.51	81.82	64.28	63.51	78.25

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 10/May/13 WEIGHT G/PLOT	ASPA 13/May/13 COUNT #	ASPA 13/May/13 WEIGHT G/PLOT	ASPA 16/May/13 COUNT #	ASPA 16/May/13 WEIGHT G/PLOT	ASPA 17/May/13 COUNT #
	Pest Code											
	Crop Code											
	Rating Date						10/May/13	13/May/13	13/May/13	16/May/13	16/May/13	17/May/13
	Rating Type						WEIGHT	COUNT	WEIGHT	COUNT	WEIGHT	COUNT
	Rating Unit						G/PLOT	#	G/PLOT	#	G/PLOT	#
1	Handweed						181.0	10.8	144.5	7.5	99.5	15.8
2	diuron	80	DF	1.2	lb ai/a	PRE	218.8	16.8	202.3	11.3	187.5	15.5
3	clomazone	3	ME	1	lb ai/a	PRE	226.0	20.8	265.3	10.5	175.5	17.0
4	clomazone	3	ME	2	lb ai/a	PRE	231.3	16.3	192.8	11.5	177.3	19.5
LSD (P=.05)							231.90	14.47	213.31	9.69	149.13	10.20
Standard Deviation							144.98	9.05	133.36	6.06	93.24	6.38
CV							67.67	56.11	66.29	59.49	58.3	37.65

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 17/May/13 WEIGHT G/PLOT	ASPA 20/May/13 COUNT #	ASPA 20/May/13 WEIGHT G/PLOT	ASPA 21/May/13 COUNT #	ASPA 21/May/13 WEIGHT G/PLOT	ASPA 22/May/13 COUNT #
	Pest Code											
	Crop Code											
	Rating Date						17/May/13	20/May/13	20/May/13	21/May/13	21/May/13	22/May/13
	Rating Type						WEIGHT	COUNT	WEIGHT	COUNT	WEIGHT	COUNT
	Rating Unit						G/PLOT	#	G/PLOT	#	G/PLOT	#
1	Handweed						228.5	33.3	872.3	17.0	264.3	11.0
2	diuron	80	DF	1.2	lb ai/a	PRE	244.0	45.3	1197.0	21.5	316.3	15.5
3	clomazone	3	ME	1	lb ai/a	PRE	252.5	37.5	972.0	19.8	284.0	12.5
4	clomazone	3	ME	2	lb ai/a	PRE	298.5	40.0	1020.0	13.8	195.8	14.0
LSD (P=.05)							181.38	27.83	771.85	14.16	210.40	8.47
Standard Deviation							113.40	17.40	482.56	8.85	131.54	5.30
CV							44.32	44.61	47.53	49.17	49.63	39.98

IR-4 Asparagus Clomazone Crop Safety and Efficacy - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 22/May/13 WEIGHT G/PLOT	ASPA 24/May/13 COUNT #	ASPA 24/May/13 WEIGHT G/PLOT	ASPA 28/May/13 COUNT #	ASPA 28/May/13 WEIGHT G/PLOT	ASPA 29/May/13 COUNT #
	Pest Code											
	Crop Code											
	Rating Date						22/May/13	24/May/13	24/May/13	28/May/13	28/May/13	29/May/13
	Rating Type						WEIGHT	COUNT	WEIGHT	COUNT	WEIGHT	COUNT
	Rating Unit						G/PLOT	#	G/PLOT	#	G/PLOT	#
1	Handweed						165.5	10.5	166.3	18.0	310.8	7.8
2	diuron	80	DF	1.2	lb ai/a	PRE	236.8	16.8	251.8	23.5	418.8	14.8
3	clomazone	3	ME	1	lb ai/a	PRE	195.5	8.5	121.8	16.3	288.0	12.0
4	clomazone	3	ME	2	lb ai/a	PRE	203.8	11.8	168.5	17.5	266.3	9.8
LSD (P=.05)							141.43	7.58	113.31	9.80	167.60	6.96
Standard Deviation							88.42	4.74	70.84	6.12	104.79	4.35
CV							44.13	39.92	40.01	32.55	32.65	39.35

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 29/May/13 WEIGHT G/PLOT	ASPA 30/May/13 COUNT #	ASPA 30/May/13 WEIGHT G/PLOT	ASPA 31/May/13 COUNT #	ASPA 31/May/13 WEIGHT G/PLOT	ASPA 3/Jun/13 COUNT #
	Pest Code											
	Crop Code											
	Rating Date						29/May/13	30/May/13	30/May/13	31/May/13	31/May/13	3/Jun/13
	Rating Type						WEIGHT	COUNT	WEIGHT	COUNT	WEIGHT	COUNT
	Rating Unit						G/PLOT	#	G/PLOT	#	G/PLOT	#
1	Handweed						113.5	15.8	214.0	8.8	123.8	16.3
2	diuron	80	DF	1.2	lb ai/a	PRE	213.5	16.3	255.0	12.3	166.3	18.3
3	clomazone	3	ME	1	lb ai/a	PRE	177.5	14.5	198.0	10.8	138.0	18.0
4	clomazone	3	ME	2	lb ai/a	PRE	129.0	19.3	255.3	12.5	163.8	18.3
LSD (P=.05)							126.43	11.39	156.91	7.75	93.19	11.17
Standard Deviation							79.05	7.12	98.10	4.84	58.26	6.98
CV							49.91	43.33	42.55	43.78	39.38	39.49

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 3/Jun/13 WEIGHT G/PLOT	ASPA 5/Jun/13 COUNT #	ASPA 5/Jun/13 WEIGHT G/PLOT	ASPA 6/Jun/13 COUNT #	ASPA 6/Jun/13 WEIGHT G/PLOT	ASPA 7/Jun/13 COUNT #	ASPA 7/Jun/13 WEIGHT G/PLOT
	Pest Code												
	Crop Code												
	Rating Date						3/Jun/13	5/Jun/13	5/Jun/13	6/Jun/13	6/Jun/13	7/Jun/13	7/Jun/13
	Rating Type						WEIGHT	COUNT	WEIGHT	COUNT	WEIGHT	COUNT	WEIGHT
	Rating Unit						G/PLOT	#	G/PLOT	#	G/PLOT	#	G/PLOT
1	Handweed						295.3	11.5	185.8	7.0	97.0	8.3	109.8
2	diuron	80	DF	1.2	lb ai/a	PRE	303.0	14.5	217.0	15.5	208.8	9.8	119.5
3	clomazone	3	ME	1	lb ai/a	PRE	327.5	13.0	208.8	9.8	126.0	6.8	96.0
4	clomazone	3	ME	2	lb ai/a	PRE	308.5	14.0	213.0	11.8	155.3	11.3	122.3
LSD (P=.05)							200.17	9.75	151.13	8.94	132.10	5.07	70.16
Standard Deviation							125.15	6.10	94.49	5.59	82.59	3.17	43.87
CV							40.56	46.01	45.84	50.8	56.28	35.23	39.21

IR-4 Asparagus Clomazone Crop Safety and Efficacy - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 10/Jun/13 COUNT #	ASPA 10/Jun/13 WEIGHT G/PLOT	ASPA 11/Jun/13 COUNT #	ASPA 11/Jun/13 WEIGHT G/PLOT	ASPA 13/Jun/13 COUNT #	ASPA 13/Jun/13 WEIGHT G/PLOT
Pest Code												
Crop Code												
Rating Date												
Rating Type												
Rating Unit												
1	Handweed						21.8	347.3	7.5	94.5	17.5	284.8
2	diuron	80	DF	1.2	lb ai/a	PRE	30.3	549.0	14.0	178.8	23.8	421.5
3	clomazone	3	ME	1	lb ai/a	PRE	26.8	446.8	8.0	105.5	20.3	340.5
4	clomazone	3	ME	2	lb ai/a	PRE	27.3	463.0	10.5	137.0	24.3	366.3
LSD (P=.05)							14.44	282.80	7.20	117.29	13.69	190.16
Standard Deviation							9.03	176.81	4.50	73.33	8.56	118.89
CV							34.07	39.16	45.03	56.87	39.92	33.66

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 14/Jun/13 COUNT #	ASPA 14/Jun/13 WEIGHT G/PLOT	ASPA 14/Jun/13 TOTAL #/PLOT	ASPA 14/Jun/13 TOTAL KG/PLOT
Pest Code										
Crop Code										
Rating Date										
Rating Type										
Rating Unit										
1	Handweed						10.5	136.0	277.3	4.642
2	diuron	80	DF	1.2	lb ai/a	PRE	13.5	167.0	379.0	6.392
3	clomazone	3	ME	1	lb ai/a	PRE	12.8	142.0	326.5	5.468
4	clomazone	3	ME	2	lb ai/a	PRE	7.8	83.5	342.5	5.520
LSD (P=.05)							9.85	118.76	178.48	3.289
Standard Deviation							6.16	74.25	111.59	2.056
CV							55.35	56.2	33.68	37.34

Weed Control in Snap Bean – HTRC - 2013

Project Code: 123-13-1 **Location: East Lansing, MI**
Block 85-86

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Snap Bean **Variety: Foremost**
Planting Method: Seeded **Planting Date: 5/8/13** **Harvest Date: 7/16/13**
Spacing: 3 inch **Row Spacing: 14 inch, 3 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.4%** **pH: 6.6**
Sand: 63% **Silt: 23%** **Clay: 14%** **CEC: 5.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/9/13	12:30 pm	81/67	F	Dry	1-2 SE	27	50% Cloudy	N
PO1	6/7/13	1:45 pm	64/69	F	Moist	6-8 NE	65	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/9	SNBE		Pre-germinate	
5/9	No weeds present			
6/7	SNBE	4-6″	2-3 trifoliate	
6/7	GRFT = green foxtail	2-3″		Many
6/7	COLQ = common lambsquarters	1-2″		Many
6/7	CORW = common ragweed	1-3″		Few
6/7	WIRA = wild radish			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Weed Control in Snap Bean – HTRC - 2013

Weed Control in Snap Bean - HTRC - 2013

Trial ID: 123-13-1 Location: HTRC block 85, 86
Protocol ID: 123-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SNBE 7/Jun/13 RATING 1-10	COLQ 7/Jun/13 RATING 1-10	CORW 7/Jun/13 RATING 1-10	GRFT 7/Jun/13 RATING 1-10	SNBE 14/Jun/13 RATING 1-10	COLQ 14/Jun/13 RATING 1-10
1	s-metolachlor	7.62	EC	1.6	lb ai/a	PRE	1.3	7.0	5.7	10.0	1.0	4.0
2	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	1.7	10.0	5.7	5.7	1.3	10.0
3	clomazone	3	ME	0.25	lb ai/a	PRE	2.0	9.7	9.7	10.0	1.3	9.7
4	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	2.7	9.3	10.0	9.7	1.7	9.3
	clomazone	3	ME	0.25	lb ai/a	PRE						
5	fomesafen	2	SL	.375	lb ai/a	PRE	2.7	9.3	10.0	10.0	1.3	8.3
6	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	3.3	10.0	10.0	10.0	3.0	10.0
	halosulfuron	75	WG	0.023	lb ai/a	PRE						
7	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	2.0	3.0	10.0	10.0	1.3	1.3
8	pyroxasulfone	85	WDG	0.18	lb ai/a	PRE	4.3	8.3	10.0	10.0	3.7	8.3
9	imazethapyr	2	EC	0.031	lb ai/a	PRE	1.0	9.7	7.0	5.0	1.0	9.0
10	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.0	10.0	7.0	10.0	2.3	10.0
	fomesafen	2	SL	0.25	lb ai/a	PO1						
	clethodim	.97	EC	.12	lb ai/a	PO1						
11	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.3	10.0	4.3	8.3	3.0	10.0
	halosulfuron	75	WG	0.023	lb ai/a	PO1						
	clethodim	.97	EC	.12	lb ai/a	PO1						
	NIS	100	SL	0.25	% ai/v	PO1						
12	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.3	10.0	7.3	9.3	2.0	10.0
	bentazon	4	L	1	lb ai/a	PO1						
	imazamox	1	AS	0.031	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	8.7	10.0	10.0	10.0	10.0	9.3
14	Untreated Check						1.0	4.3	4.0	1.7	1.0	6.0
LSD (P=.05)							0.91	2.17	4.49	1.54	0.86	2.63
Standard Deviation							0.54	1.29	2.68	0.92	0.51	1.57
CV							20.36	14.99	33.85	10.76	21.07	19.04

Weed Control in Snap Bean – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CORW	GRFT	WIRA	SNBE	COLQ	CORW
Pest Code												
Crop Code												
Rating Date							14/Jun/13	14/Jun/13	14/Jun/13	1/Jul/13	1/Jul/13	1/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	s-metolachlor	7.62	EC	1.6	lb ai/a	PRE	3.7	9.7	8.7	1.3	3.3	2.3
2	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	3.0	6.3	9.3	1.3	9.3	1.0
3	clomazone	3	ME	0.25	lb ai/a	PRE	9.7	9.7	10.0	1.3	8.7	9.7
4	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	9.3	10.0	10.0	2.3	10.0	6.3
	clomazone	3	ME	0.25	lb ai/a	PRE						
5	fomesafen	2	SL	.375	lb ai/a	PRE	10.0	9.0	9.7	2.0	6.0	10.0
6	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	10.0	9.7	10.0	3.0	10.0	8.7
	halosulfuron	75	WG	0.023	lb ai/a	PRE						
7	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	9.7	10.0	10.0	2.3	1.0	10.0
8	pyroxasulfone	85	WDG	0.18	lb ai/a	PRE	10.0	10.0	9.3	5.7	4.7	9.3
9	imazethapyr	2	EC	0.031	lb ai/a	PRE	4.3	1.7	9.7	2.0	8.3	1.7
10	pendimethalin	3.8	CS	.95	lb ai/a	PRE	10.0	10.0	10.0	2.7	10.0	10.0
	fomesafen	2	SL	0.25	lb ai/a	PO1						
	clethodim	.97	EC	.12	lb ai/a	PO1						
11	pendimethalin	3.8	CS	.95	lb ai/a	PRE	8.7	10.0	10.0	2.3	10.0	8.7
	halosulfuron	75	WG	0.023	lb ai/a	PO1						
	clethodim	.97	EC	.12	lb ai/a	PO1						
	NIS	100	SL	0.25	% ai/v	PO1						
12	pendimethalin	3.8	CS	.95	lb ai/a	PRE	10.0	10.0	10.0	2.7	10.0	10.0
	bentazon	4	L	1	lb ai/a	PO1						
	imazamox	1	AS	0.031	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	10.0	9.0	9.3	10.0	5.7	8.0
14	Untreated Check						6.3	6.7	9.0	1.3	7.7	3.7
LSD (P=.05)							3.86	1.85	1.35	1.13	2.68	2.94
Standard Deviation							2.30	1.10	0.80	0.67	1.60	1.75
CV							28.1	12.7	8.31	23.35	21.36	24.7

Weed Control in Snap Bean – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRFT 1/Jul/13 RATING 1-10	WIRA 1/Jul/13 RATING 1-10	SNBE 16/Jul/13 LEAVES KG/PLOT	SNBE 16/Jul/13 BEANS KG/PLOT
1	s-metolachlor	7.62	EC	1.6	lb ai/a	PRE	9.7	6.7	11.08	10.77
2	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	1.7	7.0	11.23	13.06
3	clomazone	3	ME	0.25	lb ai/a	PRE	9.3	8.7	15.28	18.42
4	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	10.0	10.0	15.59	12.18
	clomazone	3	ME	0.25	lb ai/a	PRE				
5	fomesafen	2	SL	.375	lb ai/a	PRE	7.3	10.0	10.32	16.27
6	pendimethalin	3.8	CS	1.3	lb ai/a	PRE	8.0	10.0	11.68	16.45
	halosulfuron	75	WG	0.023	lb ai/a	PRE				
7	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	10.0	8.7	7.77	9.47
8	pyroxasulfone	85	WDG	0.18	lb ai/a	PRE	10.0	7.0	5.01	7.50
9	imazethapyr	2	EC	0.031	lb ai/a	PRE	1.0	6.3	7.76	8.20
10	pendimethalin	3.8	CS	.95	lb ai/a	PRE	10.0	10.0	13.89	18.61
	fomesafen	2	SL	0.25	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
11	pendimethalin	3.8	CS	.95	lb ai/a	PRE	10.0	10.0	15.31	19.95
	halosulfuron	75	WG	0.023	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
	NIS	100	SL	0.25	% ai/v	PO1				
12	pendimethalin	3.8	CS	.95	lb ai/a	PRE	10.0	10.0	14.12	18.84
	bentazon	4	L	1	lb ai/a	PO1				
	imazamox	1	AS	0.031	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	3.3	7.7	0.00	0.00
14	Untreated Check						1.0	10.0	10.88	12.75
LSD (P=.05)							2.17	4.75	3.86	4.89
Standard Deviation							1.29	2.83	2.30	2.92
CV							17.89	32.49	21.48	22.37

Weed Control in Beet and Swiss Chard - HTRC - 2013

Project Code: 109-13-1 **Location: East Lansing, MI**
Block 62,72

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Beet and Chard **Variety: See Notes**
Planting Method: Seeded **Planting Date: 5/3/13** **Harvest Date: See data**
Spacing: 3 inch **Row Spacing: 14 inch**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 40 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 2%** **pH: 5.7**
Sand: 56% **Silt: 28%** **Clay: 16%** **CEC: 8.9**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/6	1:00 pm	73/64	F	Dry	4-7 SE	24	95% Cloudy	N
PO1	5/31	4:00 pm	80/74	F	Moist	8-9 SW	54	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/6	RED BEET		Preemergence	
5/6	SW CHARD		Preemergence	
5/6	SUG BEET		Preemergence	
5/31	RED BEET	2 leaves		
5/31	SW CHARD	2 leaves		
5/31	SUG BEET	2 leaves		
5/31	COLQ = common lambsquarters	2″		Many
5/31	CORW = common ragweed	2″		Many
5/31	GRFT = green foxtail	3″		Many
	LATH = ladysthumb			
	RRPW = redroot pigweed			

Notes and Comments
1. 2 rows Red Beet, 1 row Swiss Chard, 2 rows Sugar Beet per plot
2. Varieties: Red beet: Ruby Queen; Sugar beet: HM173RR; Swiss chard: Fordhook Giant
3. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
4. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
5. Harvest: All crop in 40 ft. of row.
6. Sugar beets sprayed with glyphosate 7/22/13 to kill remaining weeds.

Weed Control in Beet and Swiss Chard - HTRC - 2013

Trial ID: 109-13-1 Location: HTRC block 62, 81
Protocol ID: 109-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REDBEET 31/May/13 RATING 1-10	SWCHARD 31/May/13 RATING 1-10	SUGBEET 31/May/13 RATING 1-10	GRFT 31/May/13 RATING 1-10	COLQ 31/May/13 RATING 1-10
1	s-metolachlor	7.62	EC	0.75	lb ai/a	PRE	2.7	2.7	2.3	9.7	7.3
2	s-metolachlor	7.62	EC	1.3	lb ai/a	PRE	3.7	2.7	2.3	9.0	6.0
3	dimethenamid-p	6	EC	0.5	lb ai/a	PRE	3.7	2.3	2.0	9.0	7.3
4	pyrazon	68	DF	2	lb ai/a	PRE	2.7	2.0	2.0	7.3	8.3
5	clomazone	3	ME	0.5	lb ai/a	PRE	7.7	7.3	5.7	10.0	10.0
6	acetochlor	6.4	EC	0.5	lb ai/a	PRE	2.7	2.7	1.3	8.7	7.0
7	ethofumesate	4	SC	2	lb ai/a	PRE	2.3	2.3	2.3	8.0	8.7
8	cycloate	6	EC	3	lb ai/a	PRE	4.3	2.7	2.3	8.7	9.3
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	2.3	1.7	1.3	8.0	7.0
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	triflusulfuron	50	WDG	.0156	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
10	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	1.7	1.3	1.3	7.0	5.7
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	ethofumesate	4	SC	1	lb ai/a	PO1					
	clopyralid	3	L	.188	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
11	Untreated					PRE	2.0	2.0	2.0	5.3	3.3
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	ethofumesate	4	SC	1	lb ai/a	PO1					
	clopyralid	3	L	.188	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
12	Untreated Check						2.3	2.0	1.7	5.3	3.7
LSD (P=.05)							2.98	2.46	2.09	3.01	3.14
Standard Deviation							1.76	1.45	1.24	1.78	1.85
CV							55.59	54.96	55.62	22.22	26.59

Weed Control in Beet and Swiss Chard - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CORW	REDBEET	SWCHARD	SUGBEET	REDBEET
Pest Code											
Crop Code								REDBEET	SWCHARD	SUGBEET	REDBEET
Rating Date							31/May/13	14/Jun/13	14/Jun/13	14/Jun/13	27/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	s-metolachlor	7.62	EC	0.75	lb ai/a	PRE	6.0	3.0	2.3	2.0	2.7
2	s-metolachlor	7.62	EC	1.3	lb ai/a	PRE	5.7	4.3	2.3	1.7	3.0
3	dimethenamid-p	6	EC	0.5	lb ai/a	PRE	6.0	4.0	2.0	1.7	3.3
4	pyrazon	68	DF	2	lb ai/a	PRE	6.7	2.3	1.7	1.3	1.7
5	clomazone	3	ME	0.5	lb ai/a	PRE	10.0	7.7	9.7	4.0	5.0
6	acetochlor	6.4	EC	0.5	lb ai/a	PRE	5.3	3.7	1.3	1.0	3.0
7	ethofumesate	4	SC	2	lb ai/a	PRE	7.0	1.3	1.7	1.7	1.7
8	cycloate	6	EC	3	lb ai/a	PRE	8.3	3.0	2.0	2.0	2.3
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	4.3	2.0	1.7	1.3	3.0
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	triflusulfuron	50	WDG	.0156	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
10	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	4.0	2.7	1.7	1.7	2.3
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	ethofumesate	4	SC	1	lb ai/a	PO1					
	clopyralid	3	L	.188	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
11	Untreated					PRE	4.3	3.3	2.3	2.0	2.3
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	ethofumesate	4	SC	1	lb ai/a	PO1					
	clopyralid	3	L	.188	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
12	Untreated Check						4.3	2.0	1.0	1.0	4.0
LSD (P=.05)							4.28	2.85	2.01	1.49	2.29
Standard Deviation							2.53	1.68	1.19	0.88	1.35
CV							42.14	51.4	48.1	49.37	47.29

Weed Control in Beet and Swiss Chard - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code									GRFT	COLQ	CORW
Crop Code							SWCHARD	SUGBEET			
Rating Date							27/Jun/13	27/Jun/13	27/Jun/13	27/Jun/13	27/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	s-metolachlor	7.62	EC	0.75	lb ai/a	PRE	2.0	2.0	9.7	5.3	2.7
2	s-metolachlor	7.62	EC	1.3	lb ai/a	PRE	2.3	2.3	10.0	6.7	2.7
3	dimethenamid-p	6	EC	0.5	lb ai/a	PRE	2.3	2.3	7.3	4.7	1.7
4	pyrazon	68	DF	2	lb ai/a	PRE	1.0	1.0	3.3	7.7	7.7
5	clomazone	3	ME	0.5	lb ai/a	PRE	8.0	2.3	10.0	9.7	8.3
6	acetochlor	6.4	EC	0.5	lb ai/a	PRE	1.3	1.7	6.3	5.0	2.3
7	ethofumesate	4	SC	2	lb ai/a	PRE	1.0	1.7	4.0	9.7	2.7
8	cycloate	6	EC	3	lb ai/a	PRE	2.3	2.0	8.0	4.7	2.0
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	1.7	1.7	10.0	6.3	8.7
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	triflusulfuron	50	WDG	.0156	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
10	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	1.7	1.7	10.0	10.0	10.0
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	ethofumesate	4	SC	1	lb ai/a	PO1					
	clopyralid	3	L	.188	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
11	Untreated					PRE	1.7	2.3	10.0	10.0	10.0
	phenmediphan	1.3	L	1	lb ai/a	PO1					
	ethofumesate	4	SC	1	lb ai/a	PO1					
	clopyralid	3	L	.188	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
12	Untreated Check						3.3	3.3	1.7	1.0	1.0
LSD (P=.05)							1.71	2.08	3.87	2.75	2.15
Standard Deviation							1.01	1.23	2.28	1.62	1.27
CV							42.28	60.65	30.32	24.14	25.59

Weed Control in Beet and Swiss Chard - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	LATH	RRPW	REDBEET	REDBEET
Pest Code										
Crop Code									REDBEET	REDBEET
Rating Date							27/Jun/13	27/Jun/13	15/Jul/13	15/Jul/13
Rating Type							RATING	RATING	LEAF WEIGHT	ROOT COUNT
Rating Unit							1-10	1-10	KG/PLOT	#/PLOT
1	s-metolachlor	7.62	EC	0.75	lb ai/a	PRE	9.7	7.0	4.933	68.0
2	s-metolachlor	7.62	EC	1.3	lb ai/a	PRE	7.7	8.7	5.835	68.3
3	dimethenamid-p	6	EC	0.5	lb ai/a	PRE	9.3	10.0	5.058	62.3
4	pyrazon	68	DF	2	lb ai/a	PRE	10.0	9.3	8.955	104.0
5	clomazone	3	ME	0.5	lb ai/a	PRE	10.0	9.0	6.248	45.7
6	acetochlor	6.4	EC	0.5	lb ai/a	PRE	9.3	10.0	5.333	58.7
7	ethofumesate	4	SC	2	lb ai/a	PRE	9.7	9.7	7.570	104.0
8	cycloate	6	EC	3	lb ai/a	PRE	9.7	8.7	4.543	55.3
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	10.0	10.0	8.478	102.7
	phenmediphan	1.3	L	1	lb ai/a	PO1				
	triflusulfuron	50	WDG	.0156	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
10	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	10.0	10.0	10.638	118.0
	phenmediphan	1.3	L	1	lb ai/a	PO1				
	ethofumesate	4	SC	1	lb ai/a	PO1				
	clopyralid	3	L	.188	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
11	Untreated					PRE	10.0	10.0	8.207	102.3
	phenmediphan	1.3	L	1	lb ai/a	PO1				
	ethofumesate	4	SC	1	lb ai/a	PO1				
	clopyralid	3	L	.188	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
12	Untreated Check						4.3	3.0	2.843	44.3
LSD (P=.05)							2.82	3.43	4.4098	43.11
Standard Deviation							1.66	2.03	2.6041	25.46
CV							18.21	23.1	39.74	32.72

Weed Control in Beet and Swiss Chard - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REDBEET 15/Jul/13 ROOT WEIGHT KG/PLOT	SWCHARD 15/Jul/13 WEIGHT KG/PLOT	SUGBEET 11/Oct/13 ROOT COUNT #/PLOT	SUGBEET 11/Oct/13 ROOT WEIGHT KG/PLOT
	Pest Code									
	Crop Code									
	Rating Date									
	Rating Type									
	Rating Unit									
1	s-metolachlor	7.62	EC	0.75	lb ai/a	PRE	4.708	7.422	141.3	63.747
2	s-metolachlor	7.62	EC	1.3	lb ai/a	PRE	4.617	8.787	142.0	62.923
3	dimethenamid-p	6	EC	0.5	lb ai/a	PRE	4.783	9.160	147.7	53.700
4	pyrazon	68	DF	2	lb ai/a	PRE	8.557	14.235	161.3	70.000
5	clomazone	3	ME	0.5	lb ai/a	PRE	4.823	0.625	150.7	94.530
6	acetochlor	6.4	EC	0.5	lb ai/a	PRE	4.588	11.305	169.7	64.787
7	ethofumesate	4	SC	2	lb ai/a	PRE	7.143	10.795	138.7	60.503
8	cycloate	6	EC	3	lb ai/a	PRE	3.858	7.685	132.0	48.703
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	7.468	14.390	154.0	69.513
	phenmediphan	1.3	L	1	lb ai/a	PO1				
	triflusulfuron	50	WDG	.0156	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
10	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	9.348	14.797	182.3	86.027
	phenmediphan	1.3	L	1	lb ai/a	PO1				
	ethofumesate	4	SC	1	lb ai/a	PO1				
	clopyralid	3	L	.188	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
11	Untreated					PRE	7.365	12.038	162.7	79.983
	phenmediphan	1.3	L	1	lb ai/a	PO1				
	ethofumesate	4	SC	1	lb ai/a	PO1				
	clopyralid	3	L	.188	lb ai/a	PO1				
	clethodim	.97	EC	.12	lb ai/a	PO1				
12	Untreated Check						2.742	5.432	132.7	53.560
LSD (P=.05)							4.6988	5.3934	47.31	25.2932
Standard Deviation							2.7747	3.1849	27.94	14.9362
CV							47.57	32.76	18.47	22.18

Weed Control in Broccoli and Cabbage - HTRC - 2013

Project Code: 114-13-1 **Location: East Lansing, MI**
Block 55-56

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Broccoli, Cabbage **Variety: Packman Broccoli, Artost Cabbage**
Planting Method: Transplant **Planting Date: 5/16/13** **Harvest Date: See data**
Spacing: 22 inch **Row Spacing: 3 ft; one row of each crop/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 2.5%** **pH: 7.6**
Sand: 48% **Silt: 32%** **Clay: 20%** **CEC: 11.1**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRT	5/16	11:40 am	78/60	F	Dry	0-2 SW	30	35% Cloudy	N
POT	5/17	10:15 am	62/60	F	Dry	5-7 E	77	90% Cloudy	N
POT2	5/31	3:00 pm	80/70	F	Moist	7-9 SW	80	95% Cloudy	N
PO1	6/14	2:00 pm	82/73	F	Saturated	3-5 NE	82	10% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/14	BROCCOLI, CABBAGE	6-7″	Foliar	Good
6/14	BYGR = barnyardgrass	3-4″	Foliar	Many
6/14	CORW = common ragweed	3-6″	6-10 leaf	Moderate
6/14	EBNS = eastern black nightshade	1-3″	3-4 leaf	Moderate
6/14	LATH = ladysthumb	1-5″	6-12 leaf	Many
6/14	RRPW = redroot pigweed	2-4″	6-10 leaf	Few

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. PRT = pretransplant; POT = post transplant; POT2 = post transplant 2; PO1 = Postemergence.

Weed Control in Broccoli and Cabbage - HTRC - 2013

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trial ID: 114-13-1 Location: HTRC block 56
Protocol ID: 114-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BROCCOLI 12/Jun/13 RATING 1-10	CABBAGE 12/Jun/13 RATING 1-10	BYGR 12/Jun/13 RATING 1-10	CORW 12/Jun/13 RATING 1-10	EBNS 12/Jun/13 RATING 1-10
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	1.3	1.0	10.0	7.3	10.0
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	1.3	1.3	10.0	10.0	10.0
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT					
3	napropamide XT	50	DF	2	lb ai/a	PRT	1.7	1.3	10.0	8.0	1.0
4	napropamide	50	DF	2	lb ai/a	PRT	1.0	1.3	10.0	6.7	6.0
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	2.3	2.3	10.0	8.7	10.0
6	sulfentrazone	4	F	.188	lb ai/a	PRT	2.3	2.0	10.0	8.0	9.7
7	clopyralid	3	L	.094	lb ai/a	PO1	1.0	1.0	1.0	1.0	1.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
8	clomazone	3	ME	0.5	lb ai/a	PRT	3.3	3.0	9.7	9.7	10.0
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	3.7	2.0	7.7	6.3	10.0
10	napropamide XT	50	DF	2	lb ai/a	POT	1.7	2.0	7.7	5.7	3.7
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	6.7	4.7	10.0	10.0	7.0
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	1.0	1.0	1.0	1.0	1.0
13	clopyralid	3	L	.094	lb ai/a	PO1	1.3	1.0	1.0	1.0	1.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
14	Untreated Handweeded						1.0	1.0	1.0	1.0	1.0
15	acetochlor	3	CS	1	lb ai/a	POT2	3.7	2.7	10.0	10.0	10.0
LSD (P=.05)							1.05	1.02	2.36	2.54	3.30
Standard Deviation							0.63	0.61	1.41	1.52	1.97
CV							28.23	33.18	19.46	24.13	32.39

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	LATH	RRPW	BROCCOLI	CABBAGE	BYGR
Pest Code											
Crop Code									BROCCOLI	CABBAGE	
Rating Date							12/Jun/13	12/Jun/13	21/Jun/13	21/Jun/13	21/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	10.0	10.0	1.3	1.0	10.0
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	10.0	10.0	1.0	1.0	10.0
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT					
3	napropamide XT	50	DF	2	lb ai/a	PRT	9.3	9.3	1.0	1.0	9.3
4	napropamide	50	DF	2	lb ai/a	PRT	9.0	8.7	1.0	1.3	9.0
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	10.0	10.0	1.3	2.0	10.0
6	sulfentrazone	4	F	.188	lb ai/a	PRT	10.0	10.0	2.0	1.3	9.7
7	clopyralid	3	L	.094	lb ai/a	PO1	1.0	1.0	3.0	2.3	10.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
8	clomazone	3	ME	0.5	lb ai/a	PRT	10.0	10.0	2.7	1.3	10.0
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	10.0	10.0	4.7	1.3	10.0
10	napropamide XT	50	DF	2	lb ai/a	POT	10.0	8.7	1.3	1.3	9.7
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	8.7	7.3	6.0	3.3	10.0
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	1.0	1.0	3.3	3.7	9.0
13	clopyralid	3	L	.094	lb ai/a	PO1	1.0	1.0	2.7	2.3	10.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
14	Untreated Handweeded						1.0	1.0	1.0	1.0	1.0
15	acetochlor	3	CS	1	lb ai/a	POT2	10.0	10.0	3.0	2.3	10.0
LSD (P=.05)							0.98	1.90	0.91	0.92	1.06
Standard Deviation							0.59	1.14	0.55	0.55	0.63
CV							7.91	15.78	23.19	30.97	6.92

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CORW	EBNS	RRPW	BROCCOLI	CABBAGE
Pest Code											
Crop Code										BROCCOLI	CABBAGE
Rating Date							21/Jun/13	21/Jun/13	21/Jun/13	8/Jul/13	8/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	7.3	10.0	10.0	1.3	1.7
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	10.0	10.0	10.0	1.3	1.7
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT					
3	napropamide XT	50	DF	2	lb ai/a	PRT	6.3	1.7	8.7	1.7	1.0
4	napropamide	50	DF	2	lb ai/a	PRT	6.0	2.7	8.0	1.0	1.0
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	6.7	10.0	9.7	3.3	2.0
6	sulfentrazone	4	F	.188	lb ai/a	PRT	8.3	10.0	10.0	2.3	1.3
7	clopyralid	3	L	.094	lb ai/a	PO1	10.0	10.0	10.0	1.7	2.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
8	clomazone	3	ME	0.5	lb ai/a	PRT	9.7	10.0	9.7	1.7	1.7
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	6.7	10.0	10.0	6.0	2.3
10	napropamide XT	50	DF	2	lb ai/a	POT	7.3	2.3	10.0	2.3	2.3
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	10.0	10.0	6.3	4.0	3.0
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	9.3	9.7	9.3	1.7	2.0
13	clopyralid	3	L	.094	lb ai/a	PO1	10.0	10.0	10.0	1.3	1.3
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
14	Untreated Handweeded						1.0	1.0	1.0	1.7	1.3
15	acetochlor	3	CS	1	lb ai/a	POT2	10.0	10.0	10.0	3.3	3.3
LSD (P=.05)							3.20	1.46	1.76	1.63	1.34
Standard Deviation							1.91	0.87	1.05	0.98	0.80
CV							24.2	11.18	11.9	42.3	42.79

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BYGR	COPU	CORW	EBNS	LATH	RRPW
Pest Code							BYGR	COPU	CORW	EBNS	LATH	RRPW
Crop Code												
Rating Date							8/Jul/13	8/Jul/13	8/Jul/13	8/Jul/13	8/Jul/13	8/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	10.0	10.0	5.3	10.0	10.0	7.7
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	10.0	10.0	9.7	10.0	10.0	10.0
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT						
3	napropamide XT	50	DF	2	lb ai/a	PRT	9.0	9.0	6.0	1.0	10.0	4.0
4	napropamide	50	DF	2	lb ai/a	PRT	10.0	9.3	4.0	1.7	6.3	7.7
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	10.0	10.0	6.7	9.0	8.0	9.0
6	sulfentrazone	4	F	.188	lb ai/a	PRT	8.7	9.3	7.3	10.0	10.0	9.7
7	clopyralid	3	L	.094	lb ai/a	PO1	10.0	10.0	10.0	10.0	9.3	8.3
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1						
	clethodim	.97	EC	.068	lb ai/a	PO1						
8	clomazone	3	ME	0.5	lb ai/a	PRT	9.7	10.0	8.7	8.0	10.0	5.7
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	10.0	9.7	5.3	10.0	10.0	9.7
10	napropamide XT	50	DF	2	lb ai/a	POT	10.0	9.0	5.7	1.3	6.3	7.3
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	4.0	1.3	9.7	10.0	4.7	2.3
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	9.7	7.0	10.0	10.0	10.0	4.3
13	clopyralid	3	L	.094	lb ai/a	PO1	10.0	10.0	10.0	10.0	8.7	7.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1						
	clethodim	.97	EC	.068	lb ai/a	PO1						
14	Untreated Handweeded						7.7	10.0	10.0	9.3	7.7	6.0
15	acetochlor	3	CS	1	lb ai/a	POT2	10.0	10.0	7.3	10.0	10.0	10.0
LSD (P=.05)							3.07	1.73	2.97	1.26	3.55	3.50
Standard Deviation							1.83	1.04	1.77	0.75	2.12	2.09
CV							19.83	11.55	23.0	9.37	24.28	28.87

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SHPU	BROCCOLI	BROCCOLI	BROCCOLI
Pest Code										
Crop Code								BROCCOLI	BROCCOLI	BROCCOLI
Rating Date							8/Jul/13	5/Jul/13	5/Jul/13	8/Jul/13
Rating Type							RATING	COUNT	WEIGHT	COUNT
Rating Unit							1-10	#/PLOT	KG/PLOT	#/PLOT
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	8.3	5.3	2.21	8.7
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	10.0	3.3	1.08	8.0
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT				
3	napropamide XT	50	DF	2	lb ai/a	PRT	7.7	5.0	2.21	6.0
4	napropamide	50	DF	2	lb ai/a	PRT	10.0	10.7	4.84	6.7
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	7.0	5.7	2.20	6.0
6	sulfentrazone	4	F	.188	lb ai/a	PRT	10.0	1.7	0.67	7.0
7	clopyralid	3	L	.094	lb ai/a	PO1	9.3	6.3	2.57	7.7
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
8	clomazone	3	ME	0.5	lb ai/a	PRT	10.0	2.3	0.73	9.7
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	9.3	2.7	1.26	1.3
10	napropamide XT	50	DF	2	lb ai/a	POT	7.3	8.3	3.39	4.0
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	10.0	0.0	0.00	0.0
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	10.0	5.0	1.79	8.7
13	clopyralid	3	L	.094	lb ai/a	PO1	10.0	5.7	2.37	7.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
14	Untreated Handweeded						10.0	9.7	4.10	6.7
15	acetochlor	3	CS	1	lb ai/a	POT2	10.0	0.3	0.12	2.3
LSD (P=.05)							3.50	4.23	1.886	5.25
Standard Deviation							2.09	2.53	1.128	3.14
CV							22.57	52.74	57.28	52.5

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage				
Pest Code										
Crop Code							BROCCOLI	BROCCOLI	BROCCOLI	BROCCOLI
Rating Date							8/Jul/13	10/Jul/13	10/Jul/13	12/Jul/13
Rating Type							WEIGHT	COUNT	WEIGHT	COUNT
Rating Unit							KG/PLOT	#/PLOT	KG/PLOT	#/PLOT
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	3.88	2.3	0.90	0.3
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	3.96	3.7	1.56	0.7
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT				
3	napropamide XT	50	DF	2	lb ai/a	PRT	3.11	2.3	1.06	1.0
4	napropamide	50	DF	2	lb ai/a	PRT	3.27	1.0	0.32	0.3
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	2.36	1.7	0.79	1.3
6	sulfentrazone	4	F	.188	lb ai/a	PRT	2.86	5.7	2.19	1.0
7	clopyralid	3	L	.094	lb ai/a	PO1	3.51	2.7	1.11	0.7
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
8	clomazone	3	ME	0.5	lb ai/a	PRT	4.69	2.7	1.19	1.0
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	0.60	1.0	0.44	0.0
10	napropamide XT	50	DF	2	lb ai/a	POT	1.87	3.0	1.50	0.3
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	0.00	1.0	0.59	0.3
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	3.31	1.7	0.53	1.0
13	clopyralid	3	L	.094	lb ai/a	PO1	3.06	1.3	0.75	1.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
14	Untreated Handweeded						2.78	0.3	0.09	0.0
15	acetochlor	3	CS	1	lb ai/a	POT2	0.97	4.3	1.93	0.7
LSD (P=.05)							2.217	2.91	1.250	1.48
Standard Deviation							1.326	1.74	0.748	0.89
CV							49.45	75.4	75.11	137.41

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BROCCOLI 12/Jul/13 WEIGHT KG/PLOT	BROCCOLI 15/Jul/13 COUNT #/PLOT	BROCCOLI 15/Jul/13 WEIGHT KG/PLOT	BROCCOLI TOTAL #/PLOT
	Pest Code									
	Crop Code									
	Rating Date									
	Rating Type									
	Rating Unit									
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	0.06	1.3	0.35	18.0
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	0.20	1.7	0.46	17.3
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT				
3	napropamide XT	50	DF	2	lb ai/a	PRT	0.30	3.3	0.77	17.7
4	napropamide	50	DF	2	lb ai/a	PRT	0.09	1.3	0.16	20.0
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	0.53	1.3	0.30	16.0
6	sulfentrazone	4	F	.188	lb ai/a	PRT	0.40	2.0	0.44	17.3
7	clopyralid	3	L	.094	lb ai/a	PO1	0.23	3.0	0.69	20.3
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
8	clomazone	3	ME	0.5	lb ai/a	PRT	0.39	2.0	0.54	17.7
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	0.00	2.0	0.34	7.0
10	napropamide XT	50	DF	2	lb ai/a	POT	0.10	3.3	0.86	19.0
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	0.14	2.7	0.78	4.0
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	0.27	0.7	0.27	17.0
13	clopyralid	3	L	.094	lb ai/a	PO1	0.27	1.7	0.48	16.7
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
14	Untreated Handweeded						0.00	1.0	0.23	17.7
15	acetochlor	3	CS	1	lb ai/a	POT2	0.26	3.7	1.23	11.3
	LSD (P=.05)						0.538	2.79	0.813	3.23
	Standard Deviation						0.322	1.67	0.486	1.93
	CV						149.2	80.69	92.25	12.22

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BROCCOLI TOTAL KG/PLOT	CABBAGE 10/Jul/13 COUNT #/PLOT	CABBAGE 10/Jul/13 WEIGHT KG/PLOT	CABBAGE 15/Jul/13 COUNT #/PLOT
	Pest Code									
	Crop Code									
	Rating Date									
	Rating Type									
	Rating Unit									
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	7.40	11.0	16.83	3.3
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	7.26	9.7	14.15	5.0
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT				
3	napropamide XT	50	DF	2	lb ai/a	PRT	7.45	8.7	15.13	5.0
4	napropamide	50	DF	2	lb ai/a	PRT	8.67	11.0	16.05	4.0
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	6.18	6.3	7.50	3.7
6	sulfentrazone	4	F	.188	lb ai/a	PRT	6.55	7.0	9.33	7.3
7	clopyralid	3	L	.094	lb ai/a	PO1	8.11	10.3	14.10	5.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
8	clomazone	3	ME	0.5	lb ai/a	PRT	7.54	6.3	9.87	4.3
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	2.64	9.7	15.70	2.0
10	napropamide XT	50	DF	2	lb ai/a	POT	7.72	7.7	11.43	4.7
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	1.51	4.0	4.73	2.0
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	6.17	6.0	8.57	7.7
13	clopyralid	3	L	.094	lb ai/a	PO1	6.94	10.7	14.23	4.7
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
14	Untreated Handweeded						7.20	8.0	12.02	7.7
15	acetochlor	3	CS	1	lb ai/a	POT2	4.51	3.0	4.13	4.0
	LSD (P=.05)						1.636	5.60	8.516	3.91
	Standard Deviation						0.978	3.35	5.093	2.34
	CV						15.31	42.13	43.97	49.86

Weed Control in Broccoli and Cabbage - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CABBAGE 15/Jul/13 WEIGHT KG/PLOT	CABBAGE 22/Jul/13 COUNT #/PLOT	CABBAGE 22/Jul/13 WEIGHT KG/PLOT	CABBAGE TOTAL #/PLOT	CABBAGE TOTAL KG/PLOT
	Pest Code										
	Crop Code										
	Rating Date						15/Jul/13	22/Jul/13	22/Jul/13		
	Rating Type						WEIGHT	COUNT	WEIGHT	TOTAL	TOTAL
	Rating Unit						KG/PLOT	#/PLOT	KG/PLOT	#/PLOT	KG/PLOT
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRT	4.95	1.3	1.98	15.7	23.76
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	7.00	2.0	2.86	16.7	24.01
	oxyfluorfen	4	SC	0.5	lb ai/a	PRT					
3	napropamide XT	50	DF	2	lb ai/a	PRT	7.91	3.7	4.96	17.3	28.01
4	napropamide	50	DF	2	lb ai/a	PRT	5.54	1.3	1.61	16.3	23.20
5	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	5.04	4.7	6.27	14.7	18.82
6	sulfentrazone	4	F	.188	lb ai/a	PRT	11.61	2.3	3.14	16.7	24.07
7	clopyralid	3	L	.094	lb ai/a	PO1	7.76	2.3	3.45	17.7	25.30
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
8	clomazone	3	ME	0.5	lb ai/a	PRT	6.61	4.3	5.73	15.0	22.21
9	pendimethalin	3.8	CS	1.9	lb ai/a	POT	3.64	1.3	1.89	13.0	21.23
10	napropamide XT	50	DF	2	lb ai/a	POT	7.09	3.7	4.71	16.0	23.23
11	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	2.70	4.3	7.02	10.3	14.45
12	bicyclopyrone	1.67	SL	0.045	lb ai/a	PO1	11.57	4.0	5.66	17.7	25.79
13	clopyralid	3	L	.094	lb ai/a	PO1	6.81	1.3	1.35	16.7	22.40
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
14	Untreated Handweeded						12.19	1.7	2.06	17.3	26.27
15	acetochlor	3	CS	1	lb ai/a	POT2	4.85	8.0	9.96	15.0	18.94
LSD (P=.05)							6.396	3.16	4.263	2.96	5.370
Standard Deviation							3.825	1.89	2.550	1.77	3.211
CV							54.5	61.21	61.05	11.24	14.1

Preemergence Weed Control in Carrot – Keilen Farms - 2013

Project Code: 107-13-1 **Location: East Lansing, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Carrot **Variety: Finley**
Planting Method: Seeded **Planting Date: 5/6/13** **Harvest date: 9/5/13**
Spacing: 1 inch **Row Spacing: 10 inch**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 3 ft wide x 30 ft long

Soil Type: Houghton Muck **OM: 43.6%** **pH: 7.0**
Sand: 44% **Silt: 9%** **Clay: 3%** **CEC:**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/9/13	2:57 pm	84/67	F	Dry	0-1 N	24	95% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/9	CARROT		Pre-emergence	
5/9	No weeds			

HANS = hairy nightshade
LATH = ladysthumb
RRPW = redroot pigweed

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. 9/5/13 Harvest 5 ft. of 3 rows.

Preemergence Weed Control in Carrot – Keilen Farms - 2013

Preemergence Weed Control in Carrot - Keilen - 2013

Trial ID: 107-13-1 Location: Keilen, East Lansing
Protocol ID: 107-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CARROT 7/Jun/13 RATING 1-10	HANS 7/Jun/13 RATING 1-10	LATH 7/Jun/13 RATING 1-10	RRPW 7/Jun/13 RATING 1-10	CARROT 13/Jun/13 RATING 1-10	LATH 13/Jun/13 RATING 1-10
1	pendimethalin	3.8	CS	.95	lb ai/a	PRE	3.7	9.3	3.7	9.3	2.0	4.0
2	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	2.3	10.0	5.7	4.0	1.7	4.7
3	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	3.0	7.7	5.0	4.0	1.7	5.0
4	linuron	50	DF	1	lb ai/a	PRE	2.3	4.0	2.0	4.0	1.7	2.3
5	linuron	50	DF	2	lb ai/a	PRE	2.7	9.0	3.0	6.0	1.7	3.0
6	prometryn	4	L	1	lb ai/a	PRE	3.3	7.0	1.3	6.3	2.0	2.0
7	prometryn	4	L	2	lb ai/a	PRE	3.7	7.0	1.7	6.7	1.7	2.3
8	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.0	4.3	2.7	4.0	1.0	5.0
	linuron	50	DF	1	lb ai/a	PRE						
9	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	2.7	10.0	4.0	10.0	2.3	5.0
	linuron	50	DF	1	lb ai/a	PRE						
10	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	1.3	7.7	2.0	7.0	1.3	2.0
	prometryn	4	L	1	lb ai/a	PRE						
11	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	2.7	9.7	2.7	7.0	1.7	4.0
12	pyroxasulfone	85	WDG	0.18	lb ai/a	PRE	2.7	9.0	4.0	8.3	2.0	5.7
13	bicyclopyrone	1.67	SL	0.033	lb ai/a	PRE	2.7	9.3	3.0	7.7	2.0	4.0
14	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	2.3	7.7	2.0	7.0	1.7	3.0
15	Untreated Check						2.3	7.0	1.3	10.0	1.7	2.3
LSD (P=.05)							1.63	4.86	2.65	5.42	1.49	3.00
Standard Deviation							0.97	2.90	1.59	3.24	0.89	1.79
CV							36.78	36.7	54.11	47.94	51.29	49.48

Preemergence Weed Control in Carrot – Keilen Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CARROT 17/Jun/13 RATING 1-10	LATH 17/Jun/13 RATING 1-10	CARROT 5/Sep/13 KG/PLOT KG
	Pest Code								
	Crop Code						CARROT		CARROT
	Rating Date						17/Jun/13	17/Jun/13	5/Sep/13
	Rating Type						RATING	RATING	KG/PLOT
	Rating Unit						1-10	1-10	KG
1	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.3	5.7	10.24
2	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	2.3	7.3	14.22
3	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	2.0	6.0	11.53
4	linuron	50	DF	1	lb ai/a	PRE	1.3	4.3	14.21
5	linuron	50	DF	2	lb ai/a	PRE	2.0	6.0	13.59
6	prometryn	4	L	1	lb ai/a	PRE	1.3	3.3	14.04
7	prometryn	4	L	2	lb ai/a	PRE	1.3	4.7	14.63
8	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.3	6.0	18.66
	linuron	50	DF	1	lb ai/a	PRE			
9	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	2.0	7.3	15.72
	linuron	50	DF	1	lb ai/a	PRE			
10	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	1.0	4.3	14.61
	prometryn	4	L	1	lb ai/a	PRE			
11	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	1.7	4.7	15.13
12	pyroxasulfone	85	WDG	0.18	lb ai/a	PRE	2.3	7.7	16.15
13	bicyclopyrone	1.67	SL	0.033	lb ai/a	PRE	2.0	6.0	15.77
14	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	2.3	3.0	14.76
15	Untreated Check						2.3	3.0	16.03
LSD (P=.05)							1.43	3.39	5.533
Standard Deviation							0.86	2.02	3.309
CV							46.38	38.28	22.63

Postemergence Weed Control in Carrot – Keilen Farms - 2013

Project Code: 107-13-2 **Location: East Lansing, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Carrot **Variety: Finley**
Planting Method: Seeded **Planting Date: 5/6/13** **Harvest date: 9/5/13**
Spacing: 1 inch **Row Spacing: 10 inch, 2 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 3.3 ft wide x 30 ft long

Soil Type: Houghton Muck **OM: 43.6%** **pH: 7**
Sand: 44% **Silt: 9%** **Clay: 3%** **CEC: -**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PO1	6/11/13	11:30 am	84/67	F	Dry	6-8 SW	54	50% Cloudy	N
PO2	6/24/13	10:20 am	85/72	F	Dry	7-9 SW	57	50% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/11	CARROT	3-4″	3 leaves	
6/11	LATH = ladyshumb	2-6″		Many
6/11	RRPW = redroot pigweed	6-8″		Few
6/11	YENS = yellow nutsedge	6-8″		Few
6/11	CORW = common ragweed	6-8″		Few
6/24	CARROT	6-10″		Good
6/24	LATH = ladysthumb	4-6″		Many

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. 9/5/13 Harvest 5 ft. of 3 rows

Postemergence Weed Control in Carrot – Keilen Farms - 2013

Postemergence Weed Control in Carrot - Keilen - 2013

Trial ID: 107-13-2 Location: Keilen, East Lansing
Protocol ID: 107-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CARROT 17/Jun/13 RATING 1-10	LATH 17/Jun/13 RATING 1-10	CARROT 5/Jul/13 RATING 1-10	LATH 5/Jul/13 RATING 1-10	CARROT 5/Sep/13 HARVEST KG/PLOT
1	linuron	50	DF	1	lb ai/a	PO1, PO2	2.7	4.0	4.7	7.7	7.70
2	linuron	50	DF	2	lb ai/a	PO1, PO2	2.3	2.7	4.7	10.0	12.24
3	metribuzin	75	DF	0.25	lb ai/a	PO1, PO2	3.0	5.3	3.3	10.0	15.63
4	metribuzin	75	DF	0.5	lb ai/a	PO1, PO2	3.0	7.3	3.3	10.0	14.86
5	prometryn	4	L	1	lb ai/a	PO1, PO2	2.3	4.3	2.7	10.0	14.65
6	prometryn	4	L	2	lb ai/a	PO1, PO2	2.7	5.7	2.7	9.7	13.72
7	oxyfluorfen	4	SC	.063	lb ai/a	PO1, PO2	2.7	5.3	2.7	7.0	15.01
8	acifluorfen	2	L	0.125	lb ai/a	PO1, PO2	3.3	7.7	4.0	5.0	8.14
9	fomesafen	2	SL	0.125	lb ai/a	PO1, PO2	4.7	7.0	6.0	7.0	10.82
10	bicyclopyrone	1.67	SL	0.033	lb ai/a	PO1, PO2	3.3	4.3	6.3	10.0	8.67
11	Untreated Check						2.3	1.0	4.3	10.0	12.87
LSD (P=.05)							1.98	3.13	3.41	3.76	6.685
Standard Deviation							1.16	1.84	2.00	2.21	3.925
CV							39.55	36.95	49.24	25.21	32.15

Postemergence Micro Rates of Lorox in Carrot – Oomen Bros - Hart - 2013

Project Code: 107-13-3 **Location: Hart, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Carrot **Variety: Canada**
Planting Method: Seeded **Planting Date: 5/1/13**
Spacing: 1 inch **Row Spacing: 18 inches, 3 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Spinks Loamy Fine Sand **OM: 1.2%** **pH: 5.7**
Sand: 83% **Silt: 11%** **Clay: 6%** **CEC: 4.6**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/3/13	1:30 am	60/70	F	SliWet	2-3 SE	52	100% Cloudy	N
PO1	6/11/13	11:00 am	86/61	F	Dry	2-3 NW	50	90% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/3	CARROT		Pre-emergence	
5/3	WHEAT	1-3″		
6/11	CARROT	2-3″	2-3 leaf	
6/11	POAM = Powell amaranth	1-2″	3-4 leaf	Few
6/11	WHEAT		Dying-sprayed	

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. PO2-PO8 applied weekly from 6/18-7/30/13.
4. Harvest: 5 ft. of 3 rows (total 15 ft.).

Postemergence Micro Rates of Lorox in Carrot – Oomen Bros - Hart - 2013

Postemergence Micro Rates of Lorox in Carrot - Hart - 2013

Trial ID: 107-13-3 Location: Oomen Bros, Hart
Protocol ID: 107-13-3 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CARROT 11/Jun/13 RATING 1-10	CARROT 28/Jun/13 RATING 1-10	POAM 28/Jun/13 RATING 1-10	CARROT 22/Aug/13 RATING 1-10	CARROT 22/Aug/13 #BOLTERS #
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	2.3	2.3	10.0	2.3	0.3
	linuron	50	DF	1	lb ai/a	PO1, PO2					
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	1.7	3.3	10.0	1.7	0.3
	linuron	50	DF	1	lb ai/a	PO1, PO2					
3	prometryn	4	L	1	lb ai/a	PRE	1.3	2.7	9.7	1.3	0.3
	linuron	50	DF	1	lb ai/a	PO1, PO2					
4	linuron	50	DF	0.5	lb ai/a	PRE	2.0	2.3	10.0	2.0	1.0
	linuron	50	DF	1	lb ai/a	PO1, PO2					
5	linuron	50	DF	0.25	lb ai/a	PRE	1.0	2.0	10.0	1.0	0.7
	linuron	50	DF	0.875	lb ai/a	PO1, PO2					
6	linuron	50	DF	0.25	lb ai/a	PRE	1.7	2.7	9.0	2.0	0.0
	linuron	50	DF	0.22	lb ai/a	PO1-8					
7	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	2.3	2.3	10.0	2.3	0.0
	linuron	50	DF	0.25	lb ai/a	PO1-8					
8	Handweeded Control						1.7	2.7	6.3	2.7	0.3
LSD (P=.05)							1.80	1.29	2.94	1.34	1.11
Standard Deviation							1.03	0.74	1.68	0.77	0.63
CV							58.65	28.96	17.94	40.05	168.4

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	POAM 22/Aug/13 RATING 1-10	CARROT 5/Sep/13 RATING 1-10	CARROT 5/Sep/13 #BOLTERS #	CARROT 3/Oct/13 #BOLTERS #	CARROT 3/Oct/13 HARVEST KG/PLOT
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	8.7	1.7	0.7	0.3	18.177
	linuron	50	DF	1	lb ai/a	PO1, PO2					
2	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	9.3	1.7	0.3	0.3	19.977
	linuron	50	DF	1	lb ai/a	PO1, PO2					
3	prometryn	4	L	1	lb ai/a	PRE	8.3	1.7	0.3	0.7	20.810
	linuron	50	DF	1	lb ai/a	PO1, PO2					
4	linuron	50	DF	0.5	lb ai/a	PRE	7.0	1.7	0.7	1.3	18.427
	linuron	50	DF	1	lb ai/a	PO1, PO2					
5	linuron	50	DF	0.25	lb ai/a	PRE	5.0	1.3	0.7	0.7	20.307
	linuron	50	DF	0.875	lb ai/a	PO1, PO2					
6	linuron	50	DF	0.25	lb ai/a	PRE	3.0	2.3	0.7	0.7	19.737
	linuron	50	DF	0.22	lb ai/a	PO1-8					
7	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	9.7	1.7	0.0	0.0	21.453
	linuron	50	DF	0.25	lb ai/a	PO1-8					
8	Handweeded Control						1.0	1.0	0.3	0.3	18.320
LSD (P=.05)							2.87	1.11	0.82	1.33	4.0819
Standard Deviation							1.64	0.64	0.47	0.76	2.3307
CV							25.23	39.15	102.39	140.28	11.86

Weed Control in Celery - Schreur Farms - 2013

Project Code: 113-13-1 **Location: Hudsonville, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Celery **Variety: Duchess**
Planting Method: Transplant **Planting Date: 4/26/13** **Harvest Date: 7/9/13**
Spacing: 7 in **Row Spacing: 22 in**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 3.3 ft wide x 40 ft long

Soil Type: Carlisle Muck **OM: 67.6%** **pH: 6.1**
Sand: 17% **Silt: 15%** **Clay: 0.2%** **CEC: -**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
POT	4/29/13	1:00 pm	70/53	F	Damp	3-4 SW	61	50% Cloudy	N
PO1	5/30/13	3:00 pm	84/70	F	Damp	8-9 SW	54	80% Cloudy	

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/30	CELERY	6-8″		
5/30	PESW = Pennsylvania smartweed	1-6″		Moderate
5/30	MAYC = marsh yellowcress	2-3″	Rosette	Moderate
5/30	COGR = common groundsel			
5/30	PESW = Pennsylvania smartweed			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. 7/9/13 Harvest 10 ft. of 2 rows.

Weed Control in Celery - Schreur Farms - 2013

Weed Control in Celery - Schreur - 2013

Trial ID: 113-13-1 Location: Hudsonville
Protocol ID: 113-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CELERY 30/May/13 RATING 1-10	PESW 30/May/13 RATING 1-10	MAYC 30/May/13 RATING 1-10	CELERY 6/Jun/13 RATING 1-10	MAYC 6/Jun/13 RATING 1-10
1	prometryn	4	L	2	lb ai/a	POT	1.0	8.3	8.0	1.0	9.3
	prometryn	4	L	2	lb ai/a	PO1					
2	prometryn	4	L	2	lb ai/a	POT	1.0	8.7	8.0	1.0	9.3
	linuron	50	DF	2	lb ai/a	PO1					
3	flumioxazin	51	WDG	0.096	lb ai/a	POT	1.0	9.3	8.7	1.0	9.3
	prometryn	4	L	2	lb ai/a	PO1					
4	s-metolachlor	7.62	EC	1.9	lb ai/a	POT	1.0	9.3	8.7	1.3	9.3
	prometryn	4	L	2	lb ai/a	PO1					
5	pendimethalin	3.8	CS	1.9	lb ai/a	POT	1.3	7.7	5.0	1.0	6.3
	prometryn	4	L	2	lb ai/a	PO1					
6	pyroxasulfone	85	WDG	0.2	lb ai/a	POT	1.3	10.0	9.7	1.0	10.0
	prometryn	4	L	2	lb ai/a	PO1					
7	pyroxasulfone	85	WDG	0.2	lb ai/a	POT	1.0	9.3	9.0	1.7	9.0
	flumioazin	51	WDG	0.096	lb ai/a	POT					
8	sulfentrazone	4	F	0.25	lb ai/a	POT	1.3	8.0	7.7	1.0	8.3
	prometryn	4	L	2	lb ai/a	PO1					
9	acetochlor	3	CS	1.5	lb ai/a	POT	1.0	6.0	3.7	1.3	7.3
	prometryn	4	L	2	lb ai/a	PO1					
10	pendimethalin	3.8	CS	1.9	lb ai/a	POT	1.0	5.7	2.3	4.3	7.3
	flumioxazin	51	WDG	0.032	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
11	Untreated Handweeded						1.0	2.3	1.0	1.0	7.3
LSD (P=.05)							0.51	2.70	2.46	0.75	1.67
Standard Deviation							0.30	1.58	1.44	0.44	0.98
CV							27.64	20.58	22.18	30.92	11.61

Weed Control in Celery - Schreur Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CELERY 28/Jun/13 RATING 1-10	COGR 28/Jun/13 RATING 1-10	PESW 28/Jun/13 RATING 1-10	CELERY 9/Jul/13 COUNT #/10 ft	CELERY 9/Jul/13 WEIGHT KG/10 ft
1	prometryn	4	L	2	lb ai/a	POT	1.3	9.0	9.3	30.7	41.263
	prometryn	4	L	2	lb ai/a	PO1					
2	prometryn	4	L	2	lb ai/a	POT	1.0	7.7	10.0	32.7	35.897
	linuron	50	DF	2	lb ai/a	PO1					
3	flumioxazin	51	WDG	0.096	lb ai/a	POT	1.3	10.0	10.0	34.0	43.047
	prometryn	4	L	2	lb ai/a	PO1					
4	s-metolachlor	7.62	EC	1.9	lb ai/a	POT	1.0	9.3	10.0	33.3	40.260
	prometryn	4	L	2	lb ai/a	PO1					
5	pendimethalin	3.8	CS	1.9	lb ai/a	POT	1.0	8.7	10.0	34.7	42.523
	prometryn	4	L	2	lb ai/a	PO1					
6	pyroxasulfone	85	WDG	0.2	lb ai/a	POT	1.0	10.0	10.0	33.7	40.280
	prometryn	4	L	2	lb ai/a	PO1					
7	pyroxasulfone	85	WDG	0.2	lb ai/a	POT	1.3	9.3	6.0	35.0	39.610
	flumioazin	51	WDG	0.096	lb ai/a	POT					
8	sulfentrazone	4	F	0.25	lb ai/a	POT	2.0	10.0	8.3	33.7	37.120
	prometryn	4	L	2	lb ai/a	PO1					
9	acetochlor	3	CS	1.5	lb ai/a	POT	1.0	9.3	10.0	32.7	38.980
	prometryn	4	L	2	lb ai/a	PO1					
10	pendimethalin	3.8	CS	1.9	lb ai/a	POT	2.0	6.3	7.3	33.0	34.287
	flumioxazin	51	WDG	0.032	lb ai/a	PO1					
	clethodim	.97	EC	.12	lb ai/a	PO1					
11	Untreated Handweeded						1.0	7.3	1.0	32.3	35.507
LSD (P=.05)							0.87	3.88	2.95	3.13	5.4562
Standard Deviation							0.51	2.28	1.73	1.84	3.2035
CV							40.34	25.85	20.74	5.52	8.22

Weed Control in Celery - Cnossen Farms - 2013

Project Code: 113-13-2 **Location: Wayland, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Celery **Variety: 266**
Planting Method: Transplant **Planting Date: 6/21/13** **Harvest date: 9/9/13**
Spacing: 6 in **Row Spacing: 20 in, 2 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 3.3 ft wide x 40 ft long

Soil Type: Houghton Muck **OM: 61.4%** **pH: 6.6**
Sand: 19% **Silt: 19%** **Clay: 1%** **CEC:**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
POT	6/26/13	12:30 pm	77/72	F	Damp	2-3 NE	76	60% Cloudy	N
PO1	7/18/13	11:00 am	92/80	F	Dry	2-3 SW	56	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/26	CELERY	3-4″	2-3 leaves	10%
6/26	COPU = common purslane		Cotyledon	Many
7/18	CELERY			20%
7/18	COPU = common purslane	2-4″		Many
7/18	LATH = ladysthumb	3-4″		Few
7/18	RRPW = redroot pigweed	4-6″		Few
	FAPA = fall panicum			
	COLQ = common lambsquarters			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. 9/9/13 Harvest 10 ft. of 2 rows.

Weed Control in Celery - Cnossen Farms - 2013

Weed Control in Celery - Cnossen - 2013

Trial ID: 113-13-2
Protocol ID: 113-13-2
Study Director: Colin Phillippo
Location: Wayland
Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CELERY 18/Jul/13 RATING 1-10	COPU 18/Jul/13 RATING 1-10	LATH 18/Jul/13 RATING 1-10	RRPW 18/Jul/13 RATING 1-10	CELERY 26/Jul/13 RATING 1-10
1	prometryn	4	L	2	lb ai/a	POT	1.3	6.7	10.0	10.0	1.3
	prometryn	4	L	2	lb ai/a	PO1					
2	linuron	50	DF	1	lb ai/a	POT	1.3	7.3	10.0	10.0	2.0
	linuron	50	DF	1	lb ai/a	PO1					
3	flumioxazin	51	WDG	0.096	lb ai/a	POT	1.7	8.7	9.0	10.0	1.0
4	flumioxazin	51	WDG	0.192	lb ai/a	POT	2.3	9.3	10.0	10.0	1.0
5	pendimethalin	3.8	CS	1.9	lb ai/a	POT	1.0	10.0	9.7	8.0	1.0
6	pendimethalin	3.8	CS	3.8	lb ai/a	POT	1.7	10.0	9.7	10.0	1.7
7	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	1.3	8.7	9.3	10.0	1.7
8	pyroxasulfone	85	WDG	0.2	lb ai/a	POT	1.0	9.3	10.0	10.0	1.3
9	pyroxasulfone	85	WDG	0.4	lb ai/a	POT	1.3	9.7	10.0	10.0	1.3
10	sulfentrazone	4	F	0.25	lb ai/a	POT	2.3	9.0	9.7	10.0	2.7
11	s-metolachlor	7.62	EC	1.9	lb ai/a	POT	1.7	7.7	10.0	10.0	1.7
12	Untreated Handweeded						1.0	1.0	1.0	1.0	1.0
LSD (P=.05)							1.13	1.52	0.75	0.49	0.76
Standard Deviation							0.67	0.89	0.44	0.29	0.45
CV							44.57	11.03	4.88	3.18	30.53

Weed Control in Celery - Cnossen Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COPU 26/Jul/13 RATING 1-10	RRPW 26/Jul/13 RATING 1-10	CELERY 22/Aug/13 RATING 1-10	FAPA 22/Aug/13 RATING 1-10	COPU 22/Aug/13 RATING 1-10
1	prometryn	4	L	2	lb ai/a	POT	4.0	9.3	1.0	7.3	4.0
	prometryn	4	L	2	lb ai/a	PO1					
2	linuron	50	DF	1	lb ai/a	POT	3.3	10.0	2.0	9.3	3.3
	linuron	50	DF	1	lb ai/a	PO1					
3	flumioxazin	51	WDG	0.096	lb ai/a	POT	7.0	5.7	1.0	6.7	6.0
4	flumioxazin	51	WDG	0.192	lb ai/a	POT	8.0	9.7	1.3	9.0	6.0
5	pendimethalin	3.8	CS	1.9	lb ai/a	POT	10.0	3.7	1.0	8.3	9.3
6	pendimethalin	3.8	CS	3.8	lb ai/a	POT	10.0	9.7	1.3	5.3	9.3
7	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	7.0	9.0	1.3	9.0	6.7
8	pyroxasulfone	85	WDG	0.2	lb ai/a	POT	8.7	10.0	1.3	10.0	8.0
9	pyroxasulfone	85	WDG	0.4	lb ai/a	POT	9.3	10.0	1.7	10.0	9.7
10	sulfentrazone	4	F	0.25	lb ai/a	POT	8.0	10.0	2.0	9.3	8.7
11	s-metolachlor	7.62	EC	1.9	lb ai/a	POT	4.0	9.0	1.0	9.0	6.3
12	Untreated Handweeded						1.7	3.3	1.7	6.0	3.0
LSD (P=.05)							3.11	3.15	0.83	3.50	3.91
Standard Deviation							1.84	1.86	0.49	2.06	2.31
CV							27.2	22.49	35.27	24.94	34.46

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RRPW 22/Aug/13 RATING 1-10	COLQ 22/Aug/13 RATING 1-10	LATH 22/Aug/13 RATING 1-10	CELERY 9/Sep/13 Harvest #/10FT	CELERY 9/Sep/13 Harvest KG/10FT
1	prometryn	4	L	2	lb ai/a	POT	5.7	10.0	10.0	30.7	26.65
	prometryn	4	L	2	lb ai/a	PO1					
2	linuron	50	DF	1	lb ai/a	POT	9.3	10.0	10.0	29.3	25.83
	linuron	50	DF	1	lb ai/a	PO1					
3	flumioxazin	51	WDG	0.096	lb ai/a	POT	8.7	7.7	6.0	33.0	30.47
4	flumioxazin	51	WDG	0.192	lb ai/a	POT	10.0	9.7	8.3	31.3	28.78
5	pendimethalin	3.8	CS	1.9	lb ai/a	POT	6.3	10.0	8.0	30.7	31.21
6	pendimethalin	3.8	CS	3.8	lb ai/a	POT	8.3	10.0	9.7	33.3	33.00
7	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	9.0	10.0	6.7	32.7	31.35
8	pyroxasulfone	85	WDG	0.2	lb ai/a	POT	9.7	9.7	6.0	29.7	26.54
9	pyroxasulfone	85	WDG	0.4	lb ai/a	POT	10.0	10.0	8.3	32.7	32.79
10	sulfentrazone	4	F	0.25	lb ai/a	POT	10.0	9.3	6.7	30.7	31.22
11	s-metolachlor	7.62	EC	1.9	lb ai/a	POT	8.0	10.0	6.0	31.7	28.88
12	Untreated Handweeded						5.3	10.0	4.0	31.7	28.03
LSD (P=.05)							3.00	1.40	4.31	3.07	5.412
Standard Deviation							1.77	0.82	2.55	1.81	3.196
CV							21.17	8.5	34.07	5.76	10.81

Weed Control in Sweet Corn - HTRC - 2013

Project Code: 106-13-2 **Location: East Lansing, MI**
Block 138

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Sweet Corn **Variety: GSS 0922, Providence**
Planting Method: Seeded **Planting Date: 6/19/13**
Spacing: 10 in **Row Spacing: 28 in**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.5%** **pH: 6.6**
Sand: 58% **Silt: 26%** **Clay: 16%** **CEC: 5.3**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/20/13	3:45 pm	86/74	F	Dry	4-6 NW	23	5% Cloudy	N
PO1-A	7/22/13	4:00 pm	86/74	F	Damp	4-6 SW	54	10% Cloudy	N
PO1-B	7/26/13	1:15 pm	81/74	F	Dry	6-8 S	54	80% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/20	SWCO = sweet corn		Pre-emergence	
6/20	No weeds			
7/22	BYGR = barnyard grass			
7/22	GRFT = green foxtail			
7/22	COLQ = common lambsquarters			
7/22	COPU = common purslane			
7/22	RRPW = redroot pigweed			

Notes and Comments
1. GSS 0922 (se, a Bt/LL hybrid) was planted in the South row. Providence (se) was planted in the North row. Both varieties are bicolor.
2. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
3. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
4. Treatment 17 and 19 (PO1-B) were applied later than PO1-A because the chemicals were not available at that time.
5. Anthem ATZ = atrazine + pyroxasulfone + fluthiacet-methyl
   Anthem = pyroxasulfone + fluthiacet-methyl.

Weed Control in Sweet Corn - HTRC - 2013

Weed Control in Sweet Corn - HTRC - 2013

Trial ID: 106-13-2 Location: HTRC, block 138
Protocol ID: 106-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GSS 0922 19/Jul/13 RATING 1-10	PROVIDEN 19/Jul/13 RATING 1-10	BYGR 19/Jul/13 RATING 1-10	GRFT 19/Jul/13 RATING 1-10	COLQ 19/Jul/13 RATING 1-10
1	atrazine	4	F	2	lb ai/a	PRE	1.7	1.0	10.0	9.7	10.0
2	dimethenamid-p	6	EC	.98	lb ai/a	PRE	1.7	1.0	9.0	9.0	6.3
3	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	2.3	1.3	10.0	10.0	7.7
4	acetochlor	6.4	EC	2	lb ai/a	PRE	1.7	1.0	10.0	10.0	9.7
5	pyroxasulfone	85	WDG	0.21	lb ai/a	PRE	2.7	1.3	10.0	10.0	10.0
6	mesotrione	4	SC	.24	lb ai/a	PRE	1.3	1.0	5.7	6.3	4.0
7	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	1.7	1.3	9.7	10.0	9.7
8	Anthem ATZ	4.5	SE	1.12	lb ai/a	PRE	2.3	1.7	10.0	10.0	10.0
9	Anthem	2.15	SE	0.13	lb ai/a	PRE	1.7	1.3	9.7	10.0	3.3
	atrazine	4	F	1	lb ai/a	PO1-A					
	COC	100	SL	1	% v/v	PO1-A					
10	s-metolachlor	7.64	EC	1.2	lb ai/a	PRE	1.0	1.0	10.0	10.0	7.0
	fluthiacet	.91	EC	.0043	lb ai/a	PO1-A					
	COC	100	SL	1	% v/v	PO1-A					
11	atrazine	4	F	0.5	lb ai/a	PRE	1.7	1.0	7.7	7.3	10.0
	halosulfuron	75	WG	0.023	lb ai/a	PO1-A					
12	atrazine	4	F	0.5	lb ai/a	PRE	1.3	1.0	6.0	6.3	10.0
	atrazine	4	F	1	lb ai/a	PO1-A					
13	atrazine	4	F	0.5	lb ai/a	PRE	1.7	1.0	7.7	8.3	10.0
	nicosulfuron	75	WDG	.031	lb ai/a	PO1-A					
14	atrazine	4	F	0.5	lb ai/a	PRE	1.3	1.0	8.0	8.0	10.0
	mesotrione	4	SC	0.09	lb ai/a	PO1-A					
15	atrazine	4	F	0.5	lb ai/a	PRE	2.0	1.0	8.7	8.0	10.0
	glufosinate	2.34	L	.37	lb ai/a	PO1-A					
16	atrazine	4	F	0.5	lb ai/a	PRE	1.7	1.0	6.7	8.3	10.0
	tembotrione	3.5	SC	.082	lb ai/a	PO1-A					
17	atrazine	4	F	0.5	lb ai/a	PRE	1.7	1.0	5.7	5.3	10.0
	topramezone	2.8	L	0.0164	lb ai/a	PO1-B					
18	atrazine	4	F	0.5	lb ai/a	PRE	1.7	1.0	9.0	9.0	10.0
	foramsulfuron	35	WDG	.038	lb ai/a	PO1-A					
19	atrazine	4	F	0.5	lb ai/a	PRE	1.0	1.0	7.0	7.3	10.0
	primisulfuron	75	WG	0.036	lb ai/a	PO1-B					
20	Untreated						1.0	1.0	2.3	2.7	1.0
LSD (P=.05)							1.33	0.48	2.59	2.81	2.19
Standard Deviation							0.80	0.29	1.57	1.70	1.33
CV							48.73	26.52	19.31	20.54	15.72

Weed Control in Sweet Corn - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COPU	RRPW	GSS 0922	PROVIDEN	BYGR
Pest Code											
Crop Code											
Rating Date							19/Jul/13	19/Jul/13	4/Aug/13	4/Aug/13	4/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	atrazine	4	F	2	lb ai/a	PRE	10.0	10.0	1.0	1.0	9.7
2	dimethenamid-p	6	EC	.98	lb ai/a	PRE	8.3	9.0	1.0	1.0	10.0
3	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	10.0	10.0	2.0	1.7	10.0
4	acetochlor	6.4	EC	2	lb ai/a	PRE	10.0	10.0	1.7	1.3	10.0
5	pyroxasulfone	85	WDG	0.21	lb ai/a	PRE	10.0	10.0	2.7	1.3	10.0
6	mesotrione	4	SC	.24	lb ai/a	PRE	2.0	7.0	1.3	1.0	3.3
7	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	9.7	9.7	1.0	1.3	10.0
8	Anthem ATZ	4.5	SE	1.12	lb ai/a	PRE	10.0	10.0	2.0	1.3	10.0
9	Anthem	2.15	SE	0.13	lb ai/a	PRE	10.0	10.0	1.7	1.3	9.3
	atrazine	4	F	1	lb ai/a	PO1-A					
	COC	100	SL	1	% v/v	PO1-A					
10	s-metolachlor	7.64	EC	1.2	lb ai/a	PRE	10.0	9.7	4.0	4.0	10.0
	fluthiacet	.91	EC	.0043	lb ai/a	PO1-A					
	COC	100	SL	1	% v/v	PO1-A					
11	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	2.0	1.3	6.3
	halosulfuron	75	WG	0.023	lb ai/a	PO1-A					
12	atrazine	4	F	0.5	lb ai/a	PRE	10.0	9.7	1.0	1.0	4.3
	atrazine	4	F	1	lb ai/a	PO1-A					
13	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	2.0	1.3	8.7
	nicosulfuron	75	WDG	.031	lb ai/a	PO1-A					
14	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	1.3	1.3	7.3
	mesotrione	4	SC	0.09	lb ai/a	PO1-A					
15	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	2.0	10.0	9.7
	glufosinate	2.34	L	.37	lb ai/a	PO1-A					
16	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	1.7	1.0	7.3
	tembotrione	3.5	SC	.082	lb ai/a	PO1-A					
17	atrazine	4	F	0.5	lb ai/a	PRE	9.0	10.0	2.3	1.0	5.0
	topramezone	2.8	L	0.0164	lb ai/a	PO1-B					
18	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	1.7	1.7	8.7
	foramsulfuron	35	WDG	.038	lb ai/a	PO1-A					
19	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	1.3	1.3	6.7
	primisulfuron	75	WG	0.036	lb ai/a	PO1-B					
20	Untreated						1.0	1.0	2.3	2.0	9.0
LSD (P=.05)							1.34	1.50	1.21	0.94	1.91
Standard Deviation							0.81	0.91	0.73	0.57	1.16
CV							9.02	9.79	40.67	30.6	14.0

Weed Control in Sweet Corn - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COLQ 4/Aug/13 RATING 1-10	COPU 4/Aug/13 RATING 1-10	GSS 0922 6/Sep/13 HARVEST #/PLOT	GSS 0922 6/Sep/13 HARVEST KG/PLOT	PROVIDEN 12/Sep/13 HARVEST #/PLOT
1	atrazine	4	F	2	lb ai/a	PRE	10.0	10.0	36.7	10.697	62.0
2	dimethenamid-p	6	EC	.98	lb ai/a	PRE	6.0	8.7	35.7	10.453	49.3
3	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	6.7	10.0	31.3	8.023	53.7
4	acetochlor	6.4	EC	2	lb ai/a	PRE	9.3	10.0	46.7	12.173	62.7
5	pyroxasulfone	85	WDG	0.21	lb ai/a	PRE	10.0	10.0	36.0	9.630	57.3
6	mesotrione	4	SC	.24	lb ai/a	PRE	3.7	1.0	31.0	7.367	49.3
7	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	9.0	10.0	40.0	10.947	55.7
8	Anthem ATZ	4.5	SE	1.12	lb ai/a	PRE	10.0	10.0	42.7	11.347	54.0
9	Anthem	2.15	SE	0.13	lb ai/a	PRE	8.7	7.0	36.3	9.393	56.0
	atrazine	4	F	1	lb ai/a	PO1-A					
	COC	100	SL	1	% v/v	PO1-A					
10	s-metolachlor	7.64	EC	1.2	lb ai/a	PRE	9.7	10.0	38.3	9.450	44.0
	fluthiacet	.91	EC	.0043	lb ai/a	PO1-A					
	COC	100	SL	1	% v/v	PO1-A					
11	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	41.0	11.017	61.7
	halosulfuron	75	WG	0.023	lb ai/a	PO1-A					
12	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	40.0	10.077	62.3
	atrazine	4	F	1	lb ai/a	PO1-A					
13	atrazine	4	F	0.5	lb ai/a	PRE	9.7	9.7	40.3	9.990	60.3
	nicosulfuron	75	WDG	.031	lb ai/a	PO1-A					
14	atrazine	4	F	0.5	lb ai/a	PRE	9.3	10.0	41.7	10.937	61.0
	mesotrione	4	SC	0.09	lb ai/a	PO1-A					
15	atrazine	4	F	0.5	lb ai/a	PRE	10.0	9.7	46.3	11.673	0.3
	glufosinate	2.34	L	.37	lb ai/a	PO1-A					
16	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	37.3	9.373	62.3
	tembotrione	3.5	SC	.082	lb ai/a	PO1-A					
17	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	37.7	9.867	56.0
	topramezone	2.8	L	0.0164	lb ai/a	PO1-B					
18	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	45.0	10.317	60.7
	foramsulfuron	35	WDG	.038	lb ai/a	PO1-A					
19	atrazine	4	F	0.5	lb ai/a	PRE	10.0	10.0	37.7	9.737	55.0
	primisulfuron	75	WG	0.036	lb ai/a	PO1-B					
20	Untreated						3.7	7.3	27.3	6.880	41.7
LSD (P=.05)							2.27	2.20	13.03	3.4514	9.55
Standard Deviation							1.37	1.34	7.90	2.0916	5.79
CV							15.63	14.58	20.54	20.98	10.86

Weed Control in Sweet Corn - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	
Pest Code							
Crop Code							PROVIDEN
Rating Date							12/Sep/13
Rating Type							HARVEST
Rating Unit							KG/PLOT
1	atrazine	4	F	2	lb ai/a	PRE	19.663
2	dimethenamid-p	6	EC	.98	lb ai/a	PRE	14.647
3	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	15.380
4	acetochlor	6.4	EC	2	lb ai/a	PRE	20.420
5	pyroxasulfone	85	WDG	0.21	lb ai/a	PRE	16.070
6	mesotrione	4	SC	.24	lb ai/a	PRE	13.230
7	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	17.327
8	Anthem ATZ	4.5	SE	1.12	lb ai/a	PRE	16.010
9	Anthem	2.15	SE	0.13	lb ai/a	PRE	16.007
	atrazine	4	F	1	lb ai/a	PO1-A	
	COC	100	SL	1	% v/v	PO1-A	
10	s-metolachlor	7.64	EC	1.2	lb ai/a	PRE	13.563
	fluthiacet	.91	EC	.0043	lb ai/a	PO1-A	
	COC	100	SL	1	% v/v	PO1-A	
11	atrazine	4	F	0.5	lb ai/a	PRE	18.013
	halosulfuron	75	WG	0.023	lb ai/a	PO1-A	
12	atrazine	4	F	0.5	lb ai/a	PRE	17.533
	atrazine	4	F	1	lb ai/a	PO1-A	
13	atrazine	4	F	0.5	lb ai/a	PRE	17.827
	nicosulfuron	75	WDG	.031	lb ai/a	PO1-A	
14	atrazine	4	F	0.5	lb ai/a	PRE	18.533
	mesotrione	4	SC	0.09	lb ai/a	PO1-A	
15	atrazine	4	F	0.5	lb ai/a	PRE	0.103
	glufosinate	2.34	L	.37	lb ai/a	PO1-A	
16	atrazine	4	F	0.5	lb ai/a	PRE	18.393
	tembotrione	3.5	SC	.082	lb ai/a	PO1-A	
17	atrazine	4	F	0.5	lb ai/a	PRE	17.323
	topramezone	2.8	L	0.0164	lb ai/a	PO1-B	
18	atrazine	4	F	0.5	lb ai/a	PRE	16.673
	foramsulfuron	35	WDG	.038	lb ai/a	PO1-A	
19	atrazine	4	F	0.5	lb ai/a	PRE	16.863
	primisulfuron	75	WG	0.036	lb ai/a	PO1-B	
20	Untreated						11.087
LSD (P=.05)							3.0554
Standard Deviation							1.8516
CV							11.77

Weed Control in Pickling Cucumber – HTRC - 2013

Project Code: 108-13-1 **Location: East Lansing, MI**
Block 70-79

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Cucumber **Variety: Vlaspik**
Planting Method: Seeded **Planting Date: 6/4/13** **Harvest Date:7/25/13**
Spacing: 3 in **Row Spacing: 14 in, 3 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 16 ft wide x 50 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.6%** **pH: 5.9**
Sand: 56% **Silt: 26%** **Clay: 18%** **CEC: 7.4**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/5/13	11:00 am	63/78	F	Dry	4-6 NE	20	60% Cloudy	N
PO1	6/11/13	5:00 pm	82/78	F	Moist	2-6 SW	50	50% Cloudy	N
PO2	6/25/13	11:45 am	72/73	F	Wet	5-7 SW	82	100% Cloudy	Y
PO3	7/4/13	8:30 am	69/63	F	Damp	4-5 SW	79	20% Cloudy	Y
PO4	7/11/13	10:10 am	76/68	F	Wet	2-4 NW	47	5% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/5	CUCUMBER		Pre-emergence	
6/5	No weeds			
7/4	CUCUMBER	6-8″	4-6 leaves	Good
7/4	No weeds			
7/11	CUCUMBER		Flowering	
7/11	BYGR = barnyardgrass	6-8″		Many
7/11	COPU = common purslane	3-6″		Few
7/11	CORW = common ragweed	10-24″		Moderate
7/11	RRPW = redroot pigweed	10-24″		Moderate
7/11	COLQ = common lambsquarters	10-12″		Few

PO1 – 44 day PHI
PO2 – 30 day PHI
PO3 – 21 day PHI
PO4 – 14 day PHI
Harvest – 51 days after planting

Notes and Comments
1. Spray applied with 12 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 tractor sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Weed Control in Pickling Cucumber – HTRC - 2013

Weed Control in Pickling Cucumber - HTRC - 2013

Trial ID: 108-13-1 Location: HTRC, block 70, 79
Protocol ID: 108-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CUKE 24/Jun/13 RATING 1-10	BYGR 24/Jun/13 RATING 1-10	CORW 24/Jun/13 RATING 1-10	RRPW 24/Jun/13 RATING 1-10	CUKE 16/Jul/13 RATING 1-10
1	ethalfluralin	3	EC	1.13	lb ai/a	PRE	1.3	9.0	7.7	8.7	1.3
2	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.0	10.0	9.3	10.0	1.3
	clomazone	3	ME	0.25	lb ai/a	PRE					
3	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.0	10.0	9.0	9.3	1.7
	clomazone	3	ME	0.375	lb ai/a	PRE					
4	Strategy	2.1	SE	6	pt/a	PRE	2.0	10.0	10.0	10.0	2.3
5	ethalfluralin	3	EC	0.75	lb ai/a	PRE	2.7	10.0	10.0	10.0	2.3
	clomazone	3	ME	0.375	lb ai/a	PRE					
	halosulfuron	75	WG	0.023	lb ai/a	PRE					
6	ethalfluralin	3	EC	0.75	lb ai/a	PRE	4.0	10.0	10.0	10.0	4.0
	clomazone	3	ME	0.25	lb ai/a	PRE					
	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE					
7	ethalfluralin	3	EC	0.75	lb ai/a	PRE	5.7	10.0	10.0	10.0	4.0
	clomazone	3	ME	0.25	lb ai/a	PRE					
	s-metolachlor	7.62	EC	.64	lb ai/a	PRE					
8	clomazone	3	ME	0.25	lb ai/a	PRE	5.7	10.0	10.0	10.0	4.7
	fomesafen	2	SL	0.25	lb ai/a	PRE					
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	5.0	10.0	10.0	10.0	2.7
	halosulfuron	75	WG	0.023	lb ai/a	PRE					
10	ethalfluralin	3	EC	0.75	lb ai/a	PRE	2.7	10.0	9.7	10.0	2.0
	halosulfuron	75	WG	0.023	lb ai/a	PO2					
11	ethalfluralin	3	EC	0.75	lb ai/a	PRE	4.0	10.0	10.0	10.0	2.0
	clomazone	3	ME	0.25	lb ai/a	PRE					
	clomazone	3	ME	0.375	lb ai/a	PO1					
12	ethalfluralin	3	EC	0.75	lb ai/a	PRE	2.0	10.0	10.0	10.0	1.7
	clomazone	3	ME	0.25	lb ai/a	PRE					
	halosulfuron	75	WG	0.023	lb ai/a	PO3					
13	ethalfluralin	3	EC	0.75	lb ai/a	PRE	2.3	9.7	10.0	10.0	2.0
	clomazone	3	ME	0.25	lb ai/a	PRE					
	halosulfuron	75	WG	0.023	lb ai/a	PO4					
14	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	9.7	10.0	9.7	10.0	9.3
15	Handweeded Check						1.0	5.3	6.0	7.7	1.3
LSD (P=.05)							1.18	1.22	1.41	0.81	1.67
Standard Deviation							0.70	0.73	0.84	0.49	1.00
CV							21.11	7.61	8.93	5.01	35.13

Weed Control in Pickling Cucumber – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BYGR	LACG	CORW	CUKE	CUKE
Pest Code							BYGR	LACG	CORW		
Crop Code										CUKE	CUKE
Rating Date							16/Jul/13	16/Jul/13	16/Jul/13	25/Jul/13	25/Jul/13
Rating Type							RATING	RATING	RATING	PLT WT/50FT	FRU WT/50FT
Rating Unit							1-10	1-10	1-10	KG	KG
1	ethalfluralin	3	EC	1.13	lb ai/a	PRE	9.7	10.0	3.3	28.937	51.903
2	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.7	9.7	5.7	36.120	69.667
	clomazone	3	ME	0.25	lb ai/a	PRE					
3	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.0	9.0	5.0	29.953	45.527
	clomazone	3	ME	0.375	lb ai/a	PRE					
4	Strategy	2.1	SE	6	pt/a	PRE	10.0	10.0	8.7	29.397	60.610
5	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.7	10.0	10.0	29.040	51.063
	clomazone	3	ME	0.375	lb ai/a	PRE					
	halosulfuron	75	WG	0.023	lb ai/a	PRE					
6	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.0	10.0	7.0	28.977	56.037
	clomazone	3	ME	0.25	lb ai/a	PRE					
	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE					
7	ethalfluralin	3	EC	0.75	lb ai/a	PRE	10.0	10.0	8.3	21.300	39.770
	clomazone	3	ME	0.25	lb ai/a	PRE					
	s-metolachlor	7.62	EC	.64	lb ai/a	PRE					
8	clomazone	3	ME	0.25	lb ai/a	PRE	7.7	9.7	9.3	22.133	40.253
	fomesafen	2	SL	0.25	lb ai/a	PRE					
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	9.3	10.0	9.0	33.753	67.413
	halosulfuron	75	WG	0.023	lb ai/a	PRE					
10	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.7	10.0	9.7	35.200	69.823
	halosulfuron	75	WG	0.023	lb ai/a	PO2					
11	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.3	10.0	9.7	41.670	70.257
	clomazone	3	ME	0.25	lb ai/a	PRE					
	clomazone	3	ME	0.375	lb ai/a	PO1					
12	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.0	9.7	10.0	43.120	86.767
	clomazone	3	ME	0.25	lb ai/a	PRE					
	halosulfuron	75	WG	0.023	lb ai/a	PO3					
13	ethalfluralin	3	EC	0.75	lb ai/a	PRE	9.7	10.0	10.0	34.463	71.380
	clomazone	3	ME	0.25	lb ai/a	PRE					
	halosulfuron	75	WG	0.023	lb ai/a	PO4					
14	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	5.3	7.0	5.7	1.827	2.120
15	Handweeded Check						4.0	10.0	2.0	34.550	52.677
LSD (P=.05)							3.56	1.82	2.68	15.6708	36.6784
Standard Deviation							2.13	1.09	1.60	9.3715	21.9344
CV							24.39	11.24	21.24	31.21	39.39

Weed Control in Pickling Cucumber – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CUKE 25/Jul/13 #1/50FT KG	CUKE 25/Jul/13 #2/50FT KG	CUKE 25/Jul/13 #3/50FT KG	CUKE 25/Jul/13 #4/50FT KG
1	ethalfluralin	3	EC	1.13	lb ai/a	PRE	0.880	1.980	10.160	38.150
2	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.013	2.120	16.273	47.640
	clomazone	3	ME	0.25	lb ai/a	PRE				
3	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.293	2.300	15.213	25.120
	clomazone	3	ME	0.375	lb ai/a	PRE				
4	Strategy	2.1	SE	6	pt/a	PRE	0.840	2.270	16.693	38.427
5	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.010	3.357	17.123	28.040
	clomazone	3	ME	0.375	lb ai/a	PRE				
	halosulfuron	75	WG	0.023	lb ai/a	PRE				
6	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.057	2.700	19.690	31.860
	clomazone	3	ME	0.25	lb ai/a	PRE				
	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE				
7	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.053	3.203	16.000	10.327
	clomazone	3	ME	0.25	lb ai/a	PRE				
	s-metolachlor	7.62	EC	.64	lb ai/a	PRE				
8	clomazone	3	ME	0.25	lb ai/a	PRE	1.177	4.170	19.760	14.433
	fomesafen	2	SL	0.25	lb ai/a	PRE				
9	s-metolachlor	7.62	EC	0.5	lb ai/a	PRE	1.237	3.527	19.153	40.747
	halosulfuron	75	WG	0.023	lb ai/a	PRE				
10	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.140	2.937	14.737	49.723
	halosulfuron	75	WG	0.023	lb ai/a	PO2				
11	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.197	2.530	21.027	48.107
	clomazone	3	ME	0.25	lb ai/a	PRE				
	clomazone	3	ME	0.375	lb ai/a	PO1				
12	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.377	3.057	21.960	58.130
	clomazone	3	ME	0.25	lb ai/a	PRE				
	halosulfuron	75	WG	0.023	lb ai/a	PO3				
13	ethalfluralin	3	EC	0.75	lb ai/a	PRE	1.107	2.710	22.977	42.517
	clomazone	3	ME	0.25	lb ai/a	PRE				
	halosulfuron	75	WG	0.023	lb ai/a	PO4				
14	pyroxasulfone	85	WDG	0.09	lb ai/a	PRE	0.087	0.113	1.093	0.787
15	Handweeded Check						1.053	3.163	12.377	34.710
LSD (P=.05)							0.3752	1.0641	6.2907	34.5033
Standard Deviation							0.2244	0.6364	3.7620	20.6337
CV							21.68	23.78	23.1	60.84

Weed Control in Basil - Van Drunen Farms - 2013

Project Code: 117-13-3 **Location: Momence, IL**

Personnel: Bernard H. Zandstra, Colin Phillippo, Alan DeYoung
Crop: Basil **Variety: Genovese, Superior, St. Remo, Millita**
Planting Method: Seeded **Planting Date: 6/17/13** **Harvest Date:8/21/13**
Spacing: 2 inch **Row Spacing: 10 inch**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Jasper Loam **OM: 7.8%** **pH: 4.9**
Sand: 24% **Silt: 38%** **Clay: 38%** **CEC: 32.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/19/13	1:30 pm	78/76	F	Dry	2-3 SE	42	0% Cloudy	N
POS	7/13/13	9:00 am	68/74	F	Dry	2-3 NE	80	0% Cloudy	Y

Crop and Weed Information at Application

	Height or Diameter	Growth Stage	Density

BYGR = barnyard grass
GRFT = green foxtail
LACG = large crabgrass
WIGR = witchgrass
COLQ = common lambsquarters
COPU = common purslane
RRPW = redroot pigweed

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. All plots were hand weeded about August 1.

Weed Control in Basil - Van Drunen Farms - 2013

Weed Control in Basil - Van Drunen - 2013

Trial ID: 117-13-3 Location: Momence, IL
Protocol ID: 117-13-3 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code											BYGR	GRFT
Crop Name							BASIL	BASIL	BASIL	BASIL		
Crop Variety							Genovese	Superior	SanRemo	Millita		
Rating Date							23/Jul/13	23/Jul/13	23/Jul/13	23/Jul/13	23/Jul/13	23/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	KFD-163-01	3.2	SC	1	lb ai/a	PRE	10.0	9.7	9.3	9.7	9.7	9.7
2	napropamide XT	50	DF	1	lb ai/a	PRE	1.3	1.3	1.3	1.3	10.0	10.0
3	napropamide XT	50	DF	2	lb ai/a	PRE	1.3	1.0	1.7	1.0	8.0	9.0
4	linuron	50	DF	0.25	lb ai/a	PRE	3.3	3.3	3.0	3.0	6.0	6.0
5	clomazone	3	ME	0.5	lb ai/a	PRE	7.3	7.3	6.3	7.3	8.7	10.0
6	halosulfuron	75	WG	0.023	lb ai/a	PRE	4.3	4.0	4.0	4.0	4.7	4.7
7	halosulfuron	75	WG	.047	lb ai/a	PRE	6.0	6.0	6.3	6.0	6.0	5.3
8	halosulfuron	75	WG	0.023	lb ai/a	POS	2.7	2.7	2.7	2.7	5.7	2.7
9	carfentrazone	2	EC	0.1	lb ai/a	PRE	3.0	3.0	3.0	3.7	2.7	4.7
10	Untreated						4.0	4.0	4.7	5.0	8.0	7.0
LSD (P=.05)							2.49	2.55	2.86	2.87	4.57	4.07
Standard Deviation							1.45	1.49	1.67	1.67	2.67	2.37
CV							33.5	35.15	39.45	38.35	38.44	34.35

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code							LACG	WIGR	COLQ	COPU	RRPW	
Crop Name												BASIL
Crop Variety												Genovese
Rating Date							23/Jul/13	23/Jul/13	23/Jul/13	23/Jul/13	23/Jul/13	21/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	KFD-163-01	3.2	SC	1	lb ai/a	PRE	10.0	8.0	9.3	9.7	8.7	9.7
2	napropamide XT	50	DF	1	lb ai/a	PRE	10.0	7.7	8.3	6.7	2.0	1.0
3	napropamide XT	50	DF	2	lb ai/a	PRE	9.0	9.3	6.7	6.3	2.3	1.0
4	linuron	50	DF	0.25	lb ai/a	PRE	7.0	6.3	10.0	9.0	7.3	1.7
5	clomazone	3	ME	0.5	lb ai/a	PRE	10.0	10.0	10.0	10.0	8.3	4.3
6	halosulfuron	75	WG	0.023	lb ai/a	PRE	4.7	2.3	10.0	7.0	3.7	2.0
7	halosulfuron	75	WG	.047	lb ai/a	PRE	5.3	3.7	10.0	9.0	3.7	3.7
8	halosulfuron	75	WG	0.023	lb ai/a	POS	3.7	3.3	7.7	3.7	5.3	2.3
9	carfentrazone	2	EC	0.1	lb ai/a	PRE	5.7	4.3	8.7	9.3	9.3	2.0
10	Untreated						7.0	3.3	5.0	5.7	3.3	1.7
LSD (P=.05)							4.01	5.44	2.62	2.91	3.28	1.35
Standard Deviation							2.34	3.17	1.53	1.70	1.91	0.79
CV							32.29	54.4	17.85	22.25	35.41	26.81

Weed Control in Basil - Van Drunen Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BASIL Superior 21/Aug/13 RATING 1-10	BASIL SanRemo 21/Aug/13 RATING 1-10	BASIL Millita 21/Aug/13 RATING 1-10	BASIL Genovese 21/Aug/13 HARVEST KG/PLOT	BASIL Superior 21/Aug/13 HARVEST KG/PLOT
	Pest Code										
	Crop Name						BASIL	BASIL	BASIL	BASIL	BASIL
	Crop Variety						Superior	SanRemo	Millita	Genovese	Superior
	Rating Date						21/Aug/13	21/Aug/13	21/Aug/13	21/Aug/13	21/Aug/13
	Rating Type						RATING	RATING	RATING	HARVEST	HARVEST
	Rating Unit						1-10	1-10	1-10	KG/PLOT	KG/PLOT
1	KFD-163-01	3.2	SC	1	lb ai/a	PRE	9.7	9.0	9.7	0.00	0.02
2	napropamide XT	50	DF	1	lb ai/a	PRE	1.0	1.0	1.3	8.32	6.95
3	napropamide XT	50	DF	2	lb ai/a	PRE	1.0	1.0	1.0	6.36	6.81
4	linuron	50	DF	0.25	lb ai/a	PRE	1.7	1.7	1.7	5.85	5.46
5	clomazone	3	ME	0.5	lb ai/a	PRE	5.3	3.0	6.3	1.27	0.98
6	halosulfuron	75	WG	0.023	lb ai/a	PRE	2.0	1.7	2.0	4.04	4.01
7	halosulfuron	75	WG	.047	lb ai/a	PRE	3.7	4.0	3.7	2.24	2.30
8	halosulfuron	75	WG	0.023	lb ai/a	POS	2.3	2.7	2.3	4.94	5.23
9	carfentrazone	2	EC	0.1	lb ai/a	PRE	2.0	2.0	3.0	3.55	4.19
10	Untreated						2.3	3.0	4.0	4.83	3.79
LSD (P=.05)							1.47	2.01	1.92	2.743	1.858
Standard Deviation							0.86	1.17	1.12	1.599	1.083
CV							27.62	40.31	32.01	38.62	27.26

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BASIL SanRemo 21/Aug/13 HARVEST KG/PLOT	BASIL Millita 21/Aug/13 HARVEST KG/PLOT	BASIL 21/Aug/13 TOTAL KG/PLOT
	Pest Code								
	Crop Name						BASIL	BASIL	BASIL
	Crop Variety						SanRemo	Millita	
	Rating Date						21/Aug/13	21/Aug/13	21/Aug/13
	Rating Type						HARVEST	HARVEST	TOTAL
	Rating Unit						KG/PLOT	KG/PLOT	KG/PLOT
1	KFD-163-01	3.2	SC	1	lb ai/a	PRE	0.19	0.03	0.25
2	napropamide XT	50	DF	1	lb ai/a	PRE	5.81	6.49	27.56
3	napropamide XT	50	DF	2	lb ai/a	PRE	6.03	8.04	27.24
4	linuron	50	DF	0.25	lb ai/a	PRE	6.16	5.94	23.41
5	clomazone	3	ME	0.5	lb ai/a	PRE	2.87	0.43	5.55
6	halosulfuron	75	WG	0.023	lb ai/a	PRE	3.40	2.84	14.29
7	halosulfuron	75	WG	.047	lb ai/a	PRE	1.55	2.30	8.40
8	halosulfuron	75	WG	0.023	lb ai/a	POS	4.05	5.49	19.72
9	carfentrazone	2	EC	0.1	lb ai/a	PRE	4.71	2.68	15.12
10	Untreated						2.44	2.55	13.60
LSD (P=.05)							2.286	3.262	8.559
Standard Deviation							1.333	1.902	4.989
CV							35.81	51.69	32.16

Weed Control in Cilantro, Dill, Fennel, and Parsley - Van Drunen - 2013

Project Code: 117-13-4 **Location: Momence, IL**

Personnel: Bernard H. Zandstra, Colin Phillippo, Alan DeYoung
Crop: Cilantro, Dill, Fennel, Parsley **Variety: See notes**
Planting Method: Seeded **Planting Date: 6/17/13** **Harvest Date: See data**
Spacing: 2 inch **Row Spacing: 10 inch**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Jasper Loam **OM: 7.8%** **pH: 4.9**
Sand: 24% **Silt: 38%** **Clay: 38%** **CEC: 32.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/19/13	11:30 am	75/70	F	Dry	2-3 SE	42	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/19	WIGR = witchgrass			
6/19	COLQ = common lambsquarters			
6/19	COPU = common purslane			
6/19	RRPW = redroot pigweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. All plots hand weeded about August 1.
4. Varieties: Cilantro – Long standing
   Dill – Greensleaves
   Fennel – Zefafino
   Parsley - Lacio

Weed Control in Cilantro, Dill, Fennel, and Parsley - Van Drunen - 2013

Weed Control in Cilantro, Dill, Fennel, and Parsley - Van Drunen - 2013

Trial ID: 117-13-4 Location: Momence, IL
Protocol ID: 117-13-4 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CILANTRO 23/Jul/13 RATING 1-10	DILL 23/Jul/13 RATING 1-10	FENNEL 23/Jul/13 RATING 1-10	PARSLEY 23/Jul/13 RATING 1-10	WIGR 23/Jul/13 RATING 1-10	COLQ 23/Jul/13 RATING 1-10
1	linuron	50	DF	0.25	lb ai/a	PRE	2.3	1.3	5.3	6.7	6.0	7.0
2	linuron	50	DF	0.5	lb ai/a	PRE	1.7	1.7	4.3	3.7	6.0	10.0
3	prometryn	4	L	1	lb ai/a	PRE	2.3	1.7	3.7	5.0	10.0	10.0
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	4.0	8.7	8.7	9.3	10.0	8.3
5	pendimethalin	3.8	CS	0.5	lb ai/a	PRE	1.7	1.3	7.0	5.0	10.0	8.7
6	clomazone	3	ME	0.25	lb ai/a	PRE	2.0	1.7	4.0	5.0	10.0	10.0
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	5.3	9.7	10.0	10.0	10.0	10.0
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	2.7	9.0	9.0	8.7	10.0	10.0
9	bensulide	4	EC	6	lb ai/a	PRE	1.0	1.0	2.7	3.7	10.0	8.3
10	Untreated						1.7	1.0	5.3	5.0	9.3	1.7
LSD (P=.05)							2.78	1.16	3.32	3.17	3.08	3.27
Standard Deviation							1.62	0.68	1.94	1.85	1.80	1.91
CV							65.79	18.32	32.3	29.82	19.69	22.7

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COPU 23/Jul/13 RATING 1-10	RRPW 23/Jul/13 RATING 1-10	DILL 21/Aug/13 RATING 1-10	FENNEL 21/Aug/13 RATING 1-10	CILANTRO 21/Aug/13 RATING 1-10	PARSLEY 21/Aug/13 RATING 1-10
1	linuron	50	DF	0.25	lb ai/a	PRE	5.0	9.3	1.0	2.0	1.0	3.7
2	linuron	50	DF	0.5	lb ai/a	PRE	7.0	10.0	1.0	2.3	1.0	1.0
3	prometryn	4	L	1	lb ai/a	PRE	9.7	10.0	1.0	1.3	1.0	2.0
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	9.0	10.0	7.7	8.7	3.0	9.3
5	pendimethalin	3.8	CS	0.5	lb ai/a	PRE	8.0	8.3	1.7	3.7	1.3	1.0
6	clomazone	3	ME	0.25	lb ai/a	PRE	10.0	10.0	1.0	1.3	1.0	1.3
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	10.0	10.0	9.3	10.0	4.0	9.3
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	9.7	10.0	8.0	9.3	1.7	9.7
9	bensulide	4	EC	6	lb ai/a	PRE	4.3	9.3	1.0	2.3	1.0	1.0
10	Untreated						1.0	2.3	1.0	1.3	1.3	1.7
LSD (P=.05)							2.28	1.69	1.27	2.56	1.80	1.91
Standard Deviation							1.33	0.98	0.74	1.49	1.05	1.12
CV							18.08	11.01	22.74	35.24	64.1	27.89

Weed Control in Cilantro, Dill, Fennel, and Parsley - Van Drunen - 2013

Pest Code										
Crop Name						DILL	CILANTRO	FENNEL	FENNEL	PARSLEY
Rating Date						21/Aug/13	21/Aug/13	26/Sep/13	26/Sep/13	26/Sep/13
Rating Type						HARVEST	HARVEST	HARVEST	HARVEST	HARVEST
Rating Unit						KG/30FT	KG/30FT	#/PLOT	KG/PLOT	KG/PLOT
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage				
1	linuron	50	DF	0.25	lb ai/a	PRE	8.997	16.180	20.3	4.333	2.320
2	linuron	50	DF	0.5	lb ai/a	PRE	12.107	12.567	16.3	3.157	3.263
3	prometryn	4	L	1	lb ai/a	PRE	12.990	18.800	17.0	3.810	5.083
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	0.887	16.357	3.0	0.720	0.420
5	pendimethalin	3.8	CS	0.5	lb ai/a	PRE	10.340	13.960	10.7	1.897	3.653
6	clomazone	3	ME	0.25	lb ai/a	PRE	12.480	17.603	28.7	9.833	3.647
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	0.093	6.880	0.3	0.027	0.347
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	0.600	17.950	0.3	0.017	0.167
9	bensulide	4	EC	6	lb ai/a	PRE	16.380	19.893	20.7	6.300	7.043
10	Untreated						10.817	11.380	10.0	3.443	3.020
LSD (P=.05)							7.0877	10.0940	13.05	3.8139	3.1428
Standard Deviation							4.1317	5.8842	7.61	2.2233	1.8320
CV							48.22	38.82	59.76	66.29	63.25

Weed Control in Lettuce - Van Dyk Farms - 2013

Project Code: 116-13-1 **Location: Imlay City, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Romaine Lettuce **Variety: Sunbelt**
Planting Method: Seeded **Planting Date: 6/19/13** **Harvest Date: 7/24/13**
Spacing: 3 inch **Row Spacing: 1 ft; 2 rows/bed**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 3 ft wide x 30 ft long

Soil Type: Carlisle Muck **OM: 72.1%** **pH: 6.0**
Sand: 18% **Silt: 9%** **Clay: 0.4%** **CEC:**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/4/13	1:00 pm	64/49	F	Damp	3-4 NE	34	10% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/4/13	No weeds present BRLY = barley COPU = common purslane LATH = ladysthumb			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Weed Control in Lettuce - Van Dyk Farms - 2013

Weed Control in Lettuce - Van Dyk - 2013

Trial ID: 116-13-1
Protocol ID: 116-13-1
Study Director: Colin Phillippo
Location: Imlay City
Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	LETTUCE 20/Jun/13 RATING 1-10	BRLY 20/Jun/13 RATING 1-10	COPU 20/Jun/13 RATING 1-10	LETTUCE 17/Jul/13 RATING 1-10	COPU 17/Jul/13 RATING 1-10	LATH 17/Jul/13 RATING 1-10
1	pronamide	3.3	SC	6	lb ai/a	PRE	1.3	8.3	7.7	1.7	4.0	8.3
2	sulfentrazone	4	F	.188	lb ai/a	PRE	2.3	1.7	6.7	1.7	7.0	4.7
3	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	3.0	4.0	6.3	5.0	5.0	2.7
4	pyroxasulfone	85	WDG	0.2	lb ai/a	PRE	8.3	4.0	7.0	6.7	5.0	6.0
5	bicyclopyrone	1.67	SL	0.033	lb ai/a	PRE	7.3	5.3	3.0	7.0	1.3	5.0
6	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	6.7	3.0	5.3	9.3	1.7	5.7
7	bensulide	4	EC	6	lb ai/a	PRE	2.7	4.0	5.3	2.3	2.3	5.7
8	Untreated						2.0	1.0	1.0	2.7	1.7	1.7
LSD (P=.05)							4.01	2.81	2.91	2.04	2.43	4.60
Standard Deviation							2.29	1.60	1.66	1.16	1.39	2.62
CV							54.42	40.89	31.44	25.59	39.62	52.93

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	LETTUCE 24/Jul/13 #/PLOT #	LETTUCE 24/Jul/13 KG/PLOT KG
1	pronamide	3.3	SC	6	lb ai/a	PRE	37.3	27.297
2	sulfentrazone	4	F	.188	lb ai/a	PRE	38.7	24.693
3	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	27.0	16.453
4	pyroxasulfone	85	WDG	0.2	lb ai/a	PRE	18.3	10.360
5	bicyclopyrone	1.67	SL	0.033	lb ai/a	PRE	10.0	5.320
6	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	3.0	1.553
7	bensulide	4	EC	6	lb ai/a	PRE	38.3	21.320
8	Untreated						32.7	21.297
LSD (P=.05)							11.18	6.7781
Standard Deviation							6.38	3.8701
CV							24.87	24.13

Weed Control in Native Spearmint – Irrer Farms - 2013

Project Code: 121-13-1 **Location: St. Johns, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Spearmint **Variety: Row Native Spearmint**
Planting Method: Roots **Planting Date: 2012** **Harvest Date:**
Spacing: Solid row **Row Spacing:**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 50 ft long

Soil Type: Gilford Loam **OM: 3.1%** **pH: 6.5**
Sand: 48% **Silt: 30%** **Clay: 22%** **CEC: 9.4**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/2/13	9:30 am	70/58	F	Damp	4-6 SE	46	10% Cloudy	N
POS	6/12/13	11:00 am	74/66	F	Moist	0-1 E	73	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/2	MINT	4-8″		
5/2	No weeds present			
6/12	PRPW = prostrate pigweed	4-6″	4-8 leaf	Many
6/12	CORW = common ragweed	10-12″	6-12 leaf	Few
6/12	PRKW = prostrate knotweed	3-6″	10-20 leaf	Moderate
6/24	PRPW = prostrate pigweed	6-10″	10-20 leaf	Many

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Weed Control in Native Spearmint – Irrer Farms - 2013

Weed Control in Native Spearmint - Irrer - 2013

Trial ID: 121-13-01 Location: St. Johns
Protocol ID: 121-13-01 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	MINT 24/Jun/13 RATING 1-10	CORW 24/Jun/13 RATING 1-10	PRKW 24/Jun/13 RATING 1-10	PRPW 24/Jun/13 RATING 1-10	MINT 11/Jul/13 RATING 1-10	CORW 11/Jul/13 RATING 1-10
1	terbacil	80	WDG	1	lb/a	PRE	1.3	10.0	10.0	1.7	1.7	10.0
2	terbacil	80	WDG	2	lb/a	PRE	1.7	10.0	10.0	1.7	2.0	10.0
3	flumioxazin	51	WDG	2	oz wt/a	PRE	5.0	7.0	3.0	10.0	6.3	8.0
4	flumioxazin	51	WDG	4	oz wt/a	PRE	8.3	9.7	5.3	10.0	7.3	9.7
5	flumioxazin	51	WDG	2	oz wt/a	PRE	8.3	9.7	3.3	10.0	7.3	9.0
	flumioxazin	51	WDG	2	oz wt/a	POS						
6	flumioxazin	51	WDG	4	oz wt/a	PRE	9.7	9.3	4.3	10.0	9.7	10.0
	flumioxazin	51	WDG	4	oz wt/a	POS						
7	sulfentrazone	4	F	6	oz/a	PRE	1.7	1.7	5.7	7.3	1.3	3.3
8	sulfentrazone	4	F	8	oz/a	PRE	3.0	4.7	7.7	10.0	2.7	4.7
9	sulfentrazone	4	F	6	oz/a	PRE	8.7	6.0	8.3	10.0	6.0	6.0
	sulfentrazone	4	F	4	oz/a	POS						
10	sulfentrazone	4	F	8	oz/a	PRE	7.0	6.0	7.3	10.0	6.0	4.7
	sulfentrazone	4	F	4	oz/a	POS						
11	terbacil	80	WDG	1	lb/a	PRE	2.3	10.0	9.7	4.7	1.0	9.3
	clomazone	3	ME	1.3	pt/a	POS						
12	pyroxasulfone	85	WDG	1	oz wt/a	PRE	2.7	7.3	3.0	7.7	2.0	8.0
13	pyroxasulfone	85	WDG	2	oz wt/a	PRE	3.3	8.0	3.0	7.7	2.7	7.3
14	pyroxasulfone	85	WDG	4	oz wt/a	PRE	4.0	9.0	2.3	10.0	3.7	10.0
LSD (P=.05)							2.10	4.34	3.01	3.36	1.50	4.24
Standard Deviation							1.25	2.59	1.79	2.00	0.89	2.53
CV							26.09	33.44	30.27	25.33	20.92	32.17

Weed Control in Native Spearmint - Irrer Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PRKW	PRPW
Pest Code							PRKW	PRPW
Crop Code								
Rating Date							11/Jul/13	11/Jul/13
Rating Type							RATING	RATING
Rating Unit							1-10	1-10
1	terbacil	80	WDG	1	lb/a	PRE	10.0	1.7
2	terbacil	80	WDG	2	lb/a	PRE	9.3	2.0
3	flumioxazin	51	WDG	2	oz wt/a	PRE	4.0	8.3
4	flumioxazin	51	WDG	4	oz wt/a	PRE	3.7	10.0
5	flumioxazin	51	WDG	2	oz wt/a	PRE	2.7	10.0
	flumioxazin	51	WDG	2	oz wt/a	POS		
6	flumioxazin	51	WDG	4	oz wt/a	PRE	2.0	10.0
	flumioxazin	51	WDG	4	oz wt/a	POS		
7	sulfentrazone	4	F	6	oz/a	PRE	3.3	6.3
8	sulfentrazone	4	F	8	oz/a	PRE	5.3	10.0
9	sulfentrazone	4	F	6	oz/a	PRE	6.0	10.0
	sulfentrazone	4	F	4	oz/a	POS		
10	sulfentrazone	4	F	8	oz/a	PRE	4.3	10.0
	sulfentrazone	4	F	4	oz/a	POS		
11	terbacil	80	WDG	1	lb/a	PRE	9.7	5.3
	clomazone	3	ME	1.3	pt/a	POS		
12	pyroxasulfone	85	WDG	1	oz wt/a	PRE	4.0	5.7
13	pyroxasulfone	85	WDG	2	oz wt/a	PRE	4.0	6.3
14	pyroxasulfone	85	WDG	4	oz wt/a	PRE	3.0	8.7
LSD (P=.05)							3.64	2.87
Standard Deviation							2.17	1.71
CV							42.57	22.95

Preemergence Weed Control in Onion - Muck Soil - Keilen Farms - 2013

Project Code: 112-13-1 **Location: East Lansing, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Onion **Variety: Hamlet**
Planting Method: Seeded **Planting Date: 4/30/13** **Harvest Date: 8/28/13**
Spacing: 1 in **Row Spacing: 10 in; 2 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 3.3 ft wide x 35 ft long

Soil Type: Houghton Muck **OM: 74.1%** **pH: 6.4**
Sand: 13% **Silt: 13%** **Clay: 0.1%** **CEC:**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/2/13	12:30 pm	78/57	F	Damp	3-4 SE	38	40% Cloudy	N
PO1	6/4/13	2:30 pm	71/64	F	Moist	2-3 N	40	15% Cloudy	N
PO2	6/24/13	11:00 am	83/70	F	Dry	7-9 SW	58	70% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/4	ONION	4-6″	2 leaves	
6/4	LATH = ladysthumb	2-4″		Many
6/4	COLQ = common lambsquarters	1-2″		Few
6/4	COPU = common purslane	0.5″		Few

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Preemergence Weed Control in Onion - Muck Soil - Keilen Farms - 2013

Preemergence Weed Control in Onion - Muck Soil - Keilen-2013

Trial ID: 112-13-01 Location: Keilen, East Lansing
Protocol ID: 112-13-01 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ONION 31/May/13 RATING 1-10	LATH 31/May/13 RATING 1-10	ONION 7/Jun/13 RATING 1-10	LATH 7/Jun/13 RATING 1-10	ONION 28/Aug/13 HARVEST KG/PLOT
1	pendimethalin	3.8	CS	1.9	lb ai/a	PRE, PO1	1.0	6.7	1.0	6.3	38.10
2	pendimethalin	3.8	CS	3.8	lb ai/a	PRE, PO1	1.3	7.3	1.3	7.3	37.21
3	pendimethalin	3.8	CS	1.9	lb ai/a	PRE, PO1	1.0	5.0	1.3	5.3	36.16
	flumioxazin	51	WDG	0.032	lb ai/a	PRE, PO1					
4	pendimethalin	3.8	CS	1.9	lb ai/a	PRE, PO1	1.0	4.3	1.0	6.0	40.18
	bromoxynil	2	EC	0.25	lb ai/a	PRE					
	flumioxazin	51	WDG	0.032	lb ai/a	PO1, 2					
5	acetochlor	3	CS	1	lb ai/a	PRE	1.0	3.0	2.0	3.3	41.37
	pendimethalin	3.8	CS	1.9	lb ai/a	PO1, 2					
6	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.7	8.0	3.0	7.7	38.92
	s-metolachlor	7.62	EC	1.3	lb ai/a	PO1					
	dimethenamid-p	6	EC	.98	lb ai/a	PO2					
7	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	1.3	6.7	2.0	6.7	41.91
	flumioxazin	51	WDG	0.032	lb ai/a	PRE					
	flumioxazin	51	WDG	0.064	lb ai/a	PO1					
	dimethenamid-p	6	EC	.98	lb ai/a	PO2					
8	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.0	7.3	1.7	7.3	43.95
	bromoxynil	2	EC	0.25	lb ai/a	PRE					
	pendimethalin	3.8	CS	1.9	lb ai/a	PO1					
	flumioxazin	51	WDG	0.064	lb ai/a	PO1					
	dimethenamid-p	6	EC	.98	lb ai/a	PO2					
9	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.7	8.0	1.7	8.0	35.79
	pyroxasulfone	85	WDG	0.18	lb ai/a	PRE					
	pendimethalin	3.8	CS	1.9	lb ai/a	PO1, 2					
10	pyroxasulfone	85	WDG	.36	lb ai/a	PRE	1.0	3.7	2.7	4.7	27.97
	pendimethalin	3.8	CS	3.8	lb ai/a	PO1, 2					
11	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.0	8.0	1.0	7.3	38.56
	pyroxasulfone	85	WDG	0.18	lb ai/a	PO1, 2					
12	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.3	7.3	1.3	7.0	42.96
	pyroxasulfone	85	WDG	.36	lb ai/a	PO1, 2					
13	pendimethalin	3.8	CS	3.8	lb ai/a	PRE	1.0	7.0	1.3	7.7	40.96
	flumioxazin	51	WDG	0.096	lb ai/a	PO1					
	dimethenamid-p	6	EC	.98	lb ai/a	PO2					
14	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	1.0	1.3	2.0	1.7	34.53
	pendimethalin	3.8	CS	3.8	lb ai/a	PO1, 2					
15	Handweeded Check						1.0	1.0	2.0	9.3	33.60
LSD (P=.05)							0.71	2.70	1.07	2.70	11.593
Standard Deviation							0.42	1.62	0.64	1.61	6.933
CV							36.65	28.64	38.04	25.27	18.18

Postemergence Weed Control in Onion – Muck Soil – Keilen Farms - 2013

Project Code: 112-13-2 **Location: East Lansing, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Onion **Variety: Hamlet**
Planting Method: Seeded **Planting Date: 4/30/13** **Harvest Date:8/29/13**
Spacing: 1 inch **Row Spacing: 10 inch, 2 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 3.3 ft wide x 35 ft long

Soil Type: Houghton Muck **OM: 74.1%** **pH: 6.4**
Sand: 13% **Silt: 13%** **Clay: 0.3%** **CEC:**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PO1	5/30/13	1:00 pm	85/66	F	Moist	5-7 S	60	50% Cloudy	N
PO2	6/4/2013	3:00 pm	70/63	F	Moist	3-5 N	30	15% Cloudy	N
PO3	6/24/2013	2:30 pm	87/72	F	Dry	7-9 S	45	50% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/30	ONION		2 leaves	
5/30	LATH = ladysthumb	3-4″		Many
6/7	ONION	4-6″	2 leaves	
6/7	LATH = ladysthumb			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Postemergence Weed Control in Onion – Muck Soil – Keilen Farms - 2013

Postemergence Weed Control in Onion - Muck Soil - Keilen - 2013

Trial ID: 112-13-2 Location: Keilen, East Lansing
Protocol ID: 112-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ONION 7/Jun/13 RATING 1-10	LATH 7/Jun/13 RATING 1-10	ONION 5/Jul/13 RATING 1-10	ONION 29/Aug/13 HARVEST KG/35FT
1	oxyfluorfen	4	SC	.063	lb ai/a	PO1,2,3	1.0	7.3	2.0	33.68
2	oxyfluorfen	4	SC	0.125	lb ai/a	PO1,2,3	2.3	6.7	3.0	28.90
3	oxyfluorfen	4	SC	0.25	lb ai/a	PO1,2,3	2.3	8.3	2.3	25.35
4	flumioxazin	51	WDG	0.032	lb ai/a	PO1,2,3	1.3	4.7	3.3	28.47
5	bromoxynil	2	EC	.12	lb ai/a	PO2,3	2.3	2.3	4.3	17.54
6	oxyfluorfen	4	SC	0.125	lb ai/a	PO1,2,3	3.0	8.7	2.7	30.42
	flumioxazin	51	WDG	0.032	lb ai/a	PO1,2,3				
7	oxyfluorfen	4	SC	0.125	lb ai/a	PO2,3	1.0	5.0	4.7	26.68
	flumioxazin	51	WDG	0.032	lb ai/a	PO2,3				
8	fluroxypyr	2.8	L	.123	lb ai/a	PO2,3	3.7	4.3	4.7	19.23
9	oxyfluorfen	4	SC	.063	lb ai/a	PO1,2,3	3.7	8.7	4.0	27.78
	fluroxypyr	2.8	L	.123	lb ai/a	PO2,3				
10	fomesafen	2	SL	0.25	lb ai/a	PO2,3	1.0	7.7	1.7	39.67
11	ethofumesate	4	SC	1	lb ai/a	PO2,3	1.0	3.7	3.3	25.14
12	acifluorfen	2	L	0.25	lb ai/a	PO2,3	2.7	6.0	2.3	28.52
13	oxyfluorfen	4	SC	.063	lb ai/a	PO2,3	4.3	7.0	4.7	26.94
	flumioxazin	51	WDG	0.032	lb ai/a	PO2,3				
	fluroxypyr	2.8	L	.123	lb ai/a	PO2,3				
14	Handweeded Check						1.0	9.0	2.0	33.83
LSD (P=.05)							0.97	2.12	2.03	17.325
Standard Deviation							0.58	1.26	1.21	10.320
CV							26.43	19.76	37.59	36.84

Weed Control in Onion on Mineral Soil – Vogel Farms - 2013

Project Code: 112-13-3 **Location: Fremont, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Onion **Variety: Sherman**
Planting Method: Seeded **Planting Date: 4/17/13** **Harvest Date: 8/26/13**
Spacing: 1 in **Row Spacing: 18 in; 3 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 30 ft long

Soil Type: Pipestone Sand **OM: 2.1%** **pH: 6.8**
Sand: 89% **Silt: 6%** **Clay: 5%** **CEC: 5**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/22/13	11:30 am	53/44.8	F	Damp	5-6 S	37	5% Cloudy	N
PO1	5/30/13	10:00 am	82/64	F	Damp	4-6 SW	52	10% Cloudy	N
PO2	6/28/13	10:40 am	73/70	F	Damp	3-5 SW	61	20% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/30	ONION			
5/30	COLQ = common lambsquarters			
5/30	CORW = common ragweed			
5/30	HANS = hairy nightshade			
6/28	ONION			
6/28	No weeds present			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Weed Control in Onion on Mineral Soil – Vogel Farms - 2013

Weed Control in Onion on Mineral Soil - Vogel - 2013

Trial ID: 112-13-3 Location: Vogel, Fremont
Protocol ID: 112-13-3 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ONION 30/May/13 RATING 1-10	COLQ 30/May/13 RATING 1-10	CORW 30/May/13 RATING 1-10	HANS 30/May/13 RATING 1-10	ONION 28/Jun/13 RATING 1-10
1	pendimethalin	3.8	CS	0.75	lb ai/a	PRE,PO1,PO2	1.3	9.0	10.0	6.7	1.7
2	pendimethalin	3.8	CS	.95	lb ai/a	PRE,PO1,PO2	1.3	10.0	9.7	7.3	2.3
3	pendimethalin	3.8	CS	1.5	lb ai/a	PRE,PO1,PO2	2.3	10.0	10.0	8.7	2.7
4	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.0	10.0	8.7	9.0	1.7
	s-metolachlor	7.62	EC	.95	lb ai/a	PO1,PO2					
5	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.3	10.0	8.7	9.0	1.7
	flumioxazin	51	WDG	0.032	lb ai/a	PO1, PO2					
6	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.7	10.0	9.7	8.7	3.3
	pyroxasulfone	85	WDG	0.18	lb ai/a	PO1,PO2					
7	ethofumesate	4	SC	1	lb ai/a	PRE,PO1,PO2	2.0	10.0	8.0	6.7	2.7
8	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.0	10.0	9.0	8.0	2.0
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1,PO2					
	fluazifop-p-butyl	2	EC	0.16	lb ai/a	PO1,PO2					
9	pendimethalin	3.8	CS	1.5	lb ai/a	PRE	2.7	10.0	10.0	9.3	2.7
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1,PO2					
	fluazifop-p-butyl	2	EC	0.16	lb ai/a	PO1,PO2					
10	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.7	10.0	10.0	8.0	2.7
	acetochlor	3	CS	0.5	lb ai/a	PO1,PO2					
11	pendimethalin	3.8	CS	.95	lb ai/a	PRE,PO1,PO2	1.7	10.0	10.0	7.3	2.0
	flumioxazin	51	WDG	0.032	lb ai/a	PO1,PO2					
12	Untreated Check						1.0	1.0	10.0	1.0	1.7
LSD (P=.05)							1.09	0.85	1.63	2.35	1.14
Standard Deviation							0.65	0.50	0.96	1.39	0.67
CV							38.73	5.45	10.14	18.55	29.96

Weed Control in Onion on Mineral Soil – Vogel Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ONION 18/Jul/13 RATING 1-10	ONION 26/Aug/13 HARVEST KG/30FT
	Pest Code							
	Crop Code						ONION	ONION
	Rating Date						18/Jul/13	26/Aug/13
	Rating Type						RATING	HARVEST
	Rating Unit						1-10	KG/30FT
1	pendimethalin	3.8	CS	0.75	lb ai/a	PRE,PO1,PO2	1.7	115.92
2	pendimethalin	3.8	CS	.95	lb ai/a	PRE,PO1,PO2	1.3	113.26
3	pendimethalin	3.8	CS	1.5	lb ai/a	PRE,PO1,PO2	2.7	105.76
4	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.7	114.36
	s-metolachlor	7.62	EC	.95	lb ai/a	PO1,PO2		
5	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.0	105.33
	flumioxazin	51	WDG	0.032	lb ai/a	PO1, PO2		
6	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.3	106.57
	pyroxasulfone	85	WDG	0.18	lb ai/a	PO1,PO2		
7	ethofumesate	4	SC	1	lb ai/a	PRE,PO1,PO2	1.7	107.70
8	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.0	107.72
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1,PO2		
	fluazifop-p-butyl	2	EC	0.16	lb ai/a	PO1,PO2		
9	pendimethalin	3.8	CS	1.5	lb ai/a	PRE	2.7	103.77
	oxyfluorfen	4	SC	0.125	lb ai/a	PO1,PO2		
	fluazifop-p-butyl	2	EC	0.16	lb ai/a	PO1,PO2		
10	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.7	112.42
	acetochlor	3	CS	0.5	lb ai/a	PO1,PO2		
11	pendimethalin	3.8	CS	.95	lb ai/a	PRE,PO1,PO2	2.3	99.78
	flumioxazin	51	WDG	0.032	lb ai/a	PO1,PO2		
12	Untreated Check						1.7	118.81
LSD (P=.05)							1.14	14.955
Standard Deviation							0.67	8.831
CV							34.09	8.08

Preemergence Weed Control in Established Chives - Van Drunen Farms - 2013

Project Code: 117-13-1 **Location: Momence, IL**

Personnel: Bernard H. Zandstra, Colin Phillippo, Alan DeYoung
Crop: Established Chives **Variety: Van Drunen**
Planting Method: Seeded **Planting Date: 2012**
Spacing: Solid row **Row Spacing: 10 inch**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Jasper Loam **OM: 7.8%** **pH: 4.9**
Sand: 24% **Silt: 38%** **Clay: 38%** **CEC: 32.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/19/13	11:00 am	74/70	F	Dry	2-3 SE	47	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/19	CHIVES	10-12″	After 1st cut	Good
6/19	No weeds			
	COLQ = common lambsquarters			
	COPU = common purslane			
	RRPW = redroot pigweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Preemergence Weed Control in Established Chives - Van Drunen Farms - 2013

Preemergence Weed Control in Established Chives - Van Drunen - 2013

Trial ID: 117-13-1
Protocol ID: 117-13-1
Study Director: Colin Phillippo
Location: Momence, IL
Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CHIVES 23/Jul/13 RATING 1-10	COLQ 23/Jul/13 RATING 1-10	COPU 23/Jul/13 RATING 1-10	RRPW 23/Jul/13 RATING 1-10	CHIVES 21/Aug/13 RATING 1-10	CHIVES 23/Jul/13 HARVEST1 KG/PLOT
1	pendimethalin	3.8	CS	.95	lb ai/a	PRE	1.0	9.7	9.7	10.0	1.0	16.010
2	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	1.0	9.7	9.7	9.0	1.0	15.820
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	1.7	9.3	9.7	10.0	1.3	16.097
4	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	1.0	8.7	8.0	9.7	1.7	16.240
5	dimethenamid-p	6	EC	.98	lb ai/a	PRE	1.0	8.3	8.0	8.7	1.0	17.103
6	oxyfluorfen	4	SC	0.5	lb ai/a	PRE	2.0	10.0	10.0	10.0	1.7	15.563
7	pyroxasulfone	85	WDG	0.2	lb ai/a	PRE	1.7	9.3	10.0	10.0	2.0	16.887
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	2.7	9.3	4.3	9.7	2.0	13.003
9	acetochlor	6.4	EC	1	lb ai/a	PRE	1.7	9.0	8.3	9.7	1.3	16.293
10	Untreated						1.3	6.7	7.7	9.7	1.0	14.847
LSD (P=.05)							1.11	2.20	4.46	1.18	1.03	4.2405
Standard Deviation							0.65	1.28	2.60	0.69	0.60	2.4720
CV							43.13	14.23	30.5	7.12	42.81	15.66

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CHIVES 21/Aug/13 HARVEST2 KG/PLOT	CHIVES 26/Sep/13 HARVEST3 KG/PLOT	CHIVES TOTAL KG/PLOT
1	pendimethalin	3.8	CS	.95	lb ai/a	PRE	16.987	14.252	47.248
2	pendimethalin	3.8	CS	1.9	lb ai/a	PRE	16.300	12.222	44.342
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	18.193	13.637	47.927
4	s-metolachlor	7.62	EC	1.9	lb ai/a	PRE	17.753	12.235	46.228
5	dimethenamid-p	6	EC	.98	lb ai/a	PRE	18.540	14.900	50.543
6	oxyfluorfen	4	SC	0.5	lb ai/a	PRE	16.133	12.852	44.548
7	pyroxasulfone	85	WDG	0.2	lb ai/a	PRE	17.307	15.792	49.985
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	14.887	10.163	38.053
9	acetochlor	6.4	EC	1	lb ai/a	PRE	16.033	12.985	45.312
10	Untreated						14.727	11.365	40.938
LSD (P=.05)							4.0748	5.2336	10.8163
Standard Deviation							2.3754	3.0508	6.3052
CV							14.24	23.4	13.85

Preemergence Weed Control in Seeded Chives and Green Onions - Van Drunen Farms - 2013

Project Code: 117-13-2 **Location: Momence, IL**

Personnel: Bernard H. Zandstra, Colin Phillippo, Alan DeYoung
Crop: Chives, Green Onions **Variety: Purley, Tokyo Long White**
Planting Method: Seeded **Planting Date: 6/17/13**
Spacing: 1 inch **Row Spacing: 10 inch**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Jasper Loam **OM: 7.8%** **pH: 4.9**
Sand: 24% **Silt: 38%** **Clay: 38%** **CEC: 32.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/19/13	1:00 pm	81/76	F	Dry	1-2 SE	35	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
7/23	GRFT = green foxtail			
7/23	WIGR = witchgrass			
7/23	COPU = common purslane			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Preemergence Weed Control in Seeded Chives and Green Onions - Van Drunen Farms - 2013

Preemergence Weed Control in Seeded Chives and Green Onions - Van Drunen - 2013

Trial ID: 117-13-2 Location: Momence, IL
Protocol ID: 117-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CHIVES 23/Jul/13 RATING 1-10	GRONION 23/Jul/13 RATING 1-10	GRFT 23/Jul/13 RATING 1-10	WIGR 23/Jul/13 RATING 1-10	COPU 23/Jul/13 RATING 1-10	CHIVES 21/Aug/13 RATING 1-10
1	pendimethalin	3.8	CS	.95	lb ai/a	PRE	3.7	2.7	9.3	7.0	8.3	3.0
2	pendimethalin	3.8	CS	1.43	lb ai/a	PRE	2.0	1.7	10.0	5.7	9.7	2.0
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	9.3	8.7	10.0	10.0	9.7	9.3
4	flumioxazin	51	WDG	.032	lb ai/a	PRE	6.3	4.3	9.7	5.3	10.0	5.7
5	DCPA	75	WP	6	lb ai/a	PRE	4.0	3.0	10.0	7.0	9.7	3.7
6	bicyclopyrone	1.67	SL	0.033	lb ai/a	PRE	7.0	5.7	9.7	9.7	9.3	7.0
7	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	9.0	7.3	10.0	10.0	10.0	8.3
8	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	10.0	9.7	10.0	10.0	10.0	10.0
9	pyroxasulfone	85	WDG	0.2	lb ai/a	PRE	10.0	10.0	10.0	10.0	10.0	10.0
10	Untreated						3.3	3.0	10.0	6.3	1.0	4.3
LSD (P=.05)							3.63	3.90	0.78	5.19	0.89	3.48
Standard Deviation							2.12	2.27	0.46	3.03	0.52	2.03
CV							32.72	40.56	4.62	37.36	5.93	32.03

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRONION 21/Aug/13 RATING 1-10	CHIVES 26/Sep/13 RATING 1-10	GRONION 26/Sep/13 RATING 1-10	CHIVES 26/Sep/13 HARVEST KG/30FT	GRONION 26/Sep/13 HARVEST KG/30FT
1	pendimethalin	3.8	CS	.95	lb ai/a	PRE	2.3	1.7	1.7	0.72	15.48
2	pendimethalin	3.8	CS	1.43	lb ai/a	PRE	1.3	1.3	1.0	1.31	26.51
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	7.0	8.7	5.3	0.03	2.99
4	flumioxazin	51	WDG	.032	lb ai/a	PRE	4.3	5.0	3.3	0.33	16.03
5	DCPA	75	WP	6	lb ai/a	PRE	3.0	3.0	2.0	0.96	16.51
6	bicyclopyrone	1.67	SL	0.033	lb ai/a	PRE	4.0	6.0	3.7	0.11	5.52
7	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	6.3	8.0	6.0	0.02	3.49
8	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	8.7	10.0	8.7	0.00	0.30
9	pyroxasulfone	85	WDG	0.2	lb ai/a	PRE	10.0	10.0	10.0	0.00	0.00
10	Untreated						4.0	2.3	2.7	0.49	6.26
LSD (P=.05)							3.43	3.45	3.88	0.688	11.833
Standard Deviation							2.00	2.01	2.26	0.401	6.898
CV							39.2	35.93	50.98	100.8	74.09

Weed Control in Sweet Banana and Jalapeno Pepper - HTRC - 2013

Project Code: 101-13-1 **Location: East Lansing, MI**
Block 55

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Banana/Jalapeno Pepper Variety: Jalapeno M; Yellow Sweet Banana
Planting Method: Transplant Planting Date: 5/20/13
Spacing: 22 in Row Spacing: 36 in
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 5.5 ft wide x 35 ft long

Soil Type: Marlette Fine Sandy Loam OM: 1.9% pH: 6.2
Sand: 53% Silt: 27% Clay: 20% CEC: 8.6

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRT	5/20/13	1:30 pm	87/72.6	F	Dry	3-4 SE	41	45% Cloudy	N
POT	6/5/13	8:45 pm	58.3/59.3	F	Dry	5-6 W	42	70% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/20	No weeds present			
6/5	No weeds present			
	COPU = common purslane			
	CORW = common ragweed			
	EBNS = eastern black nightshade			
	LATH = ladysthumb			
	RRPW = redroot pigweed			
	BYGR = barnyard grass			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. PRT = pre-transplant; POT = post-transplant

Weed Control in Sweet Banana and Jalapeno Pepper – HTRC - 2013

Weed Control in Sweet Banana and Jalapeno Pepper - HTRC - 2013

Trial ID: 101-13-1 Location: HTRC block 55
Protocol ID: 101-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code									BYGR	CORW	EBNS
Crop Code							BANANA	JALAPENO			
Rating Date							27/Jun/13	27/Jun/13	27/Jun/13	27/Jun/13	27/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	napropamide	50	DF	2	lb ai/a	PRT	2.0	2.0	10.0	8.3	9.3
2	napropamide XT	50	DF	2	lb ai/a	PRT	1.3	1.3	9.7	7.7	9.3
3	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	1.0	1.0	10.0	3.3	8.7
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	1.7	1.7	10.0	6.3	10.0
5	clomazone	3	ME	1	lb ai/a	PRT	1.0	1.0	10.0	9.7	10.0
6	fomesafen	2	SL	.75	lb ai/a	PRT	2.0	2.0	9.7	10.0	10.0
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	3.3	3.3	9.7	8.3	10.0
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	2.3	2.3	8.3	10.0	10.0
9	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	4.7	3.7	9.0	10.0	10.0
10	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	2.7	2.7	10.0	9.0	10.0
11	pendimethalin	3.8	CS	1.4	lb ai/a	POT	1.3	2.0	8.7	6.7	10.0
12	Untreated Handweeded						1.3	1.3	6.0	4.3	4.0
LSD (P=.05)							1.76	1.61	1.87	3.62	2.61
Standard Deviation							1.04	0.95	1.10	2.13	1.54
CV							50.58	46.76	11.94	27.35	16.62

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code							LATH	RRPW			BYGR
Crop Code									BANANA	JALAPENO	
Rating Date							27/Jun/13	27/Jun/13	8/Jul/13	8/Jul/13	8/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	napropamide	50	DF	2	lb ai/a	PRT	10.0	10.0	1.0	1.0	7.3
2	napropamide XT	50	DF	2	lb ai/a	PRT	10.0	10.0	1.7	1.3	9.0
3	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	9.3	9.0	1.0	1.0	8.0
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	10.0	10.0	2.0	2.3	8.7
5	clomazone	3	ME	1	lb ai/a	PRT	10.0	10.0	1.0	1.3	9.7
6	fomesafen	2	SL	.75	lb ai/a	PRT	10.0	10.0	3.3	2.0	9.0
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	10.0	10.0	5.0	4.3	8.3
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	9.7	9.3	2.7	2.7	3.3
9	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	9.7	10.0	5.7	4.3	7.0
10	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	9.3	10.0	3.0	3.3	10.0
11	pendimethalin	3.8	CS	1.4	lb ai/a	POT	10.0	10.0	2.3	2.0	7.7
12	Untreated Handweeded						7.0	4.3	1.0	1.0	3.7
LSD (P=.05)							1.86	2.15	2.49	2.40	3.19
Standard Deviation							1.10	1.27	1.47	1.42	1.89
CV							11.49	13.55	59.51	63.84	24.69

Weed Control in Sweet Banana and Jalapeno Pepper - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COPU 8/Jul/13 RATING 1-10	CORW 8/Jul/13 RATING 1-10	EBNS 8/Jul/13 RATING 1-10	RRPW 8/Jul/13 RATING 1-10	BANANA 19/Jul/13 PLANT #
1	napropamide	50	DF	2	lb ai/a	PRT	6.3	7.0	6.3	9.3	15.3
2	napropamide XT	50	DF	2	lb ai/a	PRT	8.3	5.7	4.7	10.0	16.0
3	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	8.0	2.3	7.3	5.7	17.0
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	6.7	5.3	10.0	6.7	13.7
5	clomazone	3	ME	1	lb ai/a	PRT	10.0	8.7	10.0	9.3	18.0
6	fomesafen	2	SL	.75	lb ai/a	PRT	10.0	9.3	10.0	10.0	8.3
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	8.7	6.3	10.0	8.7	6.3
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	3.3	9.7	10.0	7.0	11.3
9	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	9.0	9.7	10.0	10.0	5.7
10	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	9.7	8.7	10.0	10.0	13.3
11	pendimethalin	3.8	CS	1.4	lb ai/a	POT	9.3	6.0	9.0	9.3	16.0
12	Untreated Handweeded						2.7	5.3	5.3	3.0	12.0
LSD (P=.05)							3.16	2.99	3.41	2.54	4.57
Standard Deviation							1.87	1.77	2.01	1.50	2.70
CV							24.35	25.24	23.55	18.18	21.15

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	JALAPENO 19/Jul/13 PLANT #	BANANA 13/Aug/13 #/PLOT #	BANANA 13/Aug/13 KG/PLOT KG	BANANA 6/Sep/13 HARVEST KG/PLOT	BANANA TOTAL KG/PLOT
1	napropamide	50	DF	2	lb ai/a	PRT	16.0	175.0	4.86	7.86	12.72
2	napropamide XT	50	DF	2	lb ai/a	PRT	16.7	206.3	5.35	7.34	12.69
3	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	14.0	246.0	6.87	8.03	14.90
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	16.7	119.3	3.41	5.56	8.97
5	clomazone	3	ME	1	lb ai/a	PRT	16.3	311.3	8.45	12.30	20.75
6	fomesafen	2	SL	.75	lb ai/a	PRT	16.0	42.7	1.05	2.66	3.71
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	8.3	54.3	1.46	2.17	3.63
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	13.0	98.0	2.80	3.90	6.70
9	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	11.3	108.0	3.01	4.35	7.36
10	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	15.7	135.0	4.50	7.28	11.79
11	pendimethalin	3.8	CS	1.4	lb ai/a	POT	15.0	82.3	2.68	8.24	10.92
12	Untreated Handweeded						14.0	134.7	4.04	4.65	8.70
LSD (P=.05)							5.71	124.33	3.545	4.142	7.249
Standard Deviation							3.37	73.42	2.093	2.446	4.281
CV							23.41	51.43	51.82	39.48	41.82

Weed Control in Sweet Banana and Jalapeno Pepper - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	JALAPENO 22/Aug/13 HARVEST #/PLOT	JALAPENO 22/Aug/13 HARVEST KG/PLOT	JALAPENO 12/Sep/13 HARVEST KG/PLOT	JALAPENO TOTAL KG/PLOT
	Pest Code									
	Crop Code						JALAPENO	JALAPENO	JALAPENO	JALAPENO
	Rating Date						22/Aug/13	22/Aug/13	12/Sep/13	
	Rating Type						HARVEST	HARVEST	HARVEST	TOTAL
	Rating Unit						#/PLOT	KG/PLOT	KG/PLOT	KG/PLOT
1	napropamide	50	DF	2	lb ai/a	PRT	178.0	2.83	6.85	9.67
2	napropamide XT	50	DF	2	lb ai/a	PRT	167.0	2.88	6.85	9.73
3	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	103.0	1.67	4.33	6.00
4	s-metolachlor	7.62	EC	.95	lb ai/a	PRT	121.3	2.29	6.90	9.19
5	clomazone	3	ME	1	lb ai/a	PRT	190.7	3.23	9.85	13.08
6	fomesafen	2	SL	.75	lb ai/a	PRT	183.7	3.25	7.51	10.77
7	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	51.7	0.83	2.45	3.29
8	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	83.3	1.49	4.09	5.59
9	bicyclopyrone	1.67	SL	0.045	lb ai/a	POT	152.3	2.72	6.32	9.04
10	pyroxasulfone	85	WDG	0.1	lb ai/a	POT	143.0	2.69	7.96	10.65
11	pendimethalin	3.8	CS	1.4	lb ai/a	POT	68.0	1.41	7.41	8.83
12	Untreated Handweeded						163.7	3.18	5.41	8.59
LSD (P=.05)							130.08	2.399	3.531	5.457
Standard Deviation							76.82	1.417	2.085	3.223
CV							57.41	59.69	32.95	37.04

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Project Code: 101-13-02 **Location: East Lansing, MI**
Block 55

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Bell Pepper, Tomato **Variety: Pepper – King Arthur; Tomato - Sunbrite**
Planting Method: Transplant **Planting Date: 5/20/2013**
Spacing: 22 in **Row Spacing: 3 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.9%** **pH: 6.2**
Sand: 53% **Silt: 27%** **Clay: 20%** **CEC: 8.6**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PPI	5/20/13	2:21 pm	85/71	F	Dry	5 SE	47	65% Cloudy	N
PRT	5/20/13	2:21 pm	85/71	F	Dry	5 SE	47	65% Cloudy	N
POT	6/5/13	8:41 am	59.5/59.2	F	Dry	4-5 W	45	70% Cloudy	N
PO1	6/27/13	12:00 pm	85/78	F	Moist	0-1 SW	45	50% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/27	PEPPER	6-8″		
6/27	TOMATO	6-10″		
6/27	GRFT = green foxtail	6-8″		Few
6/27	CORW = common ragweed	4-8″		Many
6/27	COPU = common purslane	2-3″		Few
6/27	LATH = ladysthumb	4-6″		Few
	EBNS = eastern black nightshade			
	RRPW = redroot pigweed			
	BYGR = barnyardgrass			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. PRT = pre-transplant; POT = post-transplant; PO1 = post 1.
4. Spartan Charge = carfentrazone + sulfentrazone
   Authority MTZ = sulfentrazone + metribuzin.

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Weed Control in Bell Pepper and Tomato - HTRC - 2013

Trial ID: 101-13-02 Location: HTRC block 55
Protocol ID: 101-13-02 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEPPER 27/Jun/13 RATING 1-10	TOMATO 27/Jun/13 RATING 1-10	GRFT 27/Jun/13 RATING 1-10	CORW 27/Jun/13 RATING 1-10	EBNS 27/Jun/13 RATING 1-10
1	napropamide	50	DF	2	lb ai/a	PRT	1.0	1.3	10.0	8.7	8.7
2	napropamide XT	50	DF	2	lb ai/a	PRT	1.0	1.0	10.0	9.3	9.7
3	sulfentrazone	4	F	.188	lb ai/a	PRT	2.3	2.0	10.0	7.3	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	1.3	1.7	9.0	4.7	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	2.7	2.0	10.0	9.3	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
6	sulfentrazone	4	F	.188	lb ai/a	PPI	2.0	2.3	9.7	5.3	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	1.3	1.3	9.3	6.0	9.7
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	2.3	1.7	10.0	4.0	10.0
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	2.0	2.0	10.0	8.0	10.0
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	3.0	3.0	10.0	9.0	10.0
11	fomesafen	2	SL	0.5	lb ai/a	PRT	2.3	2.3	10.0	10.0	10.0
12	clomazone	3	ME	1	lb ai/a	PRT	1.3	3.7	10.0	10.0	10.0
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	2.7	2.7	9.3	10.0	10.0
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	1.0	1.0	10.0	1.7	10.0
	Matrix	25	SG	0.031	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	1.0	1.0	10.0	4.0	9.7
	halosulfuron	75	WG	0.023	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
16	Untreated Handweeded						1.0	1.0	1.0	1.7	1.0
LSD (P=.05)							0.81	1.01	0.73	3.04	0.77
Standard Deviation							0.49	0.60	0.44	1.83	0.46
CV							27.6	32.23	4.71	26.79	4.96

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	LATH	RRPW	PEPPER	TOMATO	BYGR
Pest Code											
Crop Code									PEPPER	TOMATO	
Rating Date							27/Jun/13	27/Jun/13	8/Jul/13	8/Jul/13	8/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	napropamide	50	DF	2	lb ai/a	PRT	10.0	10.0	1.0	1.0	8.3
2	napropamide XT	50	DF	2	lb ai/a	PRT	10.0	10.0	1.7	1.0	10.0
3	sulfentrazone	4	F	.188	lb ai/a	PRT	10.0	10.0	3.0	2.3	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	8.7	9.7	2.0	2.0	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	10.0	10.0	3.0	2.0	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
6	sulfentrazone	4	F	.188	lb ai/a	PPI	10.0	10.0	3.0	2.7	10.0
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	10.0	10.0	1.3	2.3	8.0
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	10.0	10.0	2.0	2.7	9.3
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	10.0	10.0	2.7	2.0	10.0
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	10.0	10.0	5.3	4.0	10.0
11	fomesafen	2	SL	0.5	lb ai/a	PRT	10.0	10.0	2.0	2.0	9.7
12	clomazone	3	ME	1	lb ai/a	PRT	10.0	10.0	1.3	3.3	9.7
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	7.3	10.0	3.0	2.0	6.0
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	8.3	10.0	1.3	1.0	10.0
	Matrix	25	SG	0.031	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	7.3	9.7	2.0	1.7	10.0
	halosulfuron	75	WG	0.023	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
16	Untreated Handweeded						1.0	1.0	1.0	1.0	5.0
LSD (P=.05)							2.46	0.35	1.42	1.45	2.21
Standard Deviation							1.47	0.21	0.85	0.87	1.32
CV							16.52	2.21	38.27	42.11	14.5

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COPU	CORW	EBNS	LATH	RRPW	PEPPER
Pest Code												
Crop Code												
Rating Date							8/Jul/13	8/Jul/13	8/Jul/13	8/Jul/13	8/Jul/13	19/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	PLANT
Rating Unit							1-10	1-10	1-10	1-10	1-10	# GOOD
1	napropamide	50	DF	2	lb ai/a	PRT	7.0	7.0	5.3	9.7	10.0	16.7
2	napropamide XT	50	DF	2	lb ai/a	PRT	6.3	7.3	7.7	8.7	10.0	17.0
3	sulfentrazone	4	F	.188	lb ai/a	PRT	10.0	8.3	10.0	10.0	10.0	13.7
	metribuzin	75	DF	0.09	lb ai/a	PO1						
	rimsulfuron	25	SG	0.016	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	10.0	6.3	10.0	10.0	10.0	16.3
	metribuzin	75	DF	0.09	lb ai/a	PO1						
	rimsulfuron	25	SG	0.016	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	10.0	10.0	10.0	10.0	10.0	14.7
	metribuzin	75	DF	0.09	lb ai/a	PO1						
	rimsulfuron	25	SG	0.016	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
6	sulfentrazone	4	F	.188	lb ai/a	PPI	10.0	7.7	10.0	10.0	10.0	14.7
	metribuzin	75	DF	0.09	lb ai/a	PO1						
	rimsulfuron	25	SG	0.016	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	8.0	4.0	7.7	9.3	9.3	17.3
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	10.0	3.0	10.0	10.0	9.3	14.0
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	9.7	6.7	10.0	9.7	10.0	17.0
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	10.0	7.0	10.0	9.3	10.0	7.7
11	fomesafen	2	SL	0.5	lb ai/a	PRT	10.0	10.0	10.0	10.0	10.0	17.0
12	clomazone	3	ME	1	lb ai/a	PRT	10.0	9.3	9.7	10.0	10.0	15.0
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	5.3	9.0	10.0	6.3	10.0	11.7
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	10.0	4.3	10.0	10.0	10.0	15.7
	Matrix	25	SG	0.031	lb ai/a	PO1						
	clethodim	.97	EC	.068	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	8.3	9.3	9.3	9.3	10.0	16.7
	halosulfuron	75	WG	0.023	lb ai/a	PO1						
	clethodim	.97	EC	.068	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
16	Untreated Handweeded						5.7	7.7	9.0	10.0	10.0	18.3
LSD (P=.05)							2.93	2.70	3.10	1.87	0.66	3.66
Standard Deviation							1.76	1.62	1.86	1.12	0.39	2.19
CV							20.02	22.17	19.99	11.76	3.98	14.42

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	TOMATO 19/Jul/13 PLANT # GOOD	PEPPER 13/Aug/13 HARVEST #/PLOT	PEPPER 13/Aug/13 HARVEST KG/PLOT	PEPPER 19/Aug/13 HARVEST #/PLOT	PEPPER 19/Aug/13 HARVEST KG/PLOT
	Pest Code										
	Crop Code										
	Rating Date										
	Rating Type										
	Rating Unit										
1	napropamide	50	DF	2	lb ai/a	PRT	17.3	18.3	3.237	18.3	2.435
2	napropamide XT	50	DF	2	lb ai/a	PRT	17.0	15.7	2.905	22.3	3.480
3	sulfentrazone	4	F	.188	lb ai/a	PRT	16.0	6.7	1.083	7.7	1.132
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	16.3	8.3	1.330	7.3	1.080
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	17.0	6.3	1.115	13.3	2.253
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
6	sulfentrazone	4	F	.188	lb ai/a	PPI	16.3	5.3	0.960	6.7	1.107
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	17.0	21.0	3.792	14.7	2.132
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	12.7	9.3	1.310	6.7	0.983
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	17.7	11.7	2.082	11.3	1.830
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	11.3	2.7	0.417	4.3	0.627
11	fomesafen	2	SL	0.5	lb ai/a	PRT	16.7	14.7	2.995	8.7	1.388
12	clomazone	3	ME	1	lb ai/a	PRT	15.3	26.3	4.883	17.0	2.628
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	12.3	10.0	1.783	6.7	1.020
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	16.7	5.7	1.067	6.7	1.020
	Matrix	25	SG	0.031	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	16.0	18.0	3.090	19.3	2.832
	halosulfuron	75	WG	0.023	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
16	Untreated Handweeded						15.7	10.7	2.302	16.7	2.713
LSD (P=.05)							2.61	10.50	1.6393	9.09	1.3722
Standard Deviation							1.57	6.30	0.9832	5.45	0.8230
CV							9.97	52.84	45.8	46.49	45.95

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEPPER 27/Aug/13 HARVEST #/PLOT	PEPPER 27/Aug/13 HARVEST KG/PLOT	PEPPER 3/Sep/13 HARVEST #/PLOT	PEPPER 3/Sep/13 HARVEST KG/PLOT	PEPPER 9/Sep/13 HARVEST #/PLOT
	Pest Code										
	Crop Code										
	Rating Date						27/Aug/13	27/Aug/13	3/Sep/13	3/Sep/13	9/Sep/13
	Rating Type						HARVEST	HARVEST	HARVEST	HARVEST	HARVEST
	Rating Unit						#/PLOT	KG/PLOT	#/PLOT	KG/PLOT	#/PLOT
1	napropamide	50	DF	2	lb ai/a	PRT	15.0	2.560	13.3	2.507	12.0
2	napropamide XT	50	DF	2	lb ai/a	PRT	17.3	2.936	7.7	1.213	22.0
3	sulfentrazone	4	F	.188	lb ai/a	PRT	13.7	2.074	10.0	1.987	22.7
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	6.3	1.086	24.0	4.417	17.3
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	12.7	2.269	15.7	2.850	15.7
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
6	sulfentrazone	4	F	.188	lb ai/a	PPI	3.3	0.677	6.3	1.243	10.3
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	14.7	2.070	8.3	1.507	5.0
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	11.3	2.147	6.7	1.247	17.0
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	3.0	0.557	9.7	1.840	16.0
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	4.7	0.589	4.3	0.673	4.7
11	fomesafen	2	SL	0.5	lb ai/a	PRT	15.0	2.999	13.0	2.333	23.0
12	clomazone	3	ME	1	lb ai/a	PRT	16.7	2.900	10.0	1.857	15.3
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	4.7	0.782	2.3	0.430	10.3
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	17.0	3.027	19.7	3.710	21.7
	Matrix	25	SG	0.031	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	9.0	1.587	14.3	2.690	12.0
	halosulfuron	75	WG	0.023	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
16	Untreated Handweeded						4.7	0.792	9.7	1.793	15.0
LSD (P=.05)							9.71	1.7075	12.21	2.2414	15.19
Standard Deviation							5.82	1.0241	7.32	1.3444	9.11
CV							55.13	56.4	66.96	66.6	60.73

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code											
Crop Code							PEPPER	PEPPER	PEPPER	PEPPER	PEPPER
Rating Date							9/Sep/13	16/Sep/13	16/Sep/13	23/Sep/13	23/Sep/13
Rating Type							HARVEST	HARVEST	HARVEST	HARVEST	HARVEST
Rating Unit							KG/PLOT	#/PLOT	KG/PLOT	#/PLOT	KG/PLOT
1	napropamide	50	DF	2	lb ai/a	PRT	2.013	5.3	0.760	19.7	2.403
2	napropamide XT	50	DF	2	lb ai/a	PRT	2.923	4.0	0.577	23.3	2.710
3	sulfentrazone	4	F	.188	lb ai/a	PRT	3.040	10.3	1.423	17.0	2.067
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	2.367	5.7	0.903	17.3	2.247
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	2.223	4.3	0.607	31.3	4.560
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
6	sulfentrazone	4	F	.188	lb ai/a	PPI	1.533	5.3	0.843	16.7	2.143
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	0.737	5.0	0.723	16.0	1.933
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	2.337	5.3	0.790	33.7	4.157
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	2.430	4.0	0.590	11.3	1.533
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	0.587	3.0	0.457	7.7	1.123
11	fomesafen	2	SL	0.5	lb ai/a	PRT	2.913	5.3	0.750	18.7	3.600
12	clomazone	3	ME	1	lb ai/a	PRT	2.377	7.7	1.140	25.0	3.367
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	1.480	3.7	0.503	12.3	1.510
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	3.117	10.0	1.480	21.0	2.373
	Matrix	25	SG	0.031	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	1.580	6.0	0.900	20.0	2.493
	halosulfuron	75	WG	0.023	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
16	Untreated Handweeded						2.257	2.7	0.380	12.0	1.380
LSD (P=.05)							2.1627	8.40	1.1776	18.19	2.1401
Standard Deviation							1.2972	5.04	0.7063	10.91	1.2836
CV							61.2	91.94	88.1	57.61	51.86

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEPPER TOTAL #/PLOT	PEPPER TOTAL KG/PLOT	TOMATO 3/Sep/13 HARVEST KG/PLOT	TOMATO 9/Sep/13 HARVEST KG/PLOT	TOMATO 16/Sep/13 HARVEST KG/PLOT
	Pest Code										
	Crop Code										
	Rating Date										
	Rating Type										
	Rating Unit										
1	napropamide	50	DF	2	lb ai/a	PRT	102.0	15.915	12.977	8.417	25.077
2	napropamide XT	50	DF	2	lb ai/a	PRT	112.3	16.745	17.607	13.157	24.540
3	sulfentrazone	4	F	.188	lb ai/a	PRT	88.0	12.806	13.847	10.013	18.493
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	86.3	13.430	10.873	12.647	21.243
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	99.3	15.877	9.393	12.413	20.523
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
6	sulfentrazone	4	F	.188	lb ai/a	PPI	54.0	8.507	11.373	12.833	18.420
	metribuzin	75	DF	0.09	lb ai/a	PO1					
	rimsulfuron	25	SG	0.016	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	84.7	12.894	12.273	6.597	16.507
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	90.0	12.971	5.933	8.480	12.167
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	67.0	10.862	10.123	9.730	18.343
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	31.3	4.472	4.120	4.903	6.727
11	fomesafen	2	SL	0.5	lb ai/a	PRT	98.3	16.979	7.583	8.343	16.800
12	clomazone	3	ME	1	lb ai/a	PRT	118.0	19.151	2.387	5.970	13.447
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	50.0	7.509	6.413	5.827	15.803
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	101.7	15.793	14.263	10.130	15.897
	Matrix	25	SG	0.031	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	98.7	15.172	14.237	12.110	14.967
	halosulfuron	75	WG	0.023	lb ai/a	PO1					
	clethodim	.97	EC	.068	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
16	Untreated Handweeded						71.3	11.617	11.350	9.163	13.167
LSD (P=.05)							42.66	6.9067	6.9898	6.3702	10.2286
Standard Deviation							25.59	4.1425	4.1923	3.8207	6.1349
CV							30.26	31.46	40.71	40.56	36.07

Weed Control in Bell Pepper and Tomato – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	TOMATO 23/Sep/13 HARVEST KG/PLOT	TOMATO 30/Sep/13 HARVEST KG/PLOT	TOMATO 7/Oct/13 HARVEST KG/PLOT	TOMATO TOTAL KG/PLOT
	Pest Code									
	Crop Code									
	Rating Date									
	Rating Type									
	Rating Unit									
1	napropamide	50	DF	2	lb ai/a	PRT	22.463	4.560	5.467	78.960
2	napropamide XT	50	DF	2	lb ai/a	PRT	19.370	4.003	6.360	85.037
3	sulfentrazone	4	F	.188	lb ai/a	PRT	17.473	4.637	14.073	78.537
	metribuzin	75	DF	0.09	lb ai/a	PO1				
	rimsulfuron	25	SG	0.016	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
4	Spartan Charge	3.5	SE	.205	lb ai/a	PRT	24.797	4.560	9.563	83.683
	metribuzin	75	DF	0.09	lb ai/a	PO1				
	rimsulfuron	25	SG	0.016	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
5	Authority MTZ	45	DF	.338	lb ai/a	PRT	27.553	8.483	11.317	89.683
	metribuzin	75	DF	0.09	lb ai/a	PO1				
	rimsulfuron	25	SG	0.016	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
6	sulfentrazone	4	F	.188	lb ai/a	PPI	16.630	6.047	9.067	74.370
	metribuzin	75	DF	0.09	lb ai/a	PO1				
	rimsulfuron	25	SG	0.016	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
7	pendimethalin	3.8	CS	1.4	lb ai/a	PRT	10.143	3.907	5.850	55.277
8	pendimethalin	3.8	CS	1.4	lb ai/a	POT	13.623	3.583	4.740	48.527
9	s-metolachlor	7.62	EC	1.5	lb ai/a	PRT	19.053	7.573	10.283	75.107
10	pyroxasulfone	85	WDG	0.1	lb ai/a	PRT	7.107	1.917	6.070	30.843
11	fomesafen	2	SL	0.5	lb ai/a	PRT	15.330	7.767	14.297	70.120
12	clomazone	3	ME	1	lb ai/a	PRT	14.027	6.807	15.923	58.560
13	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRT	11.933	2.320	2.137	44.433
14	pendimethalin	3.8	CS	.95	lb ai/a	PRT	19.560	4.503	8.350	72.703
	Matrix	25	SG	0.031	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
15	pendimethalin	3.8	CS	.95	lb ai/a	PRT	16.307	4.040	6.840	68.500
	halosulfuron	75	WG	0.023	lb ai/a	PO1				
	clethodim	.97	EC	.068	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
16	Untreated Handweeded						19.893	3.677	3.620	60.870
LSD (P=.05)							10.4881	3.4260	5.3776	27.5266
Standard Deviation							6.2905	2.0548	3.2253	16.5098
CV							36.56	41.94	38.52	24.57

Weed Control in Pumpkin and Squash – HTRC - 2013

Project Code: 108-13-2 **Location: East Lansing, MI Block 109-112**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Pumpkin and Squash **Variety: See notes**
Planting Method: Seeded **Planting Date: 6/3/13** **Harvest Date: See data**
Spacing: Planted 6″; thinned to 12″ **Row Spacing: 5 ft, 1 row/variety**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 16 ft wide x 50 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.3%** **pH: 6.7**
Sand: 62% **Silt: 25%** **Clay: 13%** **CEC: 4.0**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/5/13	3:20 pm	73/70	F	Dry	5-7 N	28	80% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/5	PUMPKIN, SQUASH		Just planted 6/3	
6/5	No weeds present			

BYGR = barnyard grass
GRFT = green foxtail
LACG = large crabgrass
RRPW = redroot pigweed
WIRA = wild radish
COLQ = common lambsquarters
EBNS = eastern black nightshade

Notes and Comments
1. Howden pumpkin, Burgess buttercup, Ultra butternut.
2. Spray applied with 12 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 tractor sprayer.
3. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Weed Control in Pumpkin and Squash – HTRC - 2013

Weed Control in Pumpkin and Squash - HTRC - 2013

Trial ID: 108-13-2 Location: HTRC, block 109-112
Protocol ID: 108-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SQUASH Buttercup	PUMPKIN Howden	SQUASH Butternut	GRFT	LACG	RRPW
Pest Code												
Crop Code												
Crop Name							Buttercup	Howden	Butternut			
Rating Date							1/Jul/13	1/Jul/13	1/Jul/13	1/Jul/13	1/Jul/13	1/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	ethalfluralin	3	EC	1.13	lb ai/a	PRE	4.3	1.0	4.3	10.0	9.7	10.0
	clomazone	3	ME	0.5	lb ai/a	PRE						
2	ethalfluralin	3	EC	1.13	lb ai/a	PRE	2.3	2.7	4.7	10.0	10.0	10.0
	clomazone	3	ME	0.5	lb ai/a	PRE						
	halosulfuron	75	WG	0.023	lb ai/a	PRE						
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	2.7	1.7	7.0	10.0	10.0	10.0
	clomazone	3	ME	0.5	lb ai/a	PRE						
4	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	5.0	2.7	10.0	10.0	10.0	10.0
5	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	8.0	5.3	9.7	6.0	9.3	10.0
6	fomesafen	2	SL	0.25	lb ai/a	PRE	4.7	2.7	6.0	8.0	10.0	10.0
7	fomesafen	2	SL	.375	lb ai/a	PRE	2.7	4.0	8.3	9.3	10.0	10.0
8	fomesafen	2	SL	0.5	lb ai/a	PRE	3.7	6.7	8.3	9.7	10.0	10.0
9	fomesafen	2	SL	0.25	lb ai/a	PRE	6.0	3.0	9.0	10.0	10.0	10.0
	s-metolachlor	7.62	EC	.95	lb ai/a	PRE						
10	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	3.7	2.7	7.3	10.0	10.0	10.0
11	fomesafen	2	SL	0.25	lb ai/a	PRE	4.0	2.7	7.7	10.0	10.0	10.0
	s-metolachlor	7.62	EC	1.26	lb ai/a	PRE						
12	Untreated						2.3	1.0	7.0	3.0	3.3	4.0
LSD (P=.05)							3.70	1.81	3.04	2.29	2.03	1.76
Standard Deviation							2.19	1.07	1.80	1.35	1.20	1.04
CV							53.21	35.65	24.12	15.3	12.81	10.96

Weed Control in Pumpkin and Squash – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WIRA	SQUASH Buttercup	PUMPKIN Howden	SQUASH Butternut	BYGR	COLQ
Pest Code							WIRA				BYGR	COLQ
Crop Code								SQUASH	PUMPKIN	SQUASH		
Crop Name								Buttercup	Howden	Butternut		
Rating Date							1/Jul/13	10/Jul/13	10/Jul/13	10/Jul/13	10/Jul/13	10/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	ethalfluralin	3	EC	1.13	lb ai/a	PRE	7.7	2.7	1.0	3.3	10.0	10.0
	clomazone	3	ME	0.5	lb ai/a	PRE						
2	ethalfluralin	3	EC	1.13	lb ai/a	PRE	10.0	2.7	2.0	3.3	9.7	10.0
	clomazone	3	ME	0.5	lb ai/a	PRE						
	halosulfuron	75	WG	0.023	lb ai/a	PRE						
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	8.3	1.7	1.3	5.0	10.0	10.0
	clomazone	3	ME	0.5	lb ai/a	PRE						
4	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	8.0	4.7	2.7	9.0	10.0	3.7
5	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	7.7	6.3	4.0	7.7	7.7	9.0
6	fomesafen	2	SL	0.25	lb ai/a	PRE	10.0	2.3	1.0	4.7	4.3	7.3
7	fomesafen	2	SL	.375	lb ai/a	PRE	10.0	2.0	2.3	6.7	8.0	7.7
8	fomesafen	2	SL	0.5	lb ai/a	PRE	10.0	2.3	5.0	7.3	7.7	8.7
9	fomesafen	2	SL	0.25	lb ai/a	PRE	10.0	4.0	1.7	7.7	9.3	8.0
	s-metolachlor	7.62	EC	.95	lb ai/a	PRE						
10	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	7.0	3.0	1.3	4.3	10.0	5.0
11	fomesafen	2	SL	0.25	lb ai/a	PRE	10.0	2.3	1.3	4.7	10.0	5.7
	s-metolachlor	7.62	EC	1.26	lb ai/a	PRE						
12	Untreated						6.0	1.0	1.0	3.3	1.7	1.0
LSD (P=.05)							1.86	2.53	1.41	3.34	2.06	3.56
Standard Deviation							1.10	1.49	0.83	1.97	1.21	2.10
CV							12.57	51.26	40.54	35.31	14.82	29.32

Weed Control in Pumpkin and Squash – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	EBNS	RRPW	WIRA	SQUASH Buttercup	SQUASH Buttercup	SQUASH Butternut
Pest Code												
Crop Code										SQUASH	SQUASH	SQUASH
Crop Name										Buttercup	Buttercup	Butternut
Rating Date							10/Jul/13	10/Jul/13	10/Jul/13	24/Sep/13	24/Sep/13	23/Sep/13
Rating Type							RATING	RATING	RATING	HARVEST	HARVEST	HARVEST
Rating Unit							1-10	1-10	1-10	#/PLOT	KG/PLOT	#/PLOT
1	ethalfluralin	3	EC	1.13	lb ai/a	PRE	8.3	8.0	3.7	20.7	25.63	18.7
	clomazone	3	ME	0.5	lb ai/a	PRE						
2	ethalfluralin	3	EC	1.13	lb ai/a	PRE	10.0	10.0	10.0	38.0	35.51	24.0
	clomazone	3	ME	0.5	lb ai/a	PRE						
	halosulfuron	75	WG	0.023	lb ai/a	PRE						
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	10.0	9.7	6.0	36.7	44.16	16.7
	clomazone	3	ME	0.5	lb ai/a	PRE						
4	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	10.0	10.0	6.7	23.7	29.23	1.3
5	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	10.0	5.0	5.7	9.7	10.01	6.7
6	fomesafen	2	SL	0.25	lb ai/a	PRE	7.3	9.7	10.0	25.3	34.96	12.0
7	fomesafen	2	SL	.375	lb ai/a	PRE	9.0	10.0	10.0	31.7	40.94	9.7
8	fomesafen	2	SL	0.5	lb ai/a	PRE	10.0	10.0	10.0	41.3	48.13	12.0
9	fomesafen	2	SL	0.25	lb ai/a	PRE	10.0	10.0	10.0	20.3	24.08	13.3
	s-metolachlor	7.62	EC	.95	lb ai/a	PRE						
10	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	9.3	9.0	4.0	18.7	21.99	11.7
11	fomesafen	2	SL	0.25	lb ai/a	PRE	10.0	10.0	10.0	32.0	42.25	16.3
	s-metolachlor	7.62	EC	1.26	lb ai/a	PRE						
12	Untreated						1.0	1.0	1.0	20.3	18.69	11.0
LSD (P=.05)							2.08	2.06	4.59	20.86	24.196	9.79
Standard Deviation							1.23	1.22	2.71	12.32	14.288	5.78
CV							14.07	14.28	37.37	46.44	45.65	45.26

Weed Control in Pumpkin and Squash – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SQUASH Butternut 23/Sep/13 HARVEST KG/PLOT	GRN.PUMP Howden 25/Sep/13 HARVEST #/PLOT	GRN.PUMP Howden 25/Sep/13 HARVEST KG/PLOT	ORG.PUMP Howden 25/Sep/13 HARVEST #/PLOT	ORG.PUMP Howden 25/Sep/13 HARVEST KG/PLOT
	Pest Code										
	Crop Code										
	Crop Name										
	Rating Date										
	Rating Type										
	Rating Unit										
1	ethalfluralin	3	EC	1.13	lb ai/a	PRE	38.63	1.0	1.17	22.0	206.79
	clomazone	3	ME	0.5	lb ai/a	PRE					
2	ethalfluralin	3	EC	1.13	lb ai/a	PRE	41.16	0.3	0.65	22.0	182.46
	clomazone	3	ME	0.5	lb ai/a	PRE					
	halosulfuron	75	WG	0.023	lb ai/a	PRE					
3	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	32.09	2.3	5.18	20.0	191.42
	clomazone	3	ME	0.5	lb ai/a	PRE					
4	pyroxasulfone	85	WDG	0.1	lb ai/a	PRE	1.60	1.7	6.89	21.3	201.27
5	bicyclopyrone	1.67	SL	0.045	lb ai/a	PRE	11.87	2.0	7.72	19.7	163.71
6	fomesafen	2	SL	0.25	lb ai/a	PRE	21.36	0.3	0.73	24.0	223.25
7	fomesafen	2	SL	.375	lb ai/a	PRE	17.04	1.3	4.25	19.0	167.45
8	fomesafen	2	SL	0.5	lb ai/a	PRE	26.77	1.3	2.93	15.7	148.83
9	fomesafen	2	SL	0.25	lb ai/a	PRE	18.49	1.3	5.12	20.0	205.88
	s-metolachlor	7.62	EC	.95	lb ai/a	PRE					
10	s-metolachlor	7.62	EC	.95	lb ai/a	PRE	18.96	0.7	4.42	21.0	168.79
11	fomesafen	2	SL	0.25	lb ai/a	PRE	32.53	1.3	7.31	22.7	193.88
	s-metolachlor	7.62	EC	1.26	lb ai/a	PRE					
12	Untreated						17.46	2.3	5.78	18.7	108.72
LSD (P=.05)							19.013	1.93	7.569	6.90	88.269
Standard Deviation							11.227	1.14	4.470	4.07	52.125
CV							48.47	85.61	102.85	19.87	28.93

Fall Weed Control in Strawberry – HTRC - 2013

Project Code: 126-13-01 **Location: East Lansing, MI**
Block SH4

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Strawberry **Variety: Jewel**
Planting Method: Transplant **Planting Date: 2012** **Harvest Date: See data**
Spacing: solid row **Row Spacing: 6 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Riddles Sandy Loam **OM: 1.0%** **pH: 6.9**
Sand: 87% **Silt: 8%** **Clay: 5%** **CEC: 3.7**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
FALL	11/6/12	11:00 am	37/33	F	Damp	4-6 SE	65	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
11/6	STBE	3-4″	Dormant	30%
11/6	COMA = common mallow	6-10″	Few	Few
11/6	HOWE = horseweed	1-2″	Rosette	Moderate
5/20/13	HOAL = hoary alyssum			
5/20/13	CORW = common ragweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Experiment conducted at Sandhill.

Fall Weed Control in Strawberry – HTRC - 2013

Fall Weed Control in Strawberry - HTRC 2013

Trial ID: 126-13-01 Location: HTRC block SH4
Protocol ID: 126-13-01 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	STBE 20/May/13 RATING 1-10	CORW 20/May/13 RATING 1-10	HOAL 20/May/13 RATING 1-10	HOWE 20/May/13 RATING 1-10	STBE 31/May/13 RATING 1-10
1	terbacil	80	WDG	0.4	lb ai/a	FALL	1.3	5.0	9.0	9.3	2.3
2	sulfentrazone	4	F	0.25	lb ai/a	FALL	3.0	4.0	7.0	6.0	3.0
3	acifluorfen	2	L	0.375	lb ai/a	FALL	2.0	5.7	10.0	5.3	3.0
4	flumioxazin	51	WDG	0.096	lb ai/a	FALL	2.3	9.3	7.7	3.7	3.3
5	napropamide XT	50	DF	4	lb ai/a	FALL	2.0	9.3	6.3	3.3	2.7
6	pendimethalin	3.8	CS	1.9	lb ai/a	FALL	2.0	2.7	6.3	3.7	2.3
7	indaziflam	1.67	SC	0.085	lb ai/a	FALL	4.7	10.0	9.0	9.3	4.7
8	isoxaben	75	DF	1	lb ai/a	FALL	3.0	10.0	10.0	5.7	4.0
9	fomesafen	2	SL	.375	lb ai/a	FALL	2.7	4.7	8.3	8.3	3.3
10	Untreated						1.0	1.7	4.7	3.3	1.3
LSD (P=.05)							2.10	3.91	3.93	4.88	2.37
Standard Deviation							1.22	2.28	2.29	2.85	1.38
CV							50.9	36.57	29.25	49.07	46.13

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CORW 31/May/13 RATING 1-10	HOAL 31/May/13 RATING 1-10	HOWE 31/May/13 RATING 1-10	STBE 27/Jun/13 RATING 1-10	CORW 27/Jun/13 RATING 1-10
1	terbacil	80	WDG	0.4	lb ai/a	FALL	4.0	9.3	10.0	1.7	4.0
2	sulfentrazone	4	F	0.25	lb ai/a	FALL	3.0	3.7	6.3	2.7	3.0
3	acifluorfen	2	L	0.375	lb ai/a	FALL	2.3	9.3	4.0	2.3	3.0
4	flumioxazin	51	WDG	0.096	lb ai/a	FALL	10.0	7.7	3.7	2.3	7.3
5	napropamide XT	50	DF	4	lb ai/a	FALL	5.3	4.7	5.0	2.3	5.3
6	pendimethalin	3.8	CS	1.9	lb ai/a	FALL	2.3	6.0	4.0	2.0	3.7
7	indaziflam	1.67	SC	0.085	lb ai/a	FALL	10.0	10.0	8.7	4.7	10.0
8	isoxaben	75	DF	1	lb ai/a	FALL	7.7	10.0	5.0	4.0	7.0
9	fomesafen	2	SL	.375	lb ai/a	FALL	4.3	8.3	7.3	2.7	2.3
10	Untreated						1.7	4.3	1.3	1.7	4.7
LSD (P=.05)							3.63	4.35	4.50	1.98	3.77
Standard Deviation							2.12	2.54	2.63	1.15	2.20
CV							41.8	34.59	47.45	43.73	43.65

Fall Weed Control in Strawberry – HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HOWE	STBE	STBE	STBE	STBE	STBE
	Crop Code							STBE	STBE	STBE	STBE	STBE
	Rating Date						27/Jun/13	17/Jun/13	20/Jun/13	21/Jun/13	26/Jun/13	
	Rating Type						RATING	WEIGHT	WEIGHT	WEIGHT	WEIGHT	TOTAL
	Rating Unit						1-10	KG/PLOT	KG/PLOT	KG/PLOT	KG/PLOT	KG/PLOT
1	terbacil	80	WDG	0.4	lb ai/a	FALL	8.3	1.436	0.505	1.083	1.500	4.524
2	sulfentrazone	4	F	0.25	lb ai/a	FALL	7.0	1.276	1.223	0.566	1.672	4.738
3	acifluorfen	2	L	0.375	lb ai/a	FALL	7.3	1.342	0.722	1.004	1.196	4.264
4	flumioxazin	51	WDG	0.096	lb ai/a	FALL	7.3	1.049	0.998	0.650	1.088	3.785
5	napropamide XT	50	DF	4	lb ai/a	FALL	8.7	1.500	1.021	0.853	1.003	4.377
6	pendimethalin	3.8	CS	1.9	lb ai/a	FALL	5.7	1.252	1.012	0.828	1.595	4.687
7	indaziflam	1.67	SC	0.085	lb ai/a	FALL	9.7	1.156	0.507	0.706	0.613	2.982
8	isoxaben	75	DF	1	lb ai/a	FALL	7.0	1.263	0.658	0.934	1.124	3.979
9	fomesafen	2	SL	.375	lb ai/a	FALL	9.0	1.355	0.902	0.920	1.289	4.467
10	Untreated						9.0	0.970	1.296	0.793	1.835	4.894
LSD (P=.05)							3.38	0.5864	0.6045	0.5622	1.3968	2.5534
Standard Deviation							1.97	0.3418	0.3524	0.3277	0.8142	1.4885
CV							24.93	27.13	39.85	39.3	63.05	34.86

Fall Weed Control in Apple - CRC 2012-2013

Project Code: 128-13-01 **Location: Clarksville, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Apple **Variety: See Notes**
Planting Method: Transplant **Planting Date: 2005**
Spacing: 12 ft **Row Spacing: 18 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 11 ft wide x 50 ft long

Soil Type: Lapeer Sandy Loam **OM: 2.0%** **pH: 6.7**
Sand: 39% **Silt: 45%** **Clay: 16%** **CEC: 5.6**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
FALL	11/5/12	1:30 pm	39/40	F	SLIWET	3 NE	55	80% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
11/5	APPLE	9-12′	Dormant	
11/5	DAND = dandelion	1-2″	Rosette	Many
11/5	GORO = goldenrod	4-5′	Dormant	Few
11/5	PERG = perennial ryegrass	3-4″	Dormant	Many
11/5	BYGR = barnyard grass	4-5′	Dormant	Few
11/5	SOTH = sow thistle	1-2′	Rosette	Few
	YERO = yellow rocket			
	COGR = common groundsel			
	HOWE = horseweed			
	FAPA = fall panicum			
	COLQ = common lambsquarters			
	CORW = common ragweed			
	RRPW = redroot pigweed			
	WICA = wild carrot			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO_2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Varieties: Red Delicious, Ruby, Fuji, Dandee Red, Honeycrisp.

Fall Weed Control in Apple - CRC 2012-2013

Fall Weed Control in Apple - CRC 2012-2013

Trial ID: 128-13-01 Location: Clarksville, MI
Protocol ID: 128-13-01 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage		PERG	DAND	YERO	
Pest Code											
Crop Code							APPLE				APPLE
Rating Date							15/May/13	15/May/13	15/May/13	15/May/13	13/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	flumioxazin	51	WDG	0.383	lb ai/a	FALL	1.0	9.3	8.0	10.0	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
2	indaziflam	1.67	SC	0.085	lb ai/a	FALL	1.0	10.0	8.3	10.0	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
3	isoxaben	75	DF	1	lb ai/a	FALL	1.0	9.0	7.3	9.3	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
4	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL	1.0	10.0	9.0	10.0	1.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1	lb ai/a	FALL					
5	rimsulfuron	25	DF	.063	lb ai/a	FALL	1.0	8.7	9.3	9.7	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
6	terbacil	80	WDG	2.4	lb ai/a	FALL	1.0	9.0	7.7	10.0	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
7	pendimethalin	3.3	EC	3.8	lb ai/a	FALL	1.0	9.7	8.3	10.0	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
8	flazasulfuron	25	WG	.045	lb ai/a	FALL	1.0	9.7	8.3	10.0	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
9	diuron	80	DF	3.2	lb ai/a	FALL	1.0	9.7	8.3	9.7	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
10	dichlobenil	1.4	CS	4	lb ai/a	FALL	1.0	9.7	9.0	9.3	1.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
11	glyphosate	5.4	L	1	lb ai/a	FALL	1.0	9.3	8.3	8.3	1.0
12	Untreated Check					FALL	1.0	2.3	1.0	3.3	1.0
LSD (P=.05)							0.00	1.65	1.31	2.14	0.00
Standard Deviation							0.00	0.98	0.77	1.27	0.00
CV							0.0	11.01	9.98	13.86	0.0

Fall Weed Control in Apple - CRC 2012-2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BYGR	COGR	CORW	DAND	HOWE
Pest Code											
Crop Code											
Rating Date							13/Jun/13	13/Jun/13	13/Jun/13	13/Jun/13	13/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	flumioxazin	51	WDG	0.383	lb ai/a	FALL	10.0	10.0	7.0	2.3	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
2	indaziflam	1.67	SC	0.085	lb ai/a	FALL	9.3	10.0	10.0	6.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
3	isoxaben	75	DF	1	lb ai/a	FALL	3.3	10.0	7.7	5.7	9.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
4	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL	5.3	10.0	10.0	6.0	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1	lb ai/a	FALL					
5	rimsulfuron	25	DF	.063	lb ai/a	FALL	6.0	10.0	9.0	9.0	8.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
6	terbacil	80	WDG	2.4	lb ai/a	FALL	9.3	1.3	9.0	4.7	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
7	pendimethalin	3.3	EC	3.8	lb ai/a	FALL	7.3	8.0	9.0	4.3	8.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
8	flazasulfuron	25	WG	.045	lb ai/a	FALL	9.0	10.0	10.0	8.3	7.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
9	diuron	80	DF	3.2	lb ai/a	FALL	7.0	9.0	10.0	4.7	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
10	dichlobenil	1.4	CS	4	lb ai/a	FALL	2.0	10.0	10.0	9.7	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
11	glyphosate	5.4	L	1	lb ai/a	FALL	8.3	3.3	10.0	7.3	9.0
12	Untreated Check					FALL	7.0	7.0	10.0	1.3	9.3
LSD (P=.05)							5.54	3.25	3.66	2.75	1.99
Standard Deviation							3.27	1.92	2.16	1.62	1.17
CV							46.74	23.33	23.25	28.09	12.61

Fall Weed Control in Apple - CRC 2012-2013

Pest Code						OVERALL		BYGR	FAPA	COGR
Crop Code							APPLE			
Rating Date						13/Jun/13	16/Jul/13	16/Jul/13	16/Jul/13	16/Jul/13
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit						1-10	1-10	1-10	1-10	1-10
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage				
1	flumioxazin	51	WDG	0.383	lb ai/a	FALL	5.3	1.0	5.0	5.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
2	indaziflam	1.67	SC	0.085	lb ai/a	FALL	7.7	1.0	7.7	8.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
3	isoxaben	75	DF	1	lb ai/a	FALL	1.7	1.0	2.3	8.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
4	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL	6.0	1.0	3.0	6.0	8.7
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1	lb ai/a	FALL					
5	rimsulfuron	25	DF	.063	lb ai/a	FALL	5.7	1.0	3.3	7.0	8.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
6	terbacil	80	WDG	2.4	lb ai/a	FALL	4.0	1.0	7.7	6.7	1.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
7	pendimethalin	3.3	EC	3.8	lb ai/a	FALL	3.0	1.0	7.0	8.7	9.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
8	flazasulfuron	25	WG	.045	lb ai/a	FALL	7.3	1.0	8.7	9.3	9.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
9	diuron	80	DF	3.2	lb ai/a	FALL	5.0	1.0	5.3	5.7	7.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
10	dichlobenil	1.4	CS	4	lb ai/a	FALL	3.3	1.0	3.7	3.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
11	glyphosate	5.4	L	1	lb ai/a	FALL	1.0	1.0	8.0	7.7	10.0
12	Untreated Check					FALL	1.0	1.0	10.0	10.0	10.0
LSD (P=.05)							2.78	0.00	4.29	3.89	2.84
Standard Deviation							1.64	0.00	2.53	2.30	1.68
CV							38.7	0.0	42.43	32.44	19.34

Fall Weed Control in Apple - CRC 2012-2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COLQ	CORW	DAND	HOWE	PESW
Pest Code											
Crop Code											
Rating Date							16/Jul/13	16/Jul/13	16/Jul/13	16/Jul/13	16/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	flumioxazin	51	WDG	0.383	lb ai/a	FALL	5.7	7.0	2.7	9.7	8.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
2	indaziflam	1.67	SC	0.085	lb ai/a	FALL	6.0	7.3	5.7	10.0	7.3
	glyphosate	5.4	L	1	lb ai/a	FALL					
3	isoxaben	75	DF	1	lb ai/a	FALL	7.7	7.7	6.3	9.7	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
4	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL	10.0	10.0	4.7	8.7	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1	lb ai/a	FALL					
5	rimsulfuron	25	DF	.063	lb ai/a	FALL	3.7	7.0	7.7	5.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
6	terbacil	80	WDG	2.4	lb ai/a	FALL	4.3	10.0	6.7	9.7	9.3
	glyphosate	5.4	L	1	lb ai/a	FALL					
7	pendimethalin	3.3	EC	3.8	lb ai/a	FALL	6.7	7.0	2.0	7.3	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
8	flazasulfuron	25	WG	.045	lb ai/a	FALL	10.0	10.0	7.7	2.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
9	diuron	80	DF	3.2	lb ai/a	FALL	8.3	10.0	4.7	10.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
10	dichlobenil	1.4	CS	4	lb ai/a	FALL	8.3	10.0	8.7	9.0	7.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
11	glyphosate	5.4	L	1	lb ai/a	FALL	4.7	10.0	6.7	10.0	4.3
12	Untreated Check					FALL	9.3	10.0	2.0	10.0	10.0
LSD (P=.05)							3.98	5.34	2.81	3.02	4.51
Standard Deviation							2.35	3.16	1.66	1.79	2.66
CV							33.32	35.73	30.49	21.22	29.95

Fall Weed Control in Apple - CRC 2012-2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RRPW 16/Jul/13 RATING 1-10	WICA 16/Jul/13 RATING 1-10	OVERALL 16/Jul/13 RATING 1-10	APPLE 16/Aug/13 RATING 1-10	BYGR 16/Aug/13 RATING 1-10
1	flumioxazin	51	WDG	0.383	lb ai/a	FALL	10.0	9.3	2.7	1.0	6.3
	glyphosate	5.4	L	1	lb ai/a	FALL					
2	indaziflam	1.67	SC	0.085	lb ai/a	FALL	9.3	10.0	6.3	1.0	7.3
	glyphosate	5.4	L	1	lb ai/a	FALL					
3	isoxaben	75	DF	1	lb ai/a	FALL	8.3	9.3	4.3	1.0	4.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
4	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL	10.0	10.0	2.0	1.0	1.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1	lb ai/a	FALL					
5	rimsulfuron	25	DF	.063	lb ai/a	FALL	10.0	10.0	5.0	1.0	5.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
6	terbacil	80	WDG	2.4	lb ai/a	FALL	1.0	10.0	3.0	1.0	7.0
	glyphosate	5.4	L	1	lb ai/a	FALL					
7	pendimethalin	3.3	EC	3.8	lb ai/a	FALL	7.7	6.3	1.3	1.0	8.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
8	flazasulfuron	25	WG	.045	lb ai/a	FALL	10.0	10.0	6.3	1.0	7.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
9	diuron	80	DF	3.2	lb ai/a	FALL	7.0	10.0	2.7	1.0	4.7
	glyphosate	5.4	L	1	lb ai/a	FALL					
10	dichlobenil	1.4	CS	4	lb ai/a	FALL	10.0	10.0	4.0	1.0	1.3
	glyphosate	5.4	L	1	lb ai/a	FALL					
11	glyphosate	5.4	L	1	lb ai/a	FALL	7.7	8.3	1.0	1.3	8.0
12	Untreated Check					FALL	10.0	10.0	4.0	1.3	8.7
LSD (P=.05)							3.31	2.60	4.80	0.38	4.72
Standard Deviation							1.95	1.54	2.83	0.22	2.79
CV							23.22	16.27	79.69	21.29	47.56

Fall Weed Control in Apple - CRC 2012-2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	FAPA	COLQ	DAND	HOWE
Pest Code										
Crop Code										
Rating Date							16/Aug/13	16/Aug/13	16/Aug/13	16/Aug/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	flumioxazin	51	WDG	0.383	lb ai/a	FALL	6.7	9.7	3.0	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL				
2	indaziflam	1.67	SC	0.085	lb ai/a	FALL	8.3	6.3	5.7	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL				
3	isoxaben	75	DF	1	lb ai/a	FALL	6.7	9.3	5.7	9.0
	glyphosate	5.4	L	1	lb ai/a	FALL				
4	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL	5.3	10.0	6.7	10.0
	penoxsulam	.083	SC	.031						
	glyphosate	5.4	L	1	lb ai/a	FALL				
5	rimsulfuron	25	DF	.063	lb ai/a	FALL	7.0	5.7	6.0	7.0
	glyphosate	5.4	L	1	lb ai/a	FALL				
6	terbacil	80	WDG	2.4	lb ai/a	FALL	7.7	5.3	6.3	10.0
	glyphosate	5.4	L	1	lb ai/a	FALL				
7	pendimethalin	3.3	EC	3.8	lb ai/a	FALL	8.3	7.3	1.7	5.7
	glyphosate	5.4	L	1	lb ai/a	FALL				
8	flazasulfuron	25	WG	.045	lb ai/a	FALL	10.0	10.0	6.3	4.7
	glyphosate	5.4	L	1	lb ai/a	FALL				
9	diuron	80	DF	3.2	lb ai/a	FALL	5.0	10.0	6.0	8.7
	glyphosate	5.4	L	1	lb ai/a	FALL				
10	dichlobenil	1.4	CS	4	lb ai/a	FALL	1.7	9.3	8.7	9.0
	glyphosate	5.4	L	1	lb ai/a	FALL				
11	glyphosate	5.4	L	1	lb ai/a	FALL	8.7	6.0	7.3	6.0
12	Untreated Check					FALL	10.0	9.3	1.7	10.0
LSD (P=.05)							4.60	4.38	2.97	3.93
Standard Deviation							2.72	2.59	1.76	2.32
CV							38.19	31.57	32.42	27.85

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Project Code: 128-13-02 **Location: Clarksville, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Apple **Variety: See Notes**
Planting Method: Transplant **Planting Date: 2005**
Spacing: 12 ft **Row Spacing: 18 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 11 ft wide x 50 ft long

Soil Type: Lapeer Sandy Loam **OM: 2.0%** **pH: 6.7**
Sand: 39% **Silt: 45%** **Clay: 16%** **CEC: 5.6**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
FALL	11/5/12	11:45 am	34/38	F	DAMP	3 E	74	100% Cloudy	N
EPRE	4/5/13	3:45 pm	52/46	F	DRY	3 N	18	0% Cloudy	N
LPRE	5/3/13	10:30 am	54/61	F	DAMP	4 SE	44	10% Cloudy	N
LPOS	6/26/13	2:30 pm	85/76	F	DAMP	3 NE	62	20% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
11/5	APPLE	9-12′	Senesced	
11/5	DAND = dandelion	1-2″	Rosette	Many
11/5	SOTH = sow thistle	1-2′	Senesced	Few
11/5	GORO = goldenrod	4-5′	Dormant	Few
11/5	PERG = perennial ryegrass	3-4″	Dormant	Many
11/5	BYGR = barnyard grass	3-4′	Seed	Few
6/26	APPLE			
6/26	LACG = large crabgrass	6-12″		Many
6/26	GRFT = green foxtail	4-10″		Many
6/26	SHPU = shepherdspurse	12-18″	Seeded out	Many
6/26	COLQ = common lambsquarters	4-12″		Many
6/26	RRPW = redroot pigweed	6-12″	Foliar	Many
6/26	COGR = common groundsel	12-15″	Flower	Many
6/26	DAND = dandelion	6-8″	Post flower	Many
6/26	WICA = wild carrot	6-12″	Foliar	Moderate
6/26	PRKW = prostrate knotweed	4-12″	Flower	Many
6/26	PERG = perennial ryegrass			
6/26	BYGR = barnyard grass			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Varieties: Red Delicious, Ruby, Fuji, Dandee Red, Honeycrisp
4. Glyphosate: Durango 5.4L
5. oxyfluorfen 3.93 + penoxsulam 0.083 = Pindar 4.013 SC.

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Trial ID: 128-13-02 Location: Clarksville, MI
Protocol ID: 128-13-02 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE 15/May/13 RATING 1-10	PERG 15/May/13 RATING 1-10	COGR 15/May/13 RATING 1-10	DAND 15/May/13 RATING 1-10	YERO 15/May/13 RATING 1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL12	1.0	10.0	10.0	9.3	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
2	oxyfluorfen	4	SC	1.5	lb ai/a	FALL12	1.0	9.7	10.0	9.3	10.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
3	flumioxazin	51	WDG	0.383	lb ai/a	FALL12	1.0	9.7	10.0	9.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
4	glyphosate	5.4	L	1.35	lb ai/a	FALL12	1.0	9.0	10.0	9.0	7.7
	AMS	100	SG	0.17	lb/gal	FALL12					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL12	1.0	9.7	10.0	10.0	10.0
	AMS	100	SG	0.17	lb/gal	FALL12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE					
	AMS	100	SG	0.17	lb/gal	LPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
6	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	1.0	8.0	10.0	8.0	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	1.0	7.3	10.0	7.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	1.0	5.0	10.0	7.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
9	rimsulfuron	25	DF	.063	lb ai/a	EPRE	1.0	9.0	10.0	9.3	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
10	glyphosate	5.4	L	1.35	lb ai/a	EPRE	1.0	7.3	9.7	6.7	7.7
	AMS	100	SG	0.17	lb/gal	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
11	terbacil	80	WDG	2.4	lb ai/a	EPRE	1.0	6.7	10.0	7.7	9.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
12	Untreated Check					ALL	1.0	1.7	4.0	3.0	7.0
LSD (P=.05)							0.00	1.28	2.54	2.50	4.04
Standard Deviation							0.00	0.75	1.50	1.48	2.38
CV							0.0	9.73	15.85	18.58	25.69

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE 13/Jun/13 RATING 1-10	BYGR 13/Jun/13 RATING 1-10	PERG 13/Jun/13 RATING 1-10	COGR 13/Jun/13 RATING 1-10	COLQ 13/Jun/13 RATING 1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL12	1.0	10.0	9.3	10.0	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
2	oxyfluorfen	4	SC	1.5	lb ai/a	FALL12	1.0	5.0	10.0	10.0	8.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
3	flumioxazin	51	WDG	0.383	lb ai/a	FALL12	1.0	9.0	10.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
4	glyphosate	5.4	L	1.35	lb ai/a	FALL12	1.0	4.0	6.7	3.7	4.7
	AMS	100	SG	0.17	lb/gal	FALL12					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL12	1.0	1.0	9.7	10.0	1.3
	AMS	100	SG	0.17	lb/gal	FALL12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE					
	AMS	100	SG	0.17	lb/gal	LPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
6	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	1.0	10.0	7.7	10.0	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	1.0	9.3	6.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	1.0	5.7	5.3	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
9	rimsulfuron	25	DF	.063	lb ai/a	EPRE	1.0	9.0	8.7	10.0	9.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
10	glyphosate	5.4	L	1.35	lb ai/a	EPRE	1.0	7.7	8.3	10.0	4.7
	AMS	100	SG	0.17	lb/gal	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
11	terbacil	80	WDG	2.4	lb ai/a	EPRE	1.0	10.0	7.7	7.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
12	Untreated Check					ALL	1.0	10.0	1.0	7.7	10.0
LSD (P=.05)							0.00	4.09	2.64	3.66	3.42
Standard Deviation							0.00	2.42	1.56	2.16	2.02
CV							0.0	32.0	20.67	23.96	24.7

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	DAND	HOWE	PRKW	WICA
Pest Code										
Crop Code										
Rating Date							13/Jun/13	13/Jun/13	13/Jun/13	13/Jun/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL12	7.7	8.7	10.0	10.0
	penoxsulam	.083	SC	.031						
	glyphosate	5.4	L	1.35	lb ai/a	FALL12				
	AMS	100	SG	0.17	lb/gal	FALL12				
2	oxyfluorfen	4	SC	1.5	lb ai/a	FALL12	7.0	7.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL12				
	AMS	100	SG	0.17	lb/gal	FALL12				
3	flumioxazin	51	WDG	0.383	lb ai/a	FALL12	6.0	10.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL12				
	AMS	100	SG	0.17	lb/gal	FALL12				
4	glyphosate	5.4	L	1.35	lb ai/a	FALL12	7.7	7.7	7.0	10.0
	AMS	100	SG	0.17	lb/gal	FALL12				
5	glyphosate	5.4	L	1.35	lb ai/a	FALL12	6.0	10.0	7.7	10.0
	AMS	100	SG	0.17	lb/gal	FALL12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE				
	AMS	100	SG	0.17	lb/gal	LPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPOS				
	AMS	100	SG	0.17	lb/gal	LPOS				
6	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	4.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.031						
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	AMS	100	SG	0.17	lb/gal	EPRE				
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	1.7	9.3	10.0	6.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	AMS	100	SG	0.17	lb/gal	EPRE				
8	isoxaben	75	DF	1	lb ai/a	EPRE	2.3	10.0	7.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	AMS	100	SG	0.17	lb/gal	EPRE				
9	rimsulfuron	25	DF	.063	lb ai/a	EPRE	5.7	10.0	6.0	9.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	AMS	100	SG	0.17	lb/gal	EPRE				
10	glyphosate	5.4	L	1.35	lb ai/a	EPRE	3.3	10.0	7.0	7.0
	AMS	100	SG	0.17	lb/gal	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPOS				
	AMS	100	SG	0.17	lb/gal	LPOS				
11	terbacil	80	WDG	2.4	lb ai/a	EPRE	4.0	10.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	AMS	100	SG	0.17	lb/gal	EPRE				
12	Untreated Check					ALL	3.0	10.0	4.7	8.3
LSD (P=.05)							2.84	2.74	6.02	3.32
Standard Deviation							1.68	1.62	3.55	1.96
CV							34.52	17.26	42.94	21.19

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	OVERALL	APPLE	BYGR	FAPA	COLQ
Pest Code											
Crop Code								APPLE			
Rating Date							13/Jun/13	16/Jul/13	16/Jul/13	16/Jul/13	16/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL12	5.0	1.0	6.7	9.0	6.7
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
2	oxyfluorfen	4	SC	1.5	lb ai/a	FALL12	6.0	1.0	5.0	4.3	6.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
3	flumioxazin	51	WDG	0.383	lb ai/a	FALL12	7.3	1.0	5.0	6.3	7.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
4	glyphosate	5.4	L	1.35	lb ai/a	FALL12	1.7	1.0	6.7	6.7	7.7
	AMS	100	SG	0.17	lb/gal	FALL12					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL12	3.0	1.0	9.7	9.7	10.0
	AMS	100	SG	0.17	lb/gal	FALL12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE					
	AMS	100	SG	0.17	lb/gal	LPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
6	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	4.7	1.0	8.0	9.0	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	2.0	1.0	6.3	8.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	2.3	1.0	4.3	3.3	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
9	rimsulfuron	25	DF	.063	lb ai/a	EPRE	6.3	1.0	7.3	7.3	7.7
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
10	glyphosate	5.4	L	1.35	lb ai/a	EPRE	3.0	1.0	9.7	10.0	10.0
	AMS	100	SG	0.17	lb/gal	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
11	terbacil	80	WDG	2.4	lb ai/a	EPRE	4.7	1.0	9.0	8.3	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
12	Untreated Check					ALL	1.0	1.0	9.3	9.7	10.0
LSD (P=.05)							3.19	0.00	4.07	3.17	3.24
Standard Deviation							1.88	0.00	2.41	1.87	1.91
CV							48.02	0.0	33.18	24.51	21.81

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	DAND 16/Jul/13 RATING 1-10	HOWE 16/Jul/13 RATING 1-10	RRPW 16/Jul/13 RATING 1-10	OVERALL 16/Jul/13 RATING 1-10	APPLE 16/Aug/13 RATING 1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL12	3.7	5.3	9.7	3.3	1.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
2	oxyfluorfen	4	SC	1.5	lb ai/a	FALL12	3.7	4.0	10.0	2.3	1.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
3	flumioxazin	51	WDG	0.383	lb ai/a	FALL12	4.3	8.7	10.0	4.3	1.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
4	glyphosate	5.4	L	1.35	lb ai/a	FALL12	4.7	8.3	9.3	1.0	1.0
	AMS	100	SG	0.17	lb/gal	FALL12					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL12	9.3	10.0	10.0	10.0	1.0
	AMS	100	SG	0.17	lb/gal	FALL12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE					
	AMS	100	SG	0.17	lb/gal	LPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
6	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	2.7	7.3	10.0	2.3	1.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	1.7	4.0	10.0	1.3	1.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	4.7	9.7	9.3	1.0	1.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
9	rimsulfuron	25	DF	.063	lb ai/a	EPRE	5.3	8.7	10.0	3.3	1.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
10	glyphosate	5.4	L	1.35	lb ai/a	EPRE	9.3	10.0	10.0	10.0	1.0
	AMS	100	SG	0.17	lb/gal	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
11	terbacil	80	WDG	2.4	lb ai/a	EPRE	6.7	9.3	3.3	3.3	1.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
12	Untreated Check					ALL	3.7	8.3	7.3	1.0	1.3
LSD (P=.05)							3.92	3.81	2.62	1.83	0.64
Standard Deviation							2.31	2.25	1.55	1.08	0.38
CV							46.5	28.81	17.03	29.88	33.02

Fall & Spring Weed Control in Apple with Pindar - CRC 2012-13

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BYGR	FAPA	COLQ	DAND	HOWE
Pest Code											
Crop Code											
Rating Date							16/Aug/13	16/Aug/13	16/Aug/13	16/Aug/13	16/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL12	9.3	8.3	8.0	1.7	6.7
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
2	oxyfluorfen	4	SC	1.5	lb ai/a	FALL12	4.0	4.0	5.0	3.0	5.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
3	flumioxazin	51	WDG	0.383	lb ai/a	FALL12	8.0	5.3	9.3	1.7	6.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL12					
	AMS	100	SG	0.17	lb/gal	FALL12					
4	glyphosate	5.4	L	1.35	lb ai/a	FALL12	10.0	9.0	6.7	4.7	8.0
	AMS	100	SG	0.17	lb/gal	FALL12					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL12	9.0	8.3	8.3	9.3	10.0
	AMS	100	SG	0.17	lb/gal	FALL12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE					
	AMS	100	SG	0.17	lb/gal	LPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
6	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	8.7	10.0	10.0	1.3	8.3
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	7.7	10.0	10.0	3.3	4.7
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	6.7	6.3	10.0	4.3	8.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
9	rimsulfuron	25	DF	.063	lb ai/a	EPRE	7.3	8.7	8.7	5.3	5.7
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
10	glyphosate	5.4	L	1.35	lb ai/a	EPRE	9.0	9.3	9.0	8.7	10.0
	AMS	100	SG	0.17	lb/gal	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPOS					
	AMS	100	SG	0.17	lb/gal	LPOS					
11	terbacil	80	WDG	2.4	lb ai/a	EPRE	9.0	8.0	10.0	4.3	8.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	AMS	100	SG	0.17	lb/gal	EPRE					
12	Untreated Check					ALL	7.7	9.3	10.0	5.3	8.3
LSD (P=.05)							4.01	3.56	3.30	3.61	5.22
Standard Deviation							2.37	2.10	1.95	2.13	3.08
CV							29.53	26.02	22.27	48.31	41.41

Apple Tolerance to Pindar GT - CRC 2011-2014

Project Code: 128-13-03 **Location: Clarksville, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Apple **Variety: Honey Crisp, Golden Del., Gala**
Planting Method: Transplant **Planting Date: 2005** **Harvest date:**
Spacing: 12 ft **Row Spacing: 18 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 11 ft wide x 30 ft long

Soil Type: Lapeer Sandy Loam **OM: 2.0%** **pH: 6.7**
Sand: 39% **Silt: 45%** **Clay: 16%** **CEC: 5.6**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
FALL	11/5/12	10:24 am	33/41	F	Sliwet	3-4 NE	72	100 % Cloudy	N
EPRE	4/5/13	4:55 pm	53/47	F	Dry	4-5 NW	19	3 % Cloudy	N
LPRE	5/3/13	9:30 am	74/60	F	Damp	3-4 SE	44	20 % Cloudy	N
LPOS	6/26/13	2:00 pm	85/76	F	Damp	2-3 NE	62	10 % Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
11/5	APPLE		Post-harvest	
11/5	PERG = perennial ryegrass	6″		
6/26	APPLE			
6/26	BYGR = barnyardgrass	8-12″		Moderate
6/26	COCW = common chickweed	4-5″	Flower	Moderate
6/26	COLQ = common lambsquarters	4-6″	Foliar	Moderate
6/26	GRFT = green foxtail	4-6″		Many
6/26	LACG = large crabgrass	4-12″	Foliar	Many
6/26	RRPW = redroot pigweed	6-12″	Foliar	Moderate
6/26	DAND = dandelion			
6/26	FAPA = fall panicum			
6/26	OVERALL = overall weed control			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. All treatments included AMS @ 0.17 lb/gal.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. 2013 was the second year of a three-year project. The same treatments are applied each year. The experiment will be repeated in 2014.
4. Glyphosate: Durango 5.4L
5. oxyfluorfen + penoxsulam = Pindar GT 4.013

Apple Tolerance to Pindar GT - CRC 2011-2014

Apple Tolerance to Pindar GT - CRC 2011-2014

Trial ID: 128-13-03 Location: Clarksville, MI
Protocol ID: 128-13-03 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Pest Code							PERG	COCW	DAND	WHCL
Crop Code						APPLE				
Rating Date						15/May/13	15/May/13	15/May/13	15/May/13	15/May/13
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit						1-10	1-10	1-10	1-10	1-10
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage				
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL11,12	1.0	10.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.031						
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
2	oxyfluorfen	3.93	SC	2.94	lb ai/a	FALL11,12	1.0	10.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.062						
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
3	oxyfluorfen	4	SC	1.5	lb ai/a	FALL11,12	1.0	10.0	10.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
4	oxyfluorfen	4	SC	3	lb ai/a	FALL11,12	1.0	10.0	10.0	10.0	9.7
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
5	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	1.0	9.7	10.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
6	terbacil	80	WDG	2.4	lb ai/a	FALL11,12	1.0	10.0	10.0	10.0	9.7
	sulfentrazone	4	F	0.25	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
7	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	1.0	9.7	10.0	10.0	9.3
	penoxsulam	.083	SC	.031						
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
8	oxyfluorfen	3.93	SC	2.94	lb ai/a	EPRE	1.0	10.0	10.0	9.7	9.7
	penoxsulam	.083	SC	.062						
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
9	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	1.0	9.3	10.0	10.0	9.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
10	oxyfluorfen	4	SC	3	lb ai/a	EPRE	1.0	10.0	10.0	10.0	8.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE	1.0	10.0	9.7	9.3	8.7
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
12	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	1.0	7.3	8.7	10.0	9.0
	Untreated Check					SPRING					
LSD (P=.05)							0.00	1.37	0.38	0.64	1.27
Standard Deviation							0.00	0.81	0.22	0.38	0.75
CV							0.0	8.4	2.28	3.83	7.89

Apple Tolerance to Pindar GT - CRC 2011-2014

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	YERO	APPLE	BYGR	LACG	COCW
Pest Code											
Crop Code								APPLE			
Rating Date							15/May/13	13/Jun/13	13/Jun/13	13/Jun/13	13/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL11,12	10.0	1.0	5.7	6.7	9.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
2	oxyfluorfen	3.93	SC	2.94	lb ai/a	FALL11,12	10.0	1.0	9.3	10.0	9.7
	penoxsulam	.083	SC	.062							
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
3	oxyfluorfen	4	SC	1.5	lb ai/a	FALL11,12	10.0	1.0	7.3	8.7	6.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
4	oxyfluorfen	4	SC	3	lb ai/a	FALL11,12	10.0	1.0	9.0	10.0	9.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	10.0	1.0	1.0	4.0	4.7
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
6	terbacil	80	WDG	2.4	lb ai/a	FALL11,12	10.0	1.0	8.7	8.7	10.0
	sulfentrazone	4	F	0.25	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
7	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	10.0	1.0	7.0	10.0	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
8	oxyfluorfen	3.93	SC	2.94	lb ai/a	EPRE	10.0	1.0	9.3	7.0	10.0
	penoxsulam	.083	SC	.062							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
9	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	10.0	1.0	9.7	9.7	5.7
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
10	oxyfluorfen	4	SC	3	lb ai/a	EPRE	10.0	1.0	10.0	10.0	7.7
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE	10.0	1.0	1.7	1.0	7.7
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
12	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	10.0	1.0	1.7	4.0	9.0
	Untreated Check					SPRING					
LSD (P=.05)							0.00	0.00	2.98	4.75	3.97
Standard Deviation							0.00	0.00	1.76	2.80	2.34
CV							0.0	0.0	26.25	37.52	28.52

Apple Tolerance to Pindar GT - CRC 2011-2014

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COLQ	RRPW	SHPU	WHCL	OVERALL
Pest Code											
Crop Code											
Rating Date							13/Jun/13	13/Jun/13	13/Jun/13	13/Jun/13	13/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL11,12	10.0	10.0	10.0	10.0	8.7
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
2	oxyfluorfen	3.93	SC	2.94	lb ai/a	FALL11,12	10.0	10.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.062							
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
3	oxyfluorfen	4	SC	1.5	lb ai/a	FALL11,12	10.0	9.3	10.0	10.0	7.7
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
4	oxyfluorfen	4	SC	3	lb ai/a	FALL11,12	9.7	9.7	10.0	10.0	9.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	6.7	1.0	8.0	10.0	1.3
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
6	terbacil	80	WDG	2.4	lb ai/a	FALL11,12	10.0	8.7	10.0	10.0	9.3
	sulfentrazone	4	F	0.25	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
7	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	10.0	10.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
8	oxyfluorfen	3.93	SC	2.94	lb ai/a	EPRE	10.0	10.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.062							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
9	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	10.0	10.0	10.0	10.0	7.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
10	oxyfluorfen	4	SC	3	lb ai/a	EPRE	10.0	10.0	10.0	10.0	9.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE	4.0	1.0	8.3	10.0	1.3
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
12	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	1.7	3.7	1.0	4.0	1.0
	Untreated Check					SPRING					
LSD (P=.05)							3.06	1.65	0.87	2.54	1.41
Standard Deviation							1.81	0.98	0.51	1.50	0.83
CV							21.26	12.54	5.73	15.79	11.72

Apple Tolerance to Pindar GT - CRC 2011-2014

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE 16/Jul/13 RATING 1-10	BYGR 16/Jul/13 RATING 1-10	FAPA 16/Jul/13 RATING 1-10	RRPW 16/Jul/13 RATING 1-10	APPLE 16/Aug/13 RATING 1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL11,12	1.0	9.3	9.7	10.0	1.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
2	oxyfluorfen	3.93	SC	2.94	lb ai/a	FALL11,12	1.0	9.0	9.3	10.0	1.7
	penoxsulam	.083	SC	.062							
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
3	oxyfluorfen	4	SC	1.5	lb ai/a	FALL11,12	1.0	8.7	9.7	9.7	1.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
4	oxyfluorfen	4	SC	3	lb ai/a	FALL11,12	1.0	9.0	9.7	10.0	1.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
5	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	1.0	8.0	9.0	9.7	1.0
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
6	terbacil	80	WDG	2.4	lb ai/a	FALL11,12	1.0	9.0	10.0	10.0	1.0
	sulfentrazone	4	F	0.25	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
7	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	1.0	9.0	9.7	10.0	1.0
	penoxsulam	.083	SC	.031							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
8	oxyfluorfen	3.93	SC	2.94	lb ai/a	EPRE	1.0	9.3	10.0	10.0	1.3
	penoxsulam	.083	SC	.062							
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
9	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	1.0	9.0	9.3	10.0	1.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
10	oxyfluorfen	4	SC	3	lb ai/a	EPRE	1.3	9.0	9.3	9.7	1.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE					
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE	1.0	7.7	8.0	9.0	1.0
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS					
12	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	1.0	1.0	1.0	1.0	1.3
	Untreated Check					SPRING					
LSD (P=.05)							0.28	1.50	1.52	0.68	0.70
Standard Deviation							0.17	0.88	0.90	0.40	0.41
CV							16.22	10.82	10.31	4.39	37.29

Apple Tolerance to Pindar GT - CRC 2011-2014

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BYGR	FAPA	LACG	RRPW
Pest Code										
Crop Code										
Rating Date							16/Aug/13	16/Aug/13	16/Aug/13	16/Aug/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL11,12	9.0	9.3	6.7	7.0
	penoxsulam	.083	SC	.031						
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
2	oxyfluorfen	3.93	SC	2.94	lb ai/a	FALL11,12	8.3	9.3	4.3	6.7
	penoxsulam	.083	SC	.062						
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
3	oxyfluorfen	4	SC	1.5	lb ai/a	FALL11,12	8.3	10.0	6.7	5.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
4	oxyfluorfen	4	SC	3	lb ai/a	FALL11,12	7.7	10.0	4.3	7.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
5	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	7.3	8.3	7.0	4.3
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
6	terbacil	80	WDG	2.4	lb ai/a	FALL11,12	9.7	9.3	9.0	9.0
	sulfentrazone	4	F	0.25	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
7	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE	9.3	10.0	4.7	7.3
	penoxsulam	.083	SC	.031						
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
8	oxyfluorfen	3.93	SC	2.94	lb ai/a	EPRE	8.7	10.0	7.3	10.0
	penoxsulam	.083	SC	.062						
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
9	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	10.0	9.0	5.7	4.7
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
10	oxyfluorfen	4	SC	3	lb ai/a	EPRE	8.0	10.0	6.0	5.3
	glyphosate	5.4	L	1.35	lb ai/a	EPRE				
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE	6.7	6.3	6.7	3.7
	glyphosate	5.4	L	1.35	lb ai/a	LPRE,LPOS				
12	glyphosate	5.4	L	1.35	lb ai/a	FALL11,12	7.0	7.0	3.0	10.0
	Untreated Check					SPRING				
LSD (P=.05)							3.46	3.65	3.18	3.87
Standard Deviation							2.04	2.16	1.88	2.29
CV							24.52	23.83	31.63	34.17

Spring Weed Control in Apple - HTRC - 2013

Project Code: 128-13-4 **Location: East Lansing, MI**
Block 159-160

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Apple **Variety: See notes**
Planting Method: Transplant **Planting Date: 2006**
Spacing: 12 ft **Row Spacing: 18 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 11 ft wide x 50 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 2.1%** **pH: 6.8**
Sand: 60% **Silt: 25%** **Clay: 15%** **CEC: 6.3**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/5/13	1:40 pm	42/41	F	Dry	6-8 N	23	0 % Cloudy	N
LPRE	5/6/13	11:30 am	74/63	F	Dry	1-2 S	21	60 % Cloudy	N
EPOS	5/30/13	3:00 pm	88/7	F	Moist	5-8 S	45	35 % Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/5	APPLE			
4/5	WHCL = white clover			
4/5	YERO = yellow rocket			
5/6	APPLE		Pre-flower	
5/6	DAND = dandelion			Many
5/6	WHCL = white clover			Moderate
5/6	HOWE = horseweed			Moderate
5/6	BHPL = buckhorn plantain			Moderate
5/6	CUDO = curly dock			Moderate
5/30	APPLE		Fruit	
5/30	DAND = dandelion	8″		Many
5/30	DOBG = downy bromegrass	18″		Many
5/30	HAFE = hard fescue	3-6″		Few
5/30	CUDO = curly dock	24″		Few
5/30	WHCA = white campion	12″		Few
5/30	WICA = wild carrot	8″		Many
5/30	BFTF = birdsfoot trefoil	7″		Many
5/30	ALFA = alfalfa			
5/30	YEFT = yellow foxtail			

Notes and Comments
1. Varieties: Luckyjon, Spartan, Gala, Honeycrisp, Fuji
2. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO_2 backpack sprayer. One pass on each side of row.
3. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
4. Glyphosate used: Roundup Powermax 5.5L
5. EPRE = early pre; LPRE = late pre; EPOS = early post
6. carfentrazone + sulfentrazone = Spartan Charge

Spring Weed Control in Apple - HTRC - 2013

Spring Weed Control in Apple - HTRC - 2013

Trial ID: 128-13-4 Location: HTRC, block 159-160
Protocol ID: 128-13-4 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE 29/May/13 RATING 1-10	QUGR 29/May/13 RATING 1-10	YEFT 29/May/13 RATING 1-10	ALFA 29/May/13 RATING 1-10
1	Untreated						1.0	4.7	9.0	1.0
2	mesotrione	4	SC	.094	lb ai/a	EPRE	1.0	6.3	4.0	4.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	0.25	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
3	mesotrione	4	SC	.188	lb ai/a	EPRE	1.0	10.0	3.7	4.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
4	mesotrione	4	SC	.094	lb ai/a	EPRE, LPRE	1.0	9.3	10.0	4.3
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE				
	NIS	100	SL	2.5	% v/v	EPRE, LPRE				
	MSO	100	SL	1	% v/v	EPRE, LPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE				
5	mesotrione	4	SC	.188	lb ai/a	EPRE, LPRE	1.0	10.0	10.0	5.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE				
	NIS	100	SL	2.5	% v/v	EPRE, LPRE				
	MSO	100	SL	1	% v/v	EPRE, LPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE				
6	mesotrione	4	SC	0.375	lb ai/a	EPRE	1.0	9.7	7.7	4.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
7	mesotrione	4	SC	.188	lb ai/a	EPRE	1.0	9.3	7.7	2.7
	simazine	4	F	4	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
8	mesotrione	4	SC	.188	lb ai/a	EPRE	1.0	6.3	8.7	2.3
	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
9	mesotrione	4	SC	.188	lb ai/a	EPRE	1.0	5.3	10.0	5.0
	pendimethalin	3.8	CS	4	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE 29/May/13 RATING 1-10	QUGR 29/May/13 RATING 1-10	YEFT 29/May/13 RATING 1-10	ALFA 29/May/13 RATING 1-10
10	mesotrione	4	SC	.188	lb ai/a	EPRE	1.0	10.0	10.0	6.3
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
11	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	1.0	9.3	9.0	2.7
	sulfentrazone	3.15	SE	.246						
	terbacil	80	WDG	0.8	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
12	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	1.0	9.3	10.0	3.0
	sulfentrazone	3.15	SE	.246						
	indaziflam	1.67	SC	.065	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
13	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	1.0	10.0	10.0	2.7
	sulfentrazone	3.15	SE	.146						
	diuron	80	DF	3	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
	Matrix	25	SG	0.016	lb ai/a	EPOS				
	NIS	100	SL	0.25	% v/v	EPOS				
14	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	1.0	7.0	10.0	3.3
	sulfentrazone	3.15	SE	.146						
	indaziflam	1.67	SC	.065	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
	halosulfuron	75	WG	.047	lb ai/a	EPOS				
	NIS	100	SL	0.25	% v/v	EPOS				
LSD (P=.05)							0.00	3.89	4.30	4.68
Standard Deviation							0.00	2.32	2.56	2.79
CV							0.0	27.81	29.98	75.6

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BFTF	BHPL	CUDO	DAND
Pest Code							BFTF	BHPL	CUDO	DAND
Crop Code										
Rating Date							29/May/13	29/May/13	29/May/13	29/May/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	Untreated						4.0	9.3	1.0	1.0
2	mesotrione	4	SC	.094	lb ai/a	EPRE	4.7	7.0	1.0	1.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	0.25	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
3	mesotrione	4	SC	.188	lb ai/a	EPRE	1.7	7.0	4.0	5.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
4	mesotrione	4	SC	.094	lb ai/a	EPRE, LPRE	7.7	10.0	7.0	8.3
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE				
	NIS	100	SL	2.5	% v/v	EPRE, LPRE				
	MSO	100	SL	1	% v/v	EPRE, LPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE				
5	mesotrione	4	SC	.188	lb ai/a	EPRE, LPRE	9.7	9.3	9.0	10.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE				
	NIS	100	SL	2.5	% v/v	EPRE, LPRE				
	MSO	100	SL	1	% v/v	EPRE, LPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE				
6	mesotrione	4	SC	0.375	lb ai/a	EPRE	4.7	10.0	6.7	7.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
7	mesotrione	4	SC	.188	lb ai/a	EPRE	4.0	7.7	4.0	5.3
	simazine	4	F	4	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
8	mesotrione	4	SC	.188	lb ai/a	EPRE	5.7	10.0	1.0	3.7
	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
9	mesotrione	4	SC	.188	lb ai/a	EPRE	5.0	7.7	4.0	3.7
	pendimethalin	3.8	CS	4	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
10	mesotrione	4	SC	.188	lb ai/a	EPRE	5.0	9.0	6.3	5.7
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BFTF	BHPL	CUDO	DAND
Pest Code										
Crop Code										
Rating Date							29/May/13	29/May/13	29/May/13	29/May/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
11	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	2.3	10.0	4.7	3.7
	sulfentrazone	3.15	SE	.246						
	terbacil	80	WDG	0.8	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
12	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	6.3	9.3	1.7	3.7
	sulfentrazone	3.15	SE	.246						
	indaziflam	1.67	SC	.065	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
13	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	7.0	9.3	7.0	6.0
	sulfentrazone	3.15	SE	.146						
	diuron	80	DF	3	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
	Matrix	25	SG	0.016	lb ai/a	EPOS				
	NIS	100	SL	0.25	% v/v	EPOS				
14	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	4.7	9.7	4.0	3.0
	sulfentrazone	3.15	SE	.146						
	indaziflam	1.67	SC	.065	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
	halosulfuron	75	WG	.047	lb ai/a	EPOS				
	NIS	100	SL	0.25	% v/v	EPOS				
LSD (P=.05)							6.11	4.04	7.11	4.07
Standard Deviation							3.64	2.40	4.23	2.42
CV							70.46	26.86	96.61	50.12

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HAFE	WICA	WHCA	APPLE
	Pest Code						HAFE	WICA	WHCA	
	Crop Code									APPLE
	Rating Date						29/May/13	29/May/13	29/May/13	18/Jun/13
	Rating Type						RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10
1	Untreated						1.7	1.0	7.0	1.0
2	mesotrione	4	SC	.094	lb ai/a	EPRE	6.3	4.0	7.0	1.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	0.25	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
3	mesotrione	4	SC	.188	lb ai/a	EPRE	4.0	3.7	4.3	1.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
4	mesotrione	4	SC	.094	lb ai/a	EPRE, LPRE	9.3	9.0	10.0	1.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE				
	NIS	100	SL	2.5	% v/v	EPRE, LPRE				
	MSO	100	SL	1	% v/v	EPRE, LPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE				
5	mesotrione	4	SC	.188	lb ai/a	EPRE, LPRE	10.0	10.0	10.0	1.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE				
	NIS	100	SL	2.5	% v/v	EPRE, LPRE				
	MSO	100	SL	1	% v/v	EPRE, LPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE				
6	mesotrione	4	SC	0.375	lb ai/a	EPRE	4.7	7.7	10.0	1.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
7	mesotrione	4	SC	.188	lb ai/a	EPRE	7.0	9.3	10.0	1.0
	simazine	4	F	4	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
8	mesotrione	4	SC	.188	lb ai/a	EPRE	5.3	6.0	10.0	1.0
	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
9	mesotrione	4	SC	.188	lb ai/a	EPRE	3.3	6.0	9.0	1.0
	pendimethalin	3.8	CS	4	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
10	mesotrione	4	SC	.188	lb ai/a	EPRE	6.7	4.3	9.0	1.0
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE				
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE				
	NIS	100	SL	2.5	% v/v	EPRE				
	MSO	100	SL	1	% v/v	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HAFE	WICA	WHCA	APPLE
Pest Code							HAFE	WICA	WHCA	
Crop Code										APPLE
Rating Date							29/May/13	29/May/13	29/May/13	18/Jun/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
11	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	8.7	4.7	8.3	1.0
	sulfentrazone	3.15	SE	.246						
	terbacil	80	WDG	0.8	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
12	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	6.3	6.3	8.7	1.0
	sulfentrazone	3.15	SE	.246						
	indaziflam	1.67	SC	.065	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
13	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	9.7	6.7	10.0	1.0
	sulfentrazone	3.15	SE	.146						
	diuron	80	DF	3	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
	Matrix	25	SG	0.016	lb ai/a	EPOS				
	NIS	100	SL	0.25	% v/v	EPOS				
14	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	7.0	8.7	10.0	1.0
	sulfentrazone	3.15	SE	.146						
	indaziflam	1.67	SC	.065	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	N Pak (AMS)	100	L	2.5	% v/v	EPRE				
	halosulfuron	75	WG	.047	lb ai/a	EPOS				
	NIS	100	SL	0.25	% v/v	EPOS				
LSD (P=.05)							4.37	5.49	3.87	0.00
Standard Deviation							2.61	3.27	2.31	0.00
CV							40.53	52.43	26.17	0.0

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	QUGR	HAFE	YEFT	ALFA	BFTF
	Pest Code										
	Crop Code										
	Rating Date						18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
1	Untreated						3.7	5.3	4.3	7.0	2.7
2	mesotrione	4	SC	.094	lb ai/a	EPRE	9.0	7.7	6.0	2.3	3.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	0.25	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
3	mesotrione	4	SC	.188	lb ai/a	EPRE	7.0	4.7	4.0	3.3	2.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
4	mesotrione	4	SC	.094	lb ai/a	EPRE, LPRE	8.7	9.0	3.3	6.0	7.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE					
	NIS	100	SL	2.5	% v/v	EPRE, LPRE					
	MSO	100	SL	1	% v/v	EPRE, LPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE					
5	mesotrione	4	SC	.188	lb ai/a	EPRE, LPRE	10.0	9.3	8.0	5.0	9.3
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE					
	NIS	100	SL	2.5	% v/v	EPRE, LPRE					
	MSO	100	SL	1	% v/v	EPRE, LPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE					
6	mesotrione	4	SC	0.375	lb ai/a	EPRE	8.0	7.7	5.0	6.0	4.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
7	mesotrione	4	SC	.188	lb ai/a	EPRE	8.7	6.3	1.0	3.0	4.0
	simazine	4	F	4	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
8	mesotrione	4	SC	.188	lb ai/a	EPRE	7.0	6.3	6.3	2.3	3.3
	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
9	mesotrione	4	SC	.188	lb ai/a	EPRE	9.0	6.3	8.3	6.3	5.7
	pendimethalin	3.8	CS	4	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
10	mesotrione	4	SC	.188	lb ai/a	EPRE	8.3	5.7	2.0	8.0	1.7
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	QUGR	HAFE	YEFT	ALFA	BFTF
	Pest Code						QUGR	HAFE	YEFT	ALFA	BFTF
	Crop Code										
	Rating Date						18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
11	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	9.0	9.0	7.7	3.7	1.3
	sulfentrazone	3.15	SE	.246							
	terbacil	80	WDG	0.8	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
12	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	7.7	9.0	9.7	6.7	5.7
	sulfentrazone	3.15	SE	.246							
	indaziflam	1.67	SC	.065	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
13	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	10.0	9.7	10.0	8.3	9.7
	sulfentrazone	3.15	SE	.146							
	diuron	80	DF	3	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
	Matrix	25	SG	0.016	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
14	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	10.0	10.0	10.0	9.3	9.7
	sulfentrazone	3.15	SE	.146							
	indaziflam	1.67	SC	.065	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
	LSD (P=.05)						2.35	3.55	4.71	5.29	3.63
	Standard Deviation						1.40	2.11	2.81	3.15	2.16
	CV						16.89	27.93	45.87	57.04	42.59

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BHPL	CUDO	DAND	OVERALL	WICA
Pest Code											
Crop Code											
Rating Date							18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Untreated						4.7	1.3	1.0	1.7	1.0
2	mesotrione	4	SC	.094	lb ai/a	EPRE	4.0	1.0	1.0	1.3	2.3
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	0.25	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
3	mesotrione	4	SC	.188	lb ai/a	EPRE	7.3	4.0	5.7	2.0	2.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
4	mesotrione	4	SC	.094	lb ai/a	EPRE, LPRE	5.7	4.3	7.7	4.7	8.7
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE					
	NIS	100	SL	2.5	% v/v	EPRE, LPRE					
	MSO	100	SL	1	% v/v	EPRE, LPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE					
5	mesotrione	4	SC	.188	lb ai/a	EPRE, LPRE	9.7	7.3	10.0	7.0	10.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE, LPRE					
	NIS	100	SL	2.5	% v/v	EPRE, LPRE					
	MSO	100	SL	1	% v/v	EPRE, LPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE, LPRE					
6	mesotrione	4	SC	0.375	lb ai/a	EPRE	8.0	6.3	4.3	3.3	6.0
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
7	mesotrione	4	SC	.188	lb ai/a	EPRE	5.0	6.3	3.7	1.7	5.3
	simazine	4	F	4	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
8	mesotrione	4	SC	.188	lb ai/a	EPRE	5.7	2.3	2.3	3.7	3.7
	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
9	mesotrione	4	SC	.188	lb ai/a	EPRE	6.7	5.0	3.0	4.0	2.3
	pendimethalin	3.8	CS	4	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
10	mesotrione	4	SC	.188	lb ai/a	EPRE	7.3	5.3	1.0	2.7	3.7
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE					
	paraquat dichloride	2	SL	0.75	lb ai/a	EPRE					
	NIS	100	SL	2.5	% v/v	EPRE					
	MSO	100	SL	1	% v/v	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					

Spring Weed Control in Apple - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BHPL	CUDO	DAND	OVERALL	WICA
Pest Code											
Crop Code											
Rating Date							18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13	18/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
11	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	10.0	3.0	1.7	4.7	4.3
	sulfentrazone	3.15	SE	.246							
	terbacil	80	WDG	0.8	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
12	carfentrazone	0.35	SE	.0273	lb ai/a	EPRE	10.0	1.3	2.0	5.7	4.0
	sulfentrazone	3.15	SE	.246							
	indaziflam	1.67	SC	.065	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
13	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	10.0	9.3	9.7	8.7	9.7
	sulfentrazone	3.15	SE	.146							
	diuron	80	DF	3	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
	Matrix	25	SG	0.016	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
14	carfentrazone	0.35	SE	.0162	lb ai/a	EPRE, EPOS	10.0	9.7	9.7	9.3	10.0
	sulfentrazone	3.15	SE	.146							
	indaziflam	1.67	SC	.065	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	N Pak (AMS)	100	L	2.5	% v/v	EPRE					
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
LSD (P=.05)							5.70	5.45	3.62	2.17	4.00
Standard Deviation							3.40	3.24	2.16	1.29	2.38
CV							45.74	68.14	48.19	30.04	45.29

Preemergence Weed Control in Blueberry - SWMREC - 2013

Project Code: 127-13-1 **Location: Benton Harbor, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Blueberry **Variety: Blue Crop**
Planting Method: Transplant **Planting Date: 1990**
Spacing: 4 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 30 ft long

Soil Type: Selfridge Loamy Sand **OM: 2.3%** **pH: 4.2**
Sand: 66% **Silt: 20%** **Clay: 0.4%** **CEC: 11.4**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/4/13	2:00 pm	52/35	F	Dry	4-6 SW	16	0% Cloudy	N
EPOS	6/10/13	11:30 am	73/63	F	Damp	1-2 SW	81	100% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/4	BLBE		Pre bud break	
4/4	PERG = perennial ryegrass	1-2″	Dormant	Moderate
4/4	COCW = common chickweed	1-2″	Few flowers	Many
4/4	PUDN = purple deadnettle	1-2″	Foliar	Many
6/10	BLBE		Fruit green	25%
6/10	BLME = black medic	2-3″		Few
6/10	HAVE = hairy vetch	6-24″	Flower	Moderate
6/10	HOWE = horseweed	4-6″		Few
6/10	YEHW = yellow hawkweed	6-20″	Flower	Moderate
	REFE = red fescue			
	DAND = dandelion			
	GALI = galinsoga			
	CABR = California brome			
	BHPL = buckhorn plantain			
	TRCV = trailing crownvetch			
	BYGR = barnyardgrass			
	YENS = yellow nutsedge			
	FAPA = fall panicum			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Preemergence Weed Control in Blueberry - SWMREC - 2013

Preemergence Weed Control in Blueberry - SWMREC - 2013

Trial ID: 127-13-1 Location: Benton Harbor, MI
Protocol ID: 127-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BLBE 14/May/13 RATING 1-10	QUGR 14/May/13 RATING 1-10	REFE 14/May/13 RATING 1-10	DAND 14/May/13 RATING 1-10	GALI 14/May/13 RATING 1-10
1	Untreated Control						2.3	5.0	3.7	8.7	1.0
2	oryzalin	4	L	3	lb ai/a	EPRE	1.7	9.7	8.3	10.0	8.7
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
3	oryzalin	4	L	4	lb ai/a	EPRE	1.0	10.0	9.3	7.3	10.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
4	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	1.3	9.3	7.3	9.0	8.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
5	KFD-163-01	3.2	SC	3.2	lb ai/a	EPRE	1.0	9.0	9.0	8.3	10.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
6	oryzalin	4	L	3	lb ai/a	EPRE	1.7	10.0	10.0	9.7	10.0
	diuron	80	DF	1.6	lb ai/a	EPRE					
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
7	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	diuron	80	DF	1.6	lb ai/a	EPRE					
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
8	diuron	80	DF	3.2	lb ai/a	EPRE	1.3	10.0	10.0	7.7	10.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
9	diuron	80	DF	1.6	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE					
	rimsulfuron	25	DF	.063	lb ai/a	EPRE					
	NIS	100	SL	0.25	% v/v	EPRE					
10	diuron	80	DF	1.6	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
	rimsulfuron	25	DF	.063	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
11	terbacil	80	WDG	1.6	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	diuron	80	DF	3.2	lb ai/a	EPRE	1.3	7.7	9.0	9.0	8.3
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
LSD (P=.05)							1.32	2.66	2.80	2.20	2.28
Standard Deviation							0.78	1.57	1.65	1.30	1.34
CV							59.51	17.06	18.57	14.24	15.17

Preemergence Weed Control in Blueberry - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PUDN	TRCV	BLBE	CABR	BHPL
Pest Code											
Crop Code									BLBE		
Rating Date							14/May/13	14/May/13	10/Jun/13	10/Jun/13	10/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Untreated Control						1.0	10.0	1.0	1.0	10.0
2	oryzalin	4	L	3	lb ai/a	EPRE	3.3	7.0	1.0	6.3	10.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
3	oryzalin	4	L	4	lb ai/a	EPRE	6.7	10.0	1.0	8.7	7.7
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
4	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	5.7	10.0	1.0	4.0	9.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
5	KFD-163-01	3.2	SC	3.2	lb ai/a	EPRE	5.7	10.0	1.0	6.0	10.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
6	oryzalin	4	L	3	lb ai/a	EPRE	9.3	7.7	1.0	9.7	10.0
	diuron	80	DF	1.6	lb ai/a	EPRE					
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
7	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	8.7	4.7	1.0	9.3	6.7
	diuron	80	DF	1.6	lb ai/a	EPRE					
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
8	diuron	80	DF	3.2	lb ai/a	EPRE	9.0	9.0	1.0	8.0	3.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
9	diuron	80	DF	1.6	lb ai/a	EPRE	8.0	10.0	1.0	9.3	9.3
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE					
	rimsulfuron	25	DF	.063	lb ai/a	EPRE					
	NIS	100	SL	0.25	% v/v	EPRE					
10	diuron	80	DF	1.6	lb ai/a	EPRE	9.0	9.3	1.0	10.0	10.0
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
	rimsulfuron	25	DF	.063	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
11	terbacil	80	WDG	1.6	lb ai/a	EPRE	9.7	10.0	1.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	diuron	80	DF	3.2	lb ai/a	EPRE	5.0	4.3	1.0	5.3	9.3
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
LSD (P=.05)							3.32	3.88	0.00	2.67	3.90
Standard Deviation							1.96	2.29	0.00	1.58	2.30
CV							29.03	26.96	0.0	21.57	26.23

Preemergence Weed Control in Blueberry - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BLME	HAVE	HOWE	YEHW	BLBE
Pest Code											
Crop Code											
Rating Date							10/Jun/13	10/Jun/13	10/Jun/13	10/Jun/13	3/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Untreated Control						4.0	9.0	8.3	1.0	1.7
2	oryzalin	4	L	3	lb ai/a	EPRE	7.0	7.0	7.3	9.3	1.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
3	oryzalin	4	L	4	lb ai/a	EPRE	2.3	9.7	7.7	3.3	1.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
4	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	4.0	10.0	6.7	4.3	1.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
5	KFD-163-01	3.2	SC	3.2	lb ai/a	EPRE	4.7	7.7	6.0	3.7	1.7
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
6	oryzalin	4	L	3	lb ai/a	EPRE	10.0	6.3	6.3	10.0	1.3
	diuron	80	DF	1.6	lb ai/a	EPRE					
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
7	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	6.3	4.0	4.0	7.7	1.7
	diuron	80	DF	1.6	lb ai/a	EPRE					
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
8	diuron	80	DF	3.2	lb ai/a	EPRE	7.3	9.0	8.0	7.3	1.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE					
9	diuron	80	DF	1.6	lb ai/a	EPRE	10.0	9.3	10.0	8.3	1.0
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE					
	rimsulfuron	25	DF	.063	lb ai/a	EPRE					
	NIS	100	SL	0.25	% v/v	EPRE					
10	diuron	80	DF	1.6	lb ai/a	EPRE	9.7	7.3	9.3	10.0	1.0
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
	rimsulfuron	25	DF	.063	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
11	terbacil	80	WDG	1.6	lb ai/a	EPRE	10.0	9.3	10.0	9.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	diuron	80	DF	3.2	lb ai/a	EPRE	9.0	3.3	8.0	7.0	1.7
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
LSD (P=.05)							5.64	4.56	4.93	5.66	1.26
Standard Deviation							3.33	2.69	2.91	3.34	0.74
CV							47.38	35.12	38.11	49.11	55.77

Preemergence Weed Control in Blueberry - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BYGR	YENS	HAVE	HOWE	BLBE	BYGR
Pest Code												
Crop Code											BLBE	
Rating Date							3/Jul/13	3/Jul/13	3/Jul/13	3/Jul/13	14/Aug/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated Control						1.0	6.0	10.0	9.0	1.5	2.3
2	oryzalin	4	L	3	lb ai/a	EPRE	2.3	1.7	7.0	6.3	1.7	4.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE						
3	oryzalin	4	L	4	lb ai/a	EPRE	8.0	6.0	9.0	3.7	1.0	8.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE						
4	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	1.7	6.0	10.0	9.0	1.3	2.7
	paraquat dichloride	2	SL	1	lb ai/a	EPRE						
5	KFD-163-01	3.2	SC	3.2	lb ai/a	EPRE	4.7	3.0	9.3	6.3	1.7	3.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE						
6	oryzalin	4	L	3	lb ai/a	EPRE	8.3	9.0	6.3	9.7	1.0	4.3
	diuron	80	DF	1.6	lb ai/a	EPRE						
	paraquat dichloride	2	SL	1	lb ai/a	EPRE						
7	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	8.7	7.0	4.0	7.7	1.3	6.0
	diuron	80	DF	1.6	lb ai/a	EPRE						
	paraquat dichloride	2	SL	1	lb ai/a	EPRE						
8	diuron	80	DF	3.2	lb ai/a	EPRE	6.7	10.0	8.7	9.3	1.3	1.7
	paraquat dichloride	2	SL	1	lb ai/a	EPRE						
9	diuron	80	DF	1.6	lb ai/a	EPRE	7.7	7.0	9.0	10.0	1.7	2.7
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE						
	rimsulfuron	25	DF	.063	lb ai/a	EPRE						
	NIS	100	SL	0.25	% v/v	EPRE						
10	diuron	80	DF	1.6	lb ai/a	EPRE	9.7	10.0	7.0	10.0	1.0	5.7
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE						
	glyphosate	5.5	L	1	lb ai/a	EPRE						
	rimsulfuron	25	DF	.063	lb ai/a	EPOS						
	NIS	100	SL	0.25	% v/v	EPOS						
11	terbacil	80	WDG	1.6	lb ai/a	EPRE	9.0	10.0	10.0	9.3	1.3	8.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
12	diuron	80	DF	3.2	lb ai/a	EPRE	8.3	10.0	4.3	10.0	1.3	8.0
	halosulfuron	75	WG	.047	lb ai/a	EPOS						
LSD (P=.05)							3.06	4.80	5.49	2.66	1.15	4.31
Standard Deviation							1.81	2.84	3.24	1.57	0.68	2.55
CV							28.56	39.73	41.1	18.79	50.27	53.29

Preemergence Weed Control in Blueberry - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	FAPA	HOWE
Pest Code							FAPA	HOWE
Crop Code								
Rating Date							14/Aug/13	14/Aug/13
Rating Type							RATING	RATING
Rating Unit							1-10	1-10
1	Untreated Control						2.7	4.3
2	oryzalin	4	L	3	lb ai/a	EPRE	6.3	4.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE		
3	oryzalin	4	L	4	lb ai/a	EPRE	9.0	4.7
	paraquat dichloride	2	SL	1	lb ai/a	EPRE		
4	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	6.3	5.3
	paraquat dichloride	2	SL	1	lb ai/a	EPRE		
5	KFD-163-01	3.2	SC	3.2	lb ai/a	EPRE	6.3	2.7
	paraquat dichloride	2	SL	1	lb ai/a	EPRE		
6	oryzalin	4	L	3	lb ai/a	EPRE	5.7	8.7
	diuron	80	DF	1.6	lb ai/a	EPRE		
	paraquat dichloride	2	SL	1	lb ai/a	EPRE		
7	KFD-163-01	3.2	SC	2.4	lb ai/a	EPRE	6.3	9.0
	diuron	80	DF	1.6	lb ai/a	EPRE		
	paraquat dichloride	2	SL	1	lb ai/a	EPRE		
8	diuron	80	DF	3.2	lb ai/a	EPRE	6.0	7.0
	paraquat dichloride	2	SL	1	lb ai/a	EPRE		
9	diuron	80	DF	1.6	lb ai/a	EPRE	2.7	10.0
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE		
	rimsulfuron	25	DF	.063	lb ai/a	EPRE		
	NIS	100	SL	0.25	% v/v	EPRE		
10	diuron	80	DF	1.6	lb ai/a	EPRE	9.3	10.0
	flumioxazin	51	WDG	0.191	lb ai/a	EPRE		
	glyphosate	5.5	L	1	lb ai/a	EPRE		
	rimsulfuron	25	DF	.063	lb ai/a	EPOS		
	NIS	100	SL	0.25	% v/v	EPOS		
11	terbacil	80	WDG	1.6	lb ai/a	EPRE	10.0	7.3
	glyphosate	5.5	L	1	lb ai/a	EPRE		
12	diuron	80	DF	3.2	lb ai/a	EPRE	9.7	8.7
	halosulfuron	75	WG	.047	lb ai/a	EPOS		
LSD (P=.05)							3.71	5.09
Standard Deviation							2.19	3.00
CV							32.73	44.15

Preemergence Weed Control in Blueberry with Spartan, Alion, and Trellis - SWMREC - 2013

Project Code: 127-13-2 **Location: Benton Harbor, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Blueberry **Variety: Blue Crop**
Planting Method: Seedling TP **Planting Date: 1990**
Spacing: 4 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 30 ft long

Soil Type: Selfridge Loamy Sand **OM: 2.3%** **pH: 4.2**
Sand: 66% **Silt: 20%** **Clay: 0.4%** **CEC: 11.4**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/4/13	2:00 pm	60/44	F	Dry	4-6 W	16	0% Cloudy	N
EPOS	6/10/13	11:30 am	73/63	F	Damp	1-2 SW	81	100% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/4	BLBE		Dormant	
4/4	PERG = perennial ryegrass	1-2″	Dormant	Many
4/4	PUDN = purple deadnettle	1-2″	Green	Many
6/10	BLBE		Fruit green	
6/10	HAVE = hairy vetch	6-24″	Flower	Moderate
6/10	LACG = large crabgrass	4-6″		Moderate
6/10	HOWE = horseweed	4-6″		Moderate
	DAND = dandelion			
	GALI = galinsoga			
	CABR = California brome			
	BHPL = buckhorn plantain			
	BLME = black medic			
	FIPA = field pansy			
	RESO = red sorrel			
	YEHW = yellow hawkweed			
	BYGR = barnyard grass			
	FAPA = fall panicum			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Glyphosate: Roundup Powermax 5.5L.

Preemergence Weed Control in Blueberry with Spartan, Alion, and Trellis - SWMREC - 2013

Preemergence Weed Control in Blueberry with Spartan, Alion, and Trellis - SWMREC - 2013

Trial ID: 127-13-2 Location: Benton Harbor, MI
Protocol ID: 127-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BLBE 14/May/13 RATING 1-10	QUGR 14/May/13 RATING 1-10	REFE 14/May/13 RATING 1-10	DAND 14/May/13 RATING 1-10	GALI 14/May/13 RATING 1-10
1	sulfentrazone	4	F	.313	lb ai/a	EPRE	1.3	10.0	10.0	10.0	10.0
	terbacil	80	WDG	1.6	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
2	sulfentrazone	4	F	.313	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	mesotrione	4	SC	.188	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
3	sulfentrazone	4	F	.188	lb ai/a	EPRE	1.0	10.0	10.0	7.0	10.0
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
	Spartan Charge	3.5	SE	0.162	lb ai/a	EPOS					
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
4	glufosinate	2.34	L	1	lb ai/a	EPRE	1.0	10.0	10.0	10.0	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	1.0	10.0	10.0	9.7	9.0
	glufosinate	2.34	L	1	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	glufosinate	2.34	L	1	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	isoxaben	75	DF	0.5	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	isoxaben	75	DF	2	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
10	oxyfluorfen	4	SC	2	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
11	mesotrione	4	SC	.188	lb ai/a	EPRE	1.0	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	dichlobenil	1.4	CS	4	lb ai/a	EPRE	1.3	7.7	5.0	9.3	10.0
13	Untreated Control						1.0	9.3	6.7	7.0	9.7
LSD (P=.05)							0.39	0.61	1.85	3.39	0.61
Standard Deviation							0.23	0.36	1.10	2.01	0.36
CV							21.99	3.73	11.73	21.25	3.7

Preemergence Weed Control in Blueberry with Spartan, Alion, and Trellis - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PUDN	TRCV	BLBE	CABR	BHPL
Pest Code							PUDN	TRCV		CABR	BHPL
Crop Code									BLBE		
Rating Date							14/May/13	14/May/13	10/Jun/13	10/Jun/13	10/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	sulfentrazone	4	F	.313	lb ai/a	EPRE	9.7	10.0	1.0	10.0	10.0
	terbacil	80	WDG	1.6	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
2	sulfentrazone	4	F	.313	lb ai/a	EPRE	9.0	10.0	1.0	9.3	10.0
	mesotrione	4	SC	.188	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
3	sulfentrazone	4	F	.188	lb ai/a	EPRE	9.3	10.0	1.0	10.0	10.0
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
	Spartan Charge	3.5	SE	0.162	lb ai/a	EPOS					
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
4	glufosinate	2.34	L	1	lb ai/a	EPRE	9.3	10.0	1.0	10.0	6.3
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	8.0	10.0	1.0	7.7	10.0
	glufosinate	2.34	L	1	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	9.3	10.0	1.0	9.7	10.0
	glufosinate	2.34	L	1	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	isoxaben	75	DF	0.5	lb ai/a	EPRE	9.7	10.0	1.0	9.7	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	9.7	10.0	1.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	isoxaben	75	DF	2	lb ai/a	EPRE	9.7	10.0	1.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
10	oxyfluorfen	4	SC	2	lb ai/a	EPRE	9.3	9.0	1.0	9.7	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
11	mesotrione	4	SC	.188	lb ai/a	EPRE	10.0	9.3	1.0	9.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	dichlobenil	1.4	CS	4	lb ai/a	EPRE	8.3	6.0	1.0	1.0	10.0
13	Untreated Control						6.0	7.0	1.0	6.0	6.3
LSD (P=.05)							2.48	3.09	0.00	2.97	3.19
Standard Deviation							1.47	1.83	0.00	1.76	1.89
CV							16.3	19.64	0.0	20.46	20.05

Preemergence Weed Control in Blueberry with Spartan, Alion, and Trellis - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BLME	FIPA	HAVE	HOWE	RESO
Pest Code											
Crop Code											
Rating Date							10/Jun/13	10/Jun/13	10/Jun/13	10/Jun/13	10/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	sulfentrazone	4	F	.313	lb ai/a	EPRE	10.0	7.0	10.0	10.0	10.0
	terbacil	80	WDG	1.6	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
2	sulfentrazone	4	F	.313	lb ai/a	EPRE	9.3	9.3	10.0	10.0	10.0
	mesotrione	4	SC	.188	lb ai/a	EPRE					
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
3	sulfentrazone	4	F	.188	lb ai/a	EPRE	10.0	7.0	8.7	10.0	10.0
	glyphosate	5.5	L	.95	lb ai/a	EPRE					
	AMS	100	SG	3.4	lb ai/a	EPRE					
	Spartan Charge	3.5	SE	0.162	lb ai/a	EPOS					
	halosulfuron	75	WG	.047	lb ai/a	EPOS					
	NIS	100	SL	0.25	% v/v	EPOS					
4	glufosinate	2.34	L	1	lb ai/a	EPRE	10.0	10.0	10.0	9.7	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	10.0	6.0	10.0	10.0	6.3
	glufosinate	2.34	L	1	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	10.0	10.0	10.0	10.0	7.3
	glufosinate	2.34	L	1	lb ai/a	EPRE					
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	isoxaben	75	DF	0.5	lb ai/a	EPRE	10.0	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	isoxaben	75	DF	1	lb ai/a	EPRE	9.0	10.0	9.7	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	isoxaben	75	DF	2	lb ai/a	EPRE	9.7	10.0	10.0	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
10	oxyfluorfen	4	SC	2	lb ai/a	EPRE	9.0	8.7	8.3	10.0	8.3
	glyphosate	5.5	L	1	lb ai/a	EPRE					
11	mesotrione	4	SC	.188	lb ai/a	EPRE	10.0	9.0	10.0	10.0	7.7
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	dichlobenil	1.4	CS	4	lb ai/a	EPRE	7.0	1.3	4.0	3.7	10.0
13	Untreated Control						7.0	4.0	7.0	6.7	5.7
LSD (P=.05)							3.64	4.99	3.56	2.53	4.06
Standard Deviation							2.16	2.96	2.11	1.50	2.41
CV							23.19	37.64	23.36	16.27	27.18

Preemergence Weed Control in Blueberry with Spartan, Alion, and Trellis - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	YEHW	BLBE	BYGR	HAVE	HOWE	BLBE
Pest Code												
Crop Code								BLBE				BLBE
Rating Date							10/Jun/13	3/Jul/13	3/Jul/13	3/Jul/13	3/Jul/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	sulfentrazone	4	F	.313	lb ai/a	EPRE	10.0	1.0	8.3	10.0	10.0	1.3
	terbacil	80	WDG	1.6	lb ai/a	EPRE						
	glyphosate	5.5	L	.95	lb ai/a	EPRE						
	AMS	100	SG	3.4	lb ai/a	EPRE						
2	sulfentrazone	4	F	.313	lb ai/a	EPRE	10.0	1.0	4.3	10.0	9.7	1.0
	mesotrione	4	SC	.188	lb ai/a	EPRE						
	glyphosate	5.5	L	.95	lb ai/a	EPRE						
	AMS	100	SG	3.4	lb ai/a	EPRE						
3	sulfentrazone	4	F	.188	lb ai/a	EPRE	9.0	1.0	3.0	9.7	10.0	1.0
	glyphosate	5.5	L	.95	lb ai/a	EPRE						
	AMS	100	SG	3.4	lb ai/a	EPRE						
	Spartan Charge	3.5	SE	0.162	lb ai/a	EPOS						
	halosulfuron	75	WG	.047	lb ai/a	EPOS						
	NIS	100	SL	0.25	% v/v	EPOS						
4	glufosinate	2.34	L	1	lb ai/a	EPRE	8.7	1.0	3.0	10.0	7.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	10.0	1.0	6.3	10.0	8.3	1.3
	glufosinate	2.34	L	1	lb ai/a	EPRE						
	glyphosate	5.5	L	1	lb ai/a	EPRE						
6	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	10.0	1.0	8.3	10.0	9.3	1.0
	glufosinate	2.34	L	1	lb ai/a	EPRE						
	glyphosate	5.5	L	1	lb ai/a	EPRE						
7	isoxaben	75	DF	0.5	lb ai/a	EPRE	9.7	1.0	3.3	10.0	8.0	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
8	isoxaben	75	DF	1	lb ai/a	EPRE	9.3	1.3	1.7	10.0	9.0	1.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
9	isoxaben	75	DF	2	lb ai/a	EPRE	10.0	1.3	3.7	10.0	9.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
10	oxyfluorfen	4	SC	2	lb ai/a	EPRE	10.0	1.3	6.3	7.3	8.0	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
11	mesotrione	4	SC	.188	lb ai/a	EPRE	10.0	1.0	1.7	7.7	9.0	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
12	dichlobenil	1.4	CS	4	lb ai/a	EPRE	10.0	1.3	2.7	7.0	4.0	2.0
13	Untreated Control						3.7	1.3	1.3	10.0	4.7	1.0
LSD (P=.05)							1.86	0.56	3.84	3.40	3.26	0.47
Standard Deviation							1.10	0.33	2.28	2.02	1.93	0.28
CV							11.92	29.55	54.81	21.59	23.55	24.04

Preemergence Weed Control in Blueberry with Spartan, Alion, and Trellis - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BYGR	FAPA	LACG	HOWE
	Pest Code									
	Crop Code									
	Rating Date						14/Aug/13	14/Aug/13	14/Aug/13	14/Aug/13
	Rating Type						RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10
1	sulfentrazone	4	F	.313	lb ai/a	EPRE	8.3	10.0	6.0	10.0
	terbacil	80	WDG	1.6	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	AMS	100	SG	3.4	lb ai/a	EPRE				
2	sulfentrazone	4	F	.313	lb ai/a	EPRE	7.7	10.0	4.0	8.7
	mesotrione	4	SC	.188	lb ai/a	EPRE				
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	AMS	100	SG	3.4	lb ai/a	EPRE				
3	sulfentrazone	4	F	.188	lb ai/a	EPRE	8.0	9.0	1.3	7.7
	glyphosate	5.5	L	.95	lb ai/a	EPRE				
	AMS	100	SG	3.4	lb ai/a	EPRE				
	Spartan Charge	3.5	SE	0.162	lb ai/a	EPOS				
	halosulfuron	75	WG	.047	lb ai/a	EPOS				
	NIS	100	SL	0.25	% v/v	EPOS				
4	glufosinate	2.34	L	1	lb ai/a	EPRE	5.7	7.7	3.7	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE				
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	5.3	10.0	6.3	6.3
	glufosinate	2.34	L	1	lb ai/a	EPRE				
	glyphosate	5.5	L	1	lb ai/a	EPRE				
6	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	3.3	9.3	6.0	10.0
	glufosinate	2.34	L	1	lb ai/a	EPRE				
	glyphosate	5.5	L	1	lb ai/a	EPRE				
7	isoxaben	75	DF	0.5	lb ai/a	EPRE	1.3	7.0	1.7	9.0
	glyphosate	5.5	L	1	lb ai/a	EPRE				
8	isoxaben	75	DF	1	lb ai/a	EPRE	1.3	7.0	3.3	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE				
9	isoxaben	75	DF	2	lb ai/a	EPRE	4.7	5.3	2.3	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE				
10	oxyfluorfen	4	SC	2	lb ai/a	EPRE	7.3	9.3	4.7	9.7
	glyphosate	5.5	L	1	lb ai/a	EPRE				
11	mesotrione	4	SC	.188	lb ai/a	EPRE	4.7	7.7	5.3	9.0
	glyphosate	5.5	L	1	lb ai/a	EPRE				
12	dichlobenil	1.4	CS	4	lb ai/a	EPRE	3.0	10.0	6.3	4.7
13	Untreated Control						6.7	8.7	4.7	7.7
LSD (P=.05)							4.37	3.75	4.77	4.35
Standard Deviation							2.59	2.23	2.83	2.58
CV							50.1	26.07	66.13	29.77

IR4 Blueberry Efficacy and Crop Safety with Indaziflam - HTRC

Project Code: IR4-127-13-3 **Location: East Lansing, MI**
Block 114

Personnel: Bernard H. Zandstra, Nicole Schroeder
Crop: Blueberry **Variety: Multiple**
Planting Method: Transplant **Planting Date: 1971** **Harvest Date:**
Spacing: 4-5 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 4**
Plot Size: 10 ft wide x 40 ft long

Soil Type: Capac Loam **OM: 4.1%** **pH: 5.3**
Sand: 71% **Silt: 17%** **Clay: 12%** **CEC: 12.0**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/16/13	10:30 am	72/58	F	Dry	2-4 NW	54	20% Cloudy	N
PO1	7/16/13	12:00 pm	89/77	F	Moist	2-4 SW	71	50% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/16	BLBE = blueberry		flowering	
	GRASS = unknown grass			
	PERG = perennial ryegrass			
	WLDGRP = wild grape			
	GORO = goldenrod			
	WICA = wild carrot			
	VICR = Virginia creeper			
	RECL = red clover			
7/16	BLBE = blueberry		immature fruit	

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

IR4 Blueberry Efficacy and Crop Safety with Indaziflam - HTRC

IR4 Blueberry E&P with Indaziflam - HTRC - 2013

Trial ID: IR4-127-13-3 Location: HTRC, block 114
Protocol ID: IR4-127-13-3 Investigator: Dr. Bernard Zandstra
Study Director: Nicole Schroeder

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BLBE 23/Jul/13 RATING 1-10	GRASS 23/Jul/13 RATING 1-10	PERG 23/Jul/13 RATING 1-10	WLDGRP 23/Jul/13 RATING 1-10	GORO 23/Jul/13 RATING 1-10	WICA 23/Jul/13 RATING 1-10
1	Untreated						1.0	4.0	3.8	5.0	4.5	7.5
2	flumioxazin	51	WDG	0.383	lb ai/a	LPRE, LPOS	1.3	2.5	2.0	2.3	3.5	3.8
3	indaziflam	1.67	SC	0.065	lb ai/a	LPRE, LPOS	1.3	3.5	4.3	2.0	4.5	3.5
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE, LPOS	1.0	3.0	2.0	4.3	3.5	3.3
LSD (P=.05)							0.60	4.18	3.69	3.96	4.18	2.32
Standard Deviation							0.37	2.61	2.31	2.48	2.61	1.45
CV							33.13	80.43	76.98	73.41	65.35	32.29

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	VICR 23/Jul/13 RATING 1-10	BLBE 8/Aug/13 RATING 1-10	GRASS 8/Aug/13 RATING 1-10	GORO 8/Aug/13 RATING 1-10	WICA 8/Aug/13 RATING 1-10	RECL 8/Aug/13 RATING 1-10
1	Untreated						8.0	1.0	5.5	6.5	8.8	7.8
2	flumioxazin	51	WDG	0.383	lb ai/a	LPRE, LPOS	3.3	1.3	4.3	5.3	3.3	8.5
3	indaziflam	1.67	SC	0.065	lb ai/a	LPRE, LPOS	7.8	1.3	3.5	5.5	3.0	5.5
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE, LPOS	4.0	1.0	1.8	2.0	2.5	5.5
LSD (P=.05)							5.25	0.60	1.51	2.87	2.81	6.18
Standard Deviation							3.28	0.37	0.94	1.80	1.76	3.87
CV							57.09	33.13	25.14	37.34	40.14	56.76

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	VICR 8/Aug/13 RATING 1-10
1	Untreated						7.3
2	flumioxazin	51	WDG	0.383	lb ai/a	LPRE, LPOS	7.0
3	indaziflam	1.67	SC	0.065	lb ai/a	LPRE, LPOS	7.5
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE, LPOS	4.3
LSD (P=.05)							4.38
Standard Deviation							2.74
CV							42.13

Preemergence Weed Control in Cherry - CRC - 2013

Project Code: 128-13-5 **Location: Clarksville, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Cherry **Variety: Ulster, Heidelfinger**
Planting Method: Transplant **Planting Date: 1995**
Spacing: 8 ft, 5 trees/plot **Row Spacing: 16 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 11 ft wide x 40 ft long

Soil Type: Dryden Sandy Loam **OM: 1.5%** **pH: 6.8**
Sand: 64% **Silt: 22%** **Clay: 14%** **CEC: 5.5**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/15/13	10:45 am	59/42	F	Moist	6 SW	64	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/15	CHERRY			
4/15	DAND = dandelion			Many
4/15	COCW = common chickweed	1-2″		Many
4/15	HENB = henbit			Many
4/15	YERO = yellow rocket	2-3″		Many
4/15	CAWE = carpetweed	4-5″		Moderate
4/15	PUDN = purple deadnettle	2″		Moderate
4/15	ANBG = annual bluegrass			
4/15	DOBG = downy bromegrass			
4/15	PERG = perennial ryegrass			
4/15	CWBS = catchweed bedstraw			
4/15	HOWE = horseweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. oxyfluorfen + penoxsulam = Pindar 4.013.

Preemergence Weed Control in Cherry - CRC - 2013

Preemergence Weed Control in Cherry - CRC - 2013

Trial ID: 128-13-5 Location: Clarksville
Protocol ID: 128-13-5 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CHERRY 15/May/13 RATING 1-10	ANBG 15/May/13 RATING 1-10	DOBG 15/May/13 RATING 1-10	PERG 15/May/13 RATING 1-10	CWBS 15/May/13 RATING 1-10	DAND 15/May/13 RATING 1-10
1	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE13	1.0	10.0	10.0	10.0	10.0	10.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
2	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE13	1.0	10.0	8.7	10.0	9.7	9.0
	penoxsulam	.083	SC	.031								
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
3	oxyfluorfen	3.93	SC	2.95	lb ai/a	EPRE13	1.0	10.0	10.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.062								
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
4	oxyfluorfen	4	SC	1.5	lb ai/a	FALL13	1.0	2.3	6.0	9.7	1.0	6.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
5	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL13	1.0	1.0	4.0	5.7	4.0	6.0
	penoxsulam	.083	SC	.031								
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
6	oxyfluorfen	3.93	SC	2.95	lb ai/a	FALL13	1.0	1.0	3.7	7.7	1.0	4.7
	penoxsulam	.083	SC	.062								
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
7	isoxaben	75	DF	0.75	lb ai/a	EPRE13	1.0	9.3	10.0	10.0	8.3	9.3
	glyphosate	5.4	L	1.5	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
8	isoxaben	75	DF	2	lb ai/a	EPRE13	1.0	10.0	10.0	9.7	9.7	10.0
	glyphosate	5.4	L	1.5	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
9	isoxaben	75	DF	0.75	lb ai/a	FALL13	1.0	3.3	8.7	8.7	4.0	7.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
10	isoxaben	75	DF	2	lb ai/a	FALL13	1.0	1.7	7.0	9.3	1.7	7.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE13	1.0	9.0	9.7	9.3	10.0	9.7
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
12	glyphosate	5.4	L	1.35	lb ai/a	FALL13	1.3	2.3	7.0	6.3	6.0	6.3
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
LSD (P=.05)							0.28	2.52	5.21	2.92	3.28	2.78
Standard Deviation							0.17	1.49	3.07	1.73	1.94	1.64
CV							16.22	25.5	38.97	19.49	30.84	20.77

Preemergence Weed Control in Cherry - CRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CHERRY 13/Jun/13 RATING 1-10	DOBR 13/Jun/13 RATING 1-10	PERG 13/Jun/13 RATING 1-10	DAND 13/Jun/13 RATING 1-10	HOWE 13/Jun/13 RATING 1-10	OVERALL 13/Jun/13 RATING 1-10
	Pest Code											
	Crop Code											
	Rating Date											
	Rating Type											
	Rating Unit											
1	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE13	1.0	9.7	9.7	9.0	10.0	9.0
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
2	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE13	1.0	10.0	9.3	9.0	10.0	8.3
	penoxsulam	.083	SC	.031								
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
3	oxyfluorfen	3.93	SC	2.95	lb ai/a	EPRE13	1.0	10.0	10.0	10.0	10.0	10.0
	penoxsulam	.083	SC	.062								
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
4	oxyfluorfen	4	SC	1.5	lb ai/a	FALL13	1.0	10.0	7.7	7.3	9.3	5.7
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
5	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL13	1.0	6.0	3.7	4.7	6.0	3.0
	penoxsulam	.083	SC	.031								
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
6	oxyfluorfen	3.93	SC	2.95	lb ai/a	FALL13	1.0	6.7	6.0	4.7	7.0	2.3
	penoxsulam	.083	SC	.062								
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
7	isoxaben	75	DF	0.75	lb ai/a	EPRE13	1.0	10.0	10.0	9.7	10.0	9.7
	glyphosate	5.4	L	1.5	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
8	isoxaben	75	DF	2	lb ai/a	EPRE13	1.0	10.0	10.0	9.7	10.0	10.0
	glyphosate	5.4	L	1.5	lb ai/a	EPRE13						
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
9	isoxaben	75	DF	0.75	lb ai/a	FALL13	1.0	10.0	7.0	7.0	10.0	5.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
10	isoxaben	75	DF	2	lb ai/a	FALL13	1.0	10.0	7.0	7.0	9.7	6.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL13						
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE13	1.0	10.0	8.3	7.0	10.0	8.3
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13						
12	glyphosate	5.4	L	1.35	lb ai/a	FALL13	1.0	7.0	4.3	6.0	10.0	3.0
	N Pak (AMS)	100	L	2.5	% v/v	FALL13						
LSD (P=.05)							0.00	3.85	4.77	4.68	2.25	4.55
Standard Deviation							0.00	2.27	2.82	2.76	1.33	2.69
CV							0.0	24.96	36.37	36.46	14.23	39.94

Preemergence Weed Control in Cherry - CRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage			
Pest Code								DAND	GRASS
Crop Code							CHERRY		
Rating Date							16/Jul/13	16/Jul/13	16/Jul/13
Rating Type							RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10
1	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE13	1.0	6.7	7.7
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13			
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13			
2	oxyfluorfen	3.93	SC	1.47	lb ai/a	EPRE13	1.0	9.0	6.7
	penoxsulam	.083	SC	.031					
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13			
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13			
3	oxyfluorfen	3.93	SC	2.95	lb ai/a	EPRE13	1.0	10.0	10.0
	penoxsulam	.083	SC	.062					
	glyphosate	5.4	L	1.35	lb ai/a	EPRE13			
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13			
4	oxyfluorfen	4	SC	1.5	lb ai/a	FALL13	1.0	4.0	5.7
	glyphosate	5.4	L	1.35	lb ai/a	FALL13			
	N Pak (AMS)	100	L	2.5	% v/v	FALL13			
5	oxyfluorfen	3.93	SC	1.47	lb ai/a	FALL13	1.0	3.7	1.7
	penoxsulam	.083	SC	.031					
	glyphosate	5.4	L	1.35	lb ai/a	FALL13			
	N Pak (AMS)	100	L	2.5	% v/v	FALL13			
6	oxyfluorfen	3.93	SC	2.95	lb ai/a	FALL13	1.0	1.0	1.0
	penoxsulam	.083	SC	.062					
	glyphosate	5.4	L	1.35	lb ai/a	FALL13			
	N Pak (AMS)	100	L	2.5	% v/v	FALL13			
7	isoxaben	75	DF	0.75	lb ai/a	EPRE13	1.0	9.7	6.7
	glyphosate	5.4	L	1.5	lb ai/a	EPRE13			
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13			
8	isoxaben	75	DF	2	lb ai/a	EPRE13	1.0	9.0	9.7
	glyphosate	5.4	L	1.5	lb ai/a	EPRE13			
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13			
9	isoxaben	75	DF	0.75	lb ai/a	FALL13	1.0	4.0	3.3
	glyphosate	5.4	L	1.35	lb ai/a	FALL13			
	N Pak (AMS)	100	L	2.5	% v/v	FALL13			
10	isoxaben	75	DF	2	lb ai/a	FALL13	1.0	5.3	4.0
	glyphosate	5.4	L	1.35	lb ai/a	FALL13			
	N Pak (AMS)	100	L	2.5	% v/v	FALL13			
11	glyphosate	5.4	L	1.35	lb ai/a	EPRE13	1.0	5.7	6.3
	N Pak (AMS)	100	L	2.5	% v/v	EPRE13			
12	glyphosate	5.4	L	1.35	lb ai/a	FALL13	1.0	6.0	2.3
	N Pak (AMS)	100	L	2.5	% v/v	FALL13			
LSD (P=.05)							0.00	5.30	6.04
Standard Deviation							0.00	3.13	3.56
CV							0.0	50.71	65.8

Preemergence Weed Control in Grape - SWMREC - 2013

Project Code: 132-13-1 **Location: Benton Harbor, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Grape **Variety: Concord** **Harvest Date: 10/16/13**
Planting Method: Rooted cuttings **Planting Date: 1990**
Spacing: 7 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 42 ft long; 6 vines/plot

Soil Type: Spinks Loamy Fine Sand **OM: 2.1%** **pH: 5.2**
Sand: 90% **Silt: 5%** **Clay: 5%** **CEC: 4.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/16/13	1:00 pm	50/54	F	Damp	2-3 NW	44	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/16	GRAPE		Dormant	
4/16	ANGB = annual bluegrass	3-4″		Moderate
4/16	SFGE = smallflower geranium	4-6″		Many
4/16	HOWE = horseweed	1-2″		Moderate
4/16	RESO = red sorrel			
4/16	HAVE = hairy vetch			
4/16	HONE = horsenettle			
4/16	YEHW = yellow hawkweed			
4/16	LACG = large crabgrass			
4/16	QUGR = quackgrass			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. This experiment was funded by project GREEEN.
4. Glyphosate: Roundup Powermax 5.5 L
5. EPRE = early pre

Preemergence Weed Control in Grape - SWMREC - 2013

Preemergence Weed Control in Grape - SWMREC - 2013

Trial ID: 132-13-1 Location: Benton Harbor
Protocol ID: 132-13-1 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE 14/May/13 RATING 1-10	REFE 14/May/13 RATING 1-10	RESO 14/May/13 RATING 1-10	SFGE 14/May/13 RATING 1-10	GRAPE 10/Jun/13 RATING 1-10
1	glyphosate	5.5	L	1	lb ai/a	EPRE	1.0	8.3	10.0	5.7	1.0
2	diuron	80	DF	4	lb ai/a	EPRE	1.0	9.3	10.0	2.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
3	simazine	90	WDG	4	lb ai/a	EPRE	1.0	9.3	10.0	5.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
4	norflurazon	80	DF	3.2	lb ai/a	EPRE	1.0	8.0	10.0	2.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	dichlobenil	1.4	CS	4	lb ai/a	EPRE	1.0	10.0	10.0	7.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	flumioxazin	51	WDG	0.383	lb ai/a	EPRE	1.0	9.3	10.0	4.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	indaziflam	1.67	SC	.065	lb ai/a	EPRE	1.0	10.0	10.0	4.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	1.0	9.7	9.7	8.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	oxyfluorfen	4	SC	2	lb ai/a	EPRE	1.0	9.7	10.0	8.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
10	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	1.0	9.7	10.0	6.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
11	isoxaben	75	DF	1	lb ai/a	EPRE	1.0	7.0	10.0	4.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	oxyfluorfen	3.93	SC	0.74	lb ai/a	EPRE	1.0	8.0	10.0	6.7	1.0
	penoxsulam	.083	SC	.0155							
	glyphosate	5.5	L	1	lb ai/a	EPRE					
13	pendimethalin	3.8	CS	6	lb ai/a	EPRE	1.0	8.3	10.0	5.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
14	oryzalin	4	L	6	lb ai/a	EPRE	1.0	9.7	9.7	4.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
15	mesotrione	4	SC	0.375	lb ai/a	EPRE	1.0	5.7	10.0	3.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
16	Untreated Check						1.0	2.7	4.7	1.7	1.0
LSD (P=.05)							0.00	2.44	2.03	3.73	0.00
Standard Deviation							0.00	1.46	1.22	2.24	0.00
CV							0.0	17.39	12.64	43.88	0.0

Preemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REFE	HAVE	HONE	HOWE	RESO
Pest Code											
Crop Code											
Rating Date							10/Jun/13	10/Jun/13	10/Jun/13	10/Jun/13	10/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	glyphosate	5.5	L	1	lb ai/a	EPRE	3.7	7.0	1.0	9.0	7.7
2	diuron	80	DF	4	lb ai/a	EPRE	7.0	4.0	4.0	9.7	7.7
	glyphosate	5.5	L	1	lb ai/a	EPRE					
3	simazine	90	WDG	4	lb ai/a	EPRE	5.7	10.0	4.0	9.0	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
4	norflurazon	80	DF	3.2	lb ai/a	EPRE	10.0	10.0	1.0	7.7	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	dichlobenil	1.4	CS	4	lb ai/a	EPRE	10.0	10.0	9.0	9.3	8.3
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	flumioxazin	51	WDG	0.383	lb ai/a	EPRE	5.3	10.0	1.0	8.7	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	indaziflam	1.67	SC	.065	lb ai/a	EPRE	6.0	7.0	1.0	4.0	9.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	7.0	10.0	4.0	10.0	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	oxyfluorfen	4	SC	2	lb ai/a	EPRE	8.7	10.0	1.7	6.3	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
10	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	9.0	10.0	3.7	9.3	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
11	isoxaben	75	DF	1	lb ai/a	EPRE	1.3	9.3	1.0	7.7	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	oxyfluorfen	3.93	SC	0.74	lb ai/a	EPRE	1.0	10.0	1.7	10.0	9.0
	penoxsulam	.083	SC	.0155							
	glyphosate	5.5	L	1	lb ai/a	EPRE					
13	pendimethalin	3.8	CS	6	lb ai/a	EPRE	1.0	7.0	4.0	4.3	8.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
14	oryzalin	4	L	6	lb ai/a	EPRE	6.3	10.0	1.3	6.0	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE					
15	mesotrione	4	SC	0.375	lb ai/a	EPRE	3.0	10.0	5.0	6.7	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
16	Untreated Check						1.0	4.0	4.0	1.0	1.0
LSD (P=.05)							5.36	4.81	5.59	4.07	5.69
Standard Deviation							3.21	2.88	3.35	2.44	3.41
CV							59.79	33.36	113.14	32.91	43.94

Preemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SFGE	YEHW	GRAPE	LACG	QUGR	REFE
Pest Code												
Crop Code									GRAPE			
Rating Date							10/Jun/13	10/Jun/13	3/Jul/13	3/Jul/13	3/Jul/13	3/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	glyphosate	5.5	L	1	lb ai/a	EPRE	2.3	10.0	1.3	1.7	10.0	6.3
2	diuron	80	DF	4	lb ai/a	EPRE	3.3	8.3	1.0	7.3	10.0	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
3	simazine	90	WDG	4	lb ai/a	EPRE	2.0	10.0	1.0	2.0	7.0	8.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
4	norflurazon	80	DF	3.2	lb ai/a	EPRE	1.0	8.0	1.0	10.0	8.7	8.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
5	dichlobenil	1.4	CS	4	lb ai/a	EPRE	5.3	10.0	1.0	10.0	9.3	8.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
6	flumioxazin	51	WDG	0.383	lb ai/a	EPRE	1.7	10.0	1.0	10.0	10.0	9.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
7	indaziflam	1.67	SC	.065	lb ai/a	EPRE	2.0	10.0	1.0	10.0	10.0	8.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	2.7	10.0	1.0	6.3	10.0	8.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
9	oxyfluorfen	4	SC	2	lb ai/a	EPRE	3.3	10.0	1.0	4.7	10.0	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
10	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	9.7	10.0	1.0	9.3	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
11	isoxaben	75	DF	1	lb ai/a	EPRE	1.3	8.7	1.0	8.0	9.7	4.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
12	oxyfluorfen	3.93	SC	0.74	lb ai/a	EPRE	4.0	5.7	1.0	2.7	7.7	5.7
	penoxsulam	.083	SC	.0155								
	glyphosate	5.5	L	1	lb ai/a	EPRE						
13	pendimethalin	3.8	CS	6	lb ai/a	EPRE	2.0	7.3	1.3	9.3	10.0	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
14	oryzalin	4	L	6	lb ai/a	EPRE	1.0	8.0	1.0	10.0	9.0	8.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
15	mesotrione	4	SC	0.375	lb ai/a	EPRE	1.3	8.3	1.0	3.0	7.0	3.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
16	Untreated Check						3.3	3.7	1.3	7.7	9.0	4.7
LSD (P=.05)							3.18	3.38	0.39	3.42	3.62	3.44
Standard Deviation							1.91	2.03	0.23	2.05	2.17	2.06
CV							65.86	23.52	21.9	29.33	23.6	27.49

Preemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HONE	HOWE	RESO	SFGE	GRAPE	LACG
Pest Code												
Crop Code												
Rating Date							3/Jul/13	3/Jul/13	3/Jul/13	3/Jul/13	14/Aug/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	glyphosate	5.5	L	1	lb ai/a	EPRE	1.7	5.0	7.0	4.7	1.7	4.0
2	diuron	80	DF	4	lb ai/a	EPRE	4.0	10.0	8.7	3.7	1.3	5.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
3	simazine	90	WDG	4	lb ai/a	EPRE	4.0	10.0	7.0	5.7	1.0	1.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
4	norflurazon	80	DF	3.2	lb ai/a	EPRE	1.7	6.3	7.0	1.0	1.3	9.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
5	dichlobenil	1.4	CS	4	lb ai/a	EPRE	8.7	9.0	10.0	6.7	1.7	6.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
6	flumioxazin	51	WDG	0.383	lb ai/a	EPRE	3.7	5.7	9.0	4.0	1.0	9.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
7	indaziflam	1.67	SC	.065	lb ai/a	EPRE	2.0	5.7	6.0	2.3	1.0	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	4.0	10.0	7.3	1.7	1.0	3.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
9	oxyfluorfen	4	SC	2	lb ai/a	EPRE	4.0	6.7	10.0	4.0	1.0	3.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
10	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	4.0	10.0	10.0	9.0	1.0	4.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
11	isoxaben	75	DF	1	lb ai/a	EPRE	1.7	8.3	10.0	3.3	1.3	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
12	oxyfluorfen	3.93	SC	0.74	lb ai/a	EPRE	1.7	10.0	9.0	5.7	1.0	4.3
	penoxsulam	.083	SC	.0155								
	glyphosate	5.5	L	1	lb ai/a	EPRE						
13	pendimethalin	3.8	CS	6	lb ai/a	EPRE	4.0	6.3	7.7	4.0	1.7	9.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
14	oryzalin	4	L	6	lb ai/a	EPRE	2.7	8.3	10.0	5.3	1.0	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE						
15	mesotrione	4	SC	0.375	lb ai/a	EPRE	4.0	6.3	4.0	2.3	1.0	1.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
16	Untreated Check						4.0	1.0	1.0	7.0	1.7	7.7
LSD (P=.05)							6.24	3.24	5.60	4.40	0.80	2.75
Standard Deviation							3.74	1.94	3.36	2.64	0.48	1.65
CV							107.62	26.17	43.42	59.97	38.95	27.68

Preemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REFE RATING 1-10	HONE RATING 1-10	HOWE RATING 1-10	GRAPE HARVEST #CLUSTER*	GRAPE HARVEST KG/PLOT**
	Pest Code						REFE	HONE	HOWE		
	Crop Code									GRAPE	GRAPE
	Rating Date						14/Aug/13	14/Aug/13	14/Aug/13	16/Oct/13	16/Oct/13
	Rating Type						RATING	RATING	RATING	HARVEST	HARVEST
	Rating Unit						1-10	1-10	1-10	#CLUSTER*	KG/PLOT**
1	glyphosate	5.5	L	1	lb ai/a	EPRE	3.3	3.7	7.7	486.0	46.748
2	diuron	80	DF	4	lb ai/a	EPRE	8.0	3.0	9.7	586.0	56.079
	glyphosate	5.5	L	1	lb ai/a	EPRE					
3	simazine	90	WDG	4	lb ai/a	EPRE	6.7	4.7	9.0	598.3	55.801
	glyphosate	5.5	L	1	lb ai/a	EPRE					
4	norflurazon	80	DF	3.2	lb ai/a	EPRE	7.3	4.3	9.0	559.3	57.211
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	dichlobenil	1.4	CS	4	lb ai/a	EPRE	9.3	8.0	9.0	576.0	57.734
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	flumioxazin	51	WDG	0.383	lb ai/a	EPRE	7.7	2.3	7.7	612.3	57.263
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	indaziflam	1.67	SC	.065	lb ai/a	EPRE	7.3	2.3	5.3	562.7	51.225
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	8.7	4.3	10.0	686.0	58.249
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	oxyfluorfen	4	SC	2	lb ai/a	EPRE	7.7	4.0	9.0	581.3	57.064
	glyphosate	5.5	L	1	lb ai/a	EPRE					
10	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	7.7	3.0	9.0	535.7	53.026
	glyphosate	5.5	L	1	lb ai/a	EPRE					
11	isoxaben	75	DF	1	lb ai/a	EPRE	2.3	3.0	7.7	570.7	53.909
	glyphosate	5.5	L	1	lb ai/a	EPRE					
12	oxyfluorfen	3.93	SC	0.74	lb ai/a	EPRE	5.0	4.0	7.7	544.3	53.246
	penoxsulam	.083	SC	.0155							
	glyphosate	5.5	L	1	lb ai/a	EPRE					
13	pendimethalin	3.8	CS	6	lb ai/a	EPRE	7.0	5.0	6.3	535.7	46.482
	glyphosate	5.5	L	1	lb ai/a	EPRE					
14	oryzalin	4	L	6	lb ai/a	EPRE	8.0	3.0	5.7	510.7	42.064
	glyphosate	5.5	L	1	lb ai/a	EPRE					
15	mesotrione	4	SC	0.375	lb ai/a	EPRE	5.7	2.3	6.7	522.3	48.550
	glyphosate	5.5	L	1	lb ai/a	EPRE					
16	Untreated Check						4.0	5.0	1.3	568.0	49.631
LSD (P=.05)							2.61	5.51	3.45	126.19	11.1444
Standard Deviation							1.57	3.31	2.07	75.69	6.6841
CV							23.75	85.35	27.44	13.4	12.67

*Cluster counts taken from 4 vines per plot
**Total weight of all fruit harvested from 4 vines per plot

Postemergence Weed Control in Grape - SWMREC - 2013

Project Code: 132-13-2 **Location: Benton Harbor, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Grape **Variety: Concord** **Harvest Date: 10/16/13**
Planting Method: Rooted cuttings **Planting Date: 1990**
Spacing: 7 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 42 ft long

Soil Type: Spinks Loamy Fine Sand **OM: 2.1%** **pH: 5.2**
Sand: 90% **Silt: 5%** **Clay: 5%** **CEC: 4.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPOS	5/14/13	10:30 am	65/54	F	Moist	5-8 SE	42	0% Cloudy	N
LPOS	7/3/13	12:50 pm	80/72	F	Damp	3-5 SE	56	20% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/14	GRAPE		Early flower	
5/14	RESO = red sorrel	6″		Many
5/14	HAVE = hairy vetch	12″		Few
5/14	DOBG = downy bromegrass	14″		Many
5/14	WHCL = white clover	4″		Many
5/14	DAND = dandelion	4″		Many
5/14	SFGE = smallflower geranium	3″		Few
5/14	REFE = red fescue	3-5″		Many
5/14	HONE = horsenettle			
5/14	HOWE = horseweed			
5/14	YEHW = yellow hawkweed			
5/14	LACG = large crabgrass			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. Applied to both sides of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. This project was funded by project GREEEN.
4. EPOS = early post; LPOS = late post.

Postemergence Weed Control in Grape - SWMREC - 2013

Postemergence Weed Control in Grape - SWMREC - 2013

Trial ID: 132-13-2 Location: Benton Harbor
Protocol ID: 132-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	REFE	HAVE	HONE	HOWE
Pest Code											
Crop Code							GRAPE				
Rating Date							10/Jun/13	10/Jun/13	10/Jun/13	10/Jun/13	10/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	paraquat dichloride	2	SL	1	lb ai/a	EPOS,LPOS	1.0	10.0	10.0	6.3	1.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
2	glyphosate	5.5	L	1.4	lb ai/a	EPOS,LPOS	1.0	10.0	9.3	3.3	10.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
3	glyphosate	5.5	L	2.8	lb ai/a	EPOS,LPOS	1.0	10.0	10.0	3.0	10.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
4	carfentrazone	0.35	SE	.0273	lb ai/a	EPOS,LPOS	1.0	1.3	6.0	4.0	1.0
	sulfentrazone	3.15	SE	.246							
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
5	glufosinate	2.34	L	1.5	lb ai/a	EPOS,LPOS	1.0	10.0	10.0	3.7	10.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
6	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS,LPOS	1.0	3.3	1.3	4.0	1.3
	sethoxydim	1.53	EC	0.38	lb ai/a	EPOS,LPOS					
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
7	carfentrazone	2	EC	0.031	lb ai/a	EPOS,LPOS	1.0	3.0	7.0	1.7	1.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
8	halosulfuron	75	WG	.047	lb ai/a	EPOS,LPOS	1.0	7.7	10.0	7.0	8.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
9	rimsulfuron	25	SG	0.063	lb ai/a	EPOS,LPOS	1.0	6.3	10.0	1.0	8.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
10	Untreated Check						1.0	4.3	7.0	4.0	4.0
LSD (P=.05)							0.00	4.95	4.82	6.76	3.01
Standard Deviation							0.00	2.89	2.81	3.94	1.76
CV							0.0	43.73	34.83	103.77	31.2

Postemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RESO	SFGE	YEHW	GRAPE	LACG
Pest Code							RESO	SFGE	YEHW		LACG
Crop Code										GRAPE	
Rating Date							10/Jun/13	10/Jun/13	10/Jun/13	3/Jul/13	3/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	paraquat dichloride	2	SL	1	lb ai/a	EPOS,LPOS	10.0	10.0	8.7	1.0	5.3
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
2	glyphosate	5.5	L	1.4	lb ai/a	EPOS,LPOS	9.7	9.0	10.0	1.0	2.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
3	glyphosate	5.5	L	2.8	lb ai/a	EPOS,LPOS	10.0	10.0	10.0	1.0	1.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
4	carfentrazone	0.35	SE	.0273	lb ai/a	EPOS,LPOS	5.3	5.3	1.3	1.0	9.0
	sulfentrazone	3.15	SE	.246							
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
5	glufosinate	2.34	L	1.5	lb ai/a	EPOS,LPOS	10.0	8.7	10.0	1.3	1.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
6	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS,LPOS	1.0	1.7	5.0	1.3	7.0
	sethoxydim	1.53	EC	0.38	lb ai/a	EPOS,LPOS					
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
7	carfentrazone	2	EC	0.031	lb ai/a	EPOS,LPOS	4.7	4.0	3.7	1.0	9.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
8	halosulfuron	75	WG	.047	lb ai/a	EPOS,LPOS	4.0	7.3	10.0	1.7	5.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
9	rimsulfuron	25	SG	0.063	lb ai/a	EPOS,LPOS	1.3	5.7	10.0	1.0	10.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
10	Untreated Check						3.0	4.0	4.3	1.0	5.7
LSD (P=.05)							5.06	4.53	3.38	0.50	4.66
Standard Deviation							2.95	2.64	1.97	0.29	2.72
CV							50.04	40.17	27.03	25.75	48.25

Postemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HAVE	HONE	HOWE	RESO	GRAPE
Pest Code											
Crop Code											
Rating Date							3/Jul/13	3/Jul/13	3/Jul/13	3/Jul/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	paraquat dichloride	2	SL	1	lb ai/a	EPOS,LPOS	10.0	4.0	1.3	7.3	1.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
2	glyphosate	5.5	L	1.4	lb ai/a	EPOS,LPOS	8.7	1.3	10.0	10.0	1.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
3	glyphosate	5.5	L	2.8	lb ai/a	EPOS,LPOS	9.0	2.7	10.0	10.0	1.3
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
4	carfentrazone	0.35	SE	.0273	lb ai/a	EPOS,LPOS	9.3	6.0	2.0	4.0	1.0
	sulfentrazone	3.15	SE	.246							
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
5	glufosinate	2.34	L	1.5	lb ai/a	EPOS,LPOS	7.3	3.0	9.0	9.0	1.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
6	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS,LPOS	7.3	3.7	1.0	1.7	1.3
	sethoxydim	1.53	EC	0.38	lb ai/a	EPOS,LPOS					
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
7	carfentrazone	2	EC	0.031	lb ai/a	EPOS,LPOS	10.0	5.7	1.3	6.0	1.3
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
8	halosulfuron	75	WG	.047	lb ai/a	EPOS,LPOS	10.0	6.7	6.7	4.7	1.3
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
9	rimsulfuron	25	SG	0.063	lb ai/a	EPOS,LPOS	10.0	2.7	4.0	1.7	1.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS					
10	Untreated Check						10.0	7.0	1.0	1.7	1.3
LSD (P=.05)							3.60	6.81	1.37	4.18	0.98
Standard Deviation							2.10	3.97	0.80	2.44	0.57
CV							22.91	93.05	17.28	43.48	43.92

Postemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	LACG	REFE	HONE	HOWE
Pest Code							LACG	REFE	HONE	HOWE
Crop Code										
Rating Date							14/Aug/13	14/Aug/13	14/Aug/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	paraquat dichloride	2	SL	1	lb ai/a	EPOS,LPOS	4.0	9.0	6.7	3.3
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
2	glyphosate	5.5	L	1.4	lb ai/a	EPOS,LPOS	7.0	10.0	4.3	10.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
3	glyphosate	5.5	L	2.8	lb ai/a	EPOS,LPOS	10.0	10.0	7.7	10.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
4	carfentrazone	0.35	SE	.0273	lb ai/a	EPOS,LPOS	2.3	5.7	4.7	3.3
	sulfentrazone	3.15	SE	.246						
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
5	glufosinate	2.34	L	1.5	lb ai/a	EPOS,LPOS	6.7	10.0	8.3	10.0
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
6	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS,LPOS	8.0	3.0	2.3	3.7
	sethoxydim	1.53	EC	0.38	lb ai/a	EPOS,LPOS				
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
7	carfentrazone	2	EC	0.031	lb ai/a	EPOS,LPOS	3.7	5.0	4.0	1.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
8	halosulfuron	75	WG	.047	lb ai/a	EPOS,LPOS	2.7	2.0	4.3	6.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
9	rimsulfuron	25	SG	0.063	lb ai/a	EPOS,LPOS	9.7	9.0	2.7	7.7
	NIS	100	SL	0.25	% v/v	EPOS,LPOS				
10	Untreated Check						4.7	1.7	1.7	3.0
LSD (P=.05)							2.59	2.66	4.56	2.40
Standard Deviation							1.51	1.55	2.66	1.40
CV							25.77	23.73	56.9	23.55

Postemergence Weed Control in Grape - SWMREC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE 16/Oct/13 HARVEST #CLUSTER*	GRAPE 16/Oct/13 HARVEST KG/PLOT**
	Pest Code							
	Crop Code						GRAPE	GRAPE
	Rating Date						16/Oct/13	16/Oct/13
	Rating Type						HARVEST	HARVEST
	Rating Unit						#CLUSTER*	KG/PLOT**
1	paraquat dichloride	2	SL	1	lb ai/a	EPOS,LPOS	490.0	54.977
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
2	glyphosate	5.5	L	1.4	lb ai/a	EPOS,LPOS	622.7	61.846
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
3	glyphosate	5.5	L	2.8	lb ai/a	EPOS,LPOS	446.7	42.255
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
4	carfentrazone	0.35	SE	.0273	lb ai/a	EPOS,LPOS	531.0	51.100
	sulfentrazone	3.15	SE	.246				
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
5	glufosinate	2.34	L	1.5	lb ai/a	EPOS,LPOS	531.3	51.436
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
6	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS,LPOS	615.7	55.548
	sethoxydim	1.53	EC	0.38	lb ai/a	EPOS,LPOS		
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
7	carfentrazone	2	EC	0.031	lb ai/a	EPOS,LPOS	487.7	43.844
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
8	halosulfuron	75	WG	.047	lb ai/a	EPOS,LPOS	510.0	45.029
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
9	rimsulfuron	25	SG	0.063	lb ai/a	EPOS,LPOS	483.7	45.207
	NIS	100	SL	0.25	% v/v	EPOS,LPOS		
10	Untreated Check						471.3	47.660
	LSD (P=.05)						164.50	18.2958
	Standard Deviation						95.89	10.6653
	CV						18.48	21.38

*Cluster counts taken from 4 vines per plot
**Total weight of all fruit harvested from 4 vines per plot

Preemergence and Postemergence Weed Control on Concord Grapes - HTRC - 2013

Project Code: 132-13-4 **Location: East Lansing, MI Block 37**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Grape **Variety: Concord**
Planting Method: Seedling **Planting Date: 1967**
Spacing: 7 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 30 ft long

Soil Type: Capac Loam **OM: 2.2%** **pH: 6.7**
Sand: 53% **Silt: 31%** **Clay: 15%** **CEC: 6.6**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/8/13	4:40 pm	58/42	F	Wet	7-8 SW	82	97% Cloudy	Y
EPOS	5/21/13	10:00 am	73/68	F	Moist	3-6 S	62	100% Cloudy	N
LPOS	6/25/13	11:40 am	77/68	F	Saturated	3-5 SW	81	100% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/8	GRAPE		Dormant	
4/8	DAND = dandelion	1-2″		Few
5/21	GRAPE		Small buds	
5/21	DAND = dandelion	12-18″		Many
5/21	ANBG = annual bluegrass	16-18″		Few
5/21	FIBW = field bindweed	1-2″		Many
5/21	COMA = common mallow	3″		Moderate
5/21	WICA = wild carrot	8″		Few
6/25	GRAPE		0.25″ fruit	100%
6/25	CABR = California brome	12-18″		Moderate
6/25	QUGR = quackgrass	20-24″		Moderate
6/25	FIBW = field bindweed	3-5″	Flower	Moderate
6/25	DAND = dandelion	6-7″	Post-flower	Moderate
6/25	WHCL = white clover	4-5″	Flower	Moderate

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. EPRE = early pre; EPOS = early post; LPOS = late post.

Preemergence and Postemergence Weed Control on Concord Grapes - HTRC - 2013

Preemergence and Postemergence Weed Control on Concord Grapes - HTRC - 2013

Trial ID: 132-13-4 Location: HTRC, block 37
Protocol ID: 132-13-4 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE 13/May/13 RATING 1-10	ANBG 13/May/13 RATING 1-10	QUGR 13/May/13 RATING 1-10	DAND 13/May/13 RATING 1-10	GRAPE 12/Jun/13 RATING 1-10
1	sulfentrazone	4	F	0.3125	lb ai/a	EPRE	1.0	5.7	4.0	6.0	1.0
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE					
	diuron	80	DF	1.6	lb ai/a	EPRE					
	glyphosate	5.5	L	1.375	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
	carfentrazone	2	EC	0.02	lb ai/a	EPOS					
	sethoxydim	1.53	EC	.393	lb ai/a	EPOS					
	COC	100	SL	1	% v/v	EPOS					
2	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	1.0	7.0	6.7	7.7	1.0
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE					
	glyphosate	5.5	L	1.375	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
	carfentrazone	2	EC	0.02	lb ai/a	EPOS					
	paraquat dichloride	2	SL	0.5	lb ai/a	EPOS					
	COC	100	SL	1	% v/v	EPOS					
3	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	1.0	5.7	5.7	4.7	1.0
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE					
	glyphosate	5.5	L	1.375	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
	Spartan Charge	3.5	SE	.205	lb ai/a	EPOS					
	COC	100	SL	1	% v/v	EPOS					
	paraquat dichloride	2	SL	0.5	lb ai/a	LPOS					
	diuron	80	DF	1.6	lb ai/a	LPOS					
	COC	100	SL	1	% v/v	LPOS					
4	isoxaben	75	DF	0.5	lb ai/a	EPRE	1.0	10.0	7.7	8.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	isoxaben	75	DF	1	lb ai/a	EPRE	1.0	5.7	6.0	8.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	isoxaben	75	DF	2	lb ai/a	EPRE	1.0	7.0	6.7	10.0	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	1.0	10.0	8.0	10.0	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	oxyfluorfen	4	SC	3	lb ai/a	EPRE	1.0	9.3	8.3	9.7	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	glyphosate	5.5	L	1	lb ai/a	EPRE	1.0	8.3	8.0	9.3	1.0
10	diuron	80	DF	4	lb ai/a	EPRE	1.0	9.7	8.0	5.3	1.0
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS					
	sethoxydim	1.53	EC	0.29	lb ai/a	EPOS					
11	indaziflam	1.67	SC	.065	lb ai/a	EPRE	1.0	8.0	8.0	9.3	1.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
12	Untreated						1.0	1.0	3.0	1.0	1.0
LSD (P=.05)							0.00	3.57	5.52	4.62	0.00
Standard Deviation							0.00	2.11	3.26	2.73	0.00
CV							0.0	28.97	48.94	36.23	0.0

Preemergence and Postemergence Weed Control on Concord Grapes - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CABR	QUGR	COMA	FIBW	WHCL
Pest Code							CABR	QUGR	COMA	FIBW	WHCL
Crop Code											
Rating Date							12/Jun/13	12/Jun/13	12/Jun/13	12/Jun/13	12/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	sulfentrazone	4	F	0.3125	lb ai/a	EPRE	10.0	8.3	5.7	5.7	7.0
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE					
	diuron	80	DF	1.6	lb ai/a	EPRE					
	glyphosate	5.5	L	1.375	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
	carfentrazone	2	EC	0.02	lb ai/a	EPOS					
	sethoxydim	1.53	EC	.393	lb ai/a	EPOS					
	COC	100	SL	1	% v/v	EPOS					
2	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	10.0	10.0	10.0	5.7	7.7
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE					
	glyphosate	5.5	L	1.375	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
	carfentrazone	2	EC	0.02	lb ai/a	EPOS					
	paraquat dichloride	2	SL	0.5	lb ai/a	EPOS					
	COC	100	SL	1	% v/v	EPOS					
3	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	5.3	7.3	10.0	9.3	5.0
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE					
	glyphosate	5.5	L	1.375	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
	Spartan Charge	3.5	SE	.205	lb ai/a	EPOS					
	COC	100	SL	1	% v/v	EPOS					
	paraquat dichloride	2	SL	0.5	lb ai/a	LPOS					
	diuron	80	DF	1.6	lb ai/a	LPOS					
	COC	100	SL	1	% v/v	LPOS					
4	isoxaben	75	DF	0.5	lb ai/a	EPRE	10.0	7.0	4.0	1.7	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
5	isoxaben	75	DF	1	lb ai/a	EPRE	6.3	3.7	5.0	6.0	4.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
6	isoxaben	75	DF	2	lb ai/a	EPRE	6.3	6.7	1.0	2.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	10.0	5.0	4.0	1.3	8.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
8	oxyfluorfen	4	SC	3	lb ai/a	EPRE	6.3	9.0	2.7	1.7	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
9	glyphosate	5.5	L	1	lb ai/a	EPRE	7.0	6.3	10.0	2.3	10.0
10	diuron	80	DF	4	lb ai/a	EPRE	10.0	9.0	3.7	4.3	10.0
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS					
	sethoxydim	1.53	EC	0.29	lb ai/a	EPOS					
11	indaziflam	1.67	SC	.065	lb ai/a	EPRE	6.3	8.3	7.0	2.3	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE					
12	Untreated						4.0	2.0	5.0	4.0	4.0
LSD (P=.05)							5.16	5.29	6.39	3.19	5.82
Standard Deviation							3.04	3.13	3.77	1.88	3.44
CV							39.86	45.37	66.6	48.75	45.97

Preemergence and Postemergence Weed Control on Concord Grapes - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA	GRAPE	COMA	DAND	FIBW	HOWE
Pest Code												
Crop Code												
Rating Date							12/Jun/13	8/Jul/13	8/Jul/13	8/Jul/13	8/Jul/13	8/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	sulfentrazone	4	F	0.3125	lb ai/a	EPRE	7.0	1.0	7.0	5.7	2.3	7.0
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE						
	diuron	80	DF	1.6	lb ai/a	EPRE						
	glyphosate	5.5	L	1.375	lb ai/a	EPRE						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE						
	carfentrazone	2	EC	0.02	lb ai/a	EPOS						
	sethoxydim	1.53	EC	.393	lb ai/a	EPOS						
	COC	100	SL	1	% v/v	EPOS						
2	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	10.0	1.0	9.3	4.0	1.7	6.7
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE						
	glyphosate	5.5	L	1.375	lb ai/a	EPRE						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE						
	carfentrazone	2	EC	0.02	lb ai/a	EPOS						
	paraquat dichloride	2	SL	0.5	lb ai/a	EPOS						
	COC	100	SL	1	% v/v	EPOS						
3	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	5.0	1.0	10.0	9.3	8.0	10.0
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE						
	glyphosate	5.5	L	1.375	lb ai/a	EPRE						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE						
	Spartan Charge	3.5	SE	.205	lb ai/a	EPOS						
	COC	100	SL	1	% v/v	EPOS						
	paraquat dichloride	2	SL	0.5	lb ai/a	LPOS						
	diuron	80	DF	1.6	lb ai/a	LPOS						
	COC	100	SL	1	% v/v	LPOS						
4	isoxaben	75	DF	0.5	lb ai/a	EPRE	10.0	1.0	7.0	6.7	2.7	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
5	isoxaben	75	DF	1	lb ai/a	EPRE	7.0	1.0	4.7	3.3	4.7	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
6	isoxaben	75	DF	2	lb ai/a	EPRE	7.0	1.0	2.7	6.0	3.3	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	7.0	1.0	7.7	5.3	1.0	9.7
	glyphosate	5.5	L	1	lb ai/a	EPRE						
8	oxyfluorfen	4	SC	3	lb ai/a	EPRE	4.7	1.0	1.7	6.0	1.7	6.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
9	glyphosate	5.5	L	1	lb ai/a	EPRE	7.0	1.0	7.0	6.3	2.0	6.0
10	diuron	80	DF	4	lb ai/a	EPRE	8.7	1.0	4.0	3.3	2.0	10.0
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS						
	sethoxydim	1.53	EC	0.29	lb ai/a	EPOS						
11	indaziflam	1.67	SC	.065	lb ai/a	EPRE	7.0	1.0	7.0	6.7	2.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE						
12	Untreated						10.0	1.0	10.0	4.3	2.0	10.0
LSD (P=.05)							6.58	0.00	6.53	5.16	1.66	4.02
Standard Deviation							3.88	0.00	3.86	3.05	0.98	2.37
CV							51.6	0.0	59.33	54.54	35.27	27.02

Preemergence and Postemergence Weed Control on Concord Grapes - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCL	WICA
Pest Code							WHCL	WICA
Crop Code								
Rating Date							8/Jul/13	8/Jul/13
Rating Type							RATING	RATING
Rating Unit							1-10	1-10
1	sulfentrazone	4	F	0.3125	lb ai/a	EPRE	7.3	7.0
	rimsulfuron	25	SG	0.063	lb ai/a	EPRE		
	diuron	80	DF	1.6	lb ai/a	EPRE		
	glyphosate	5.5	L	1.375	lb ai/a	EPRE		
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE		
	carfentrazone	2	EC	0.02	lb ai/a	EPOS		
	sethoxydim	1.53	EC	.393	lb ai/a	EPOS		
	COC	100	SL	1	% v/v	EPOS		
2	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	7.0	6.7
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE		
	glyphosate	5.5	L	1.375	lb ai/a	EPRE		
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE		
	carfentrazone	2	EC	0.02	lb ai/a	EPOS		
	paraquat dichloride	2	SL	0.5	lb ai/a	EPOS		
	COC	100	SL	1	% v/v	EPOS		
3	sulfentrazone	4	F	0.1875	lb ai/a	EPRE	10.0	10.0
	pendimethalin	3.8	CS	3.8	lb ai/a	EPRE		
	glyphosate	5.5	L	1.375	lb ai/a	EPRE		
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE		
	Spartan Charge	3.5	SE	.205	lb ai/a	EPOS		
	COC	100	SL	1	% v/v	EPOS		
	paraquat dichloride	2	SL	0.5	lb ai/a	LPOS		
	diuron	80	DF	1.6	lb ai/a	LPOS		
	COC	100	SL	1	% v/v	LPOS		
4	isoxaben	75	DF	0.5	lb ai/a	EPRE	10.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE		
5	isoxaben	75	DF	1	lb ai/a	EPRE	7.0	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE		
6	isoxaben	75	DF	2	lb ai/a	EPRE	10.0	7.0
	glyphosate	5.5	L	1	lb ai/a	EPRE		
7	oxyfluorfen	4	SC	1.5	lb ai/a	EPRE	10.0	6.7
	glyphosate	5.5	L	1	lb ai/a	EPRE		
8	oxyfluorfen	4	SC	3	lb ai/a	EPRE	8.3	6.0
	glyphosate	5.5	L	1	lb ai/a	EPRE		
9	glyphosate	5.5	L	1	lb ai/a	EPRE	10.0	7.0
10	diuron	80	DF	4	lb ai/a	EPRE	10.0	7.7
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS		
	sethoxydim	1.53	EC	0.29	lb ai/a	EPOS		
11	indaziflam	1.67	SC	.065	lb ai/a	EPRE	9.0	7.7
	glyphosate	5.5	L	1	lb ai/a	EPRE		
	Ammonium Sulfate	100	SG	3.4	lb ai/a	EPRE		
12	Untreated						10.0	10.0
LSD (P=.05)							4.53	5.93
Standard Deviation							2.67	3.50
CV							29.51	45.35

Weed Control in Third-year Concord Grape with Sandea – Plant Pathology Farm - 2013

Project Code: 132-13-5 **Location: East Lansing, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Grape **Variety: Concord**
Planting Method: Small plants **Planting Date: 2011** **Harvest Date:**
Spacing: 7 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 4**
Plot Size: 6 ft wide x 42 ft long

Soil Type: Capac Loam **OM: 2.1%** **pH: 7.6**
Sand: 51% **Silt: 30%** **Clay: 19%** **CEC: 10.5**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
LPRE	5/6/13	2:45pm	72/65	F	Dry	6-8 E	32	95% Cloudy	N
LPOS	6/25	12:00pm	75/70	F	Wet	3-5 SW	81	100% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/6	GRAPE		Bud break	
5/6	DAND = dandelion	6″		Many
5/6	WHCL = white clover			Few
6/25	GRAPE		0.25″ fruit	
6/25	QUGR = quackgrass	24-30″	Seed head	Many
6/25	WHCL = white clover	3-5″	90% flower	Moderate
6/25	DAND = dandelion	6-8″	70% flower	Moderate
6/25	COMW = common milkweed	18-24″	70% flower	Moderate
	ANBG = annual bluegrass			
	EBNS = eastern black nightshade			
	HOWE = horseweed			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Grape ratings on 5/29/13 and 6/25/13 were for grape foliar growth. Ratings on 7/26/13 and 9/4/13 were for fruit development.

Weed Control in Third-year Concord Grape with Sandea – Plant Pathology Farm - 2013

Weed Control in Third-year Concord Grape with Sandea - Plant Pathology Farm - 2013

Trial ID: 132-13-5 Location: PP Farm, E. Lansing
Protocol ID: 132-13-5 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE 29/May/13 RATING 1-10	ANBG 29/May/13 RATING 1-10	DAND 29/May/13 RATING 1-10	GRAPE 25/Jun/13 RATING 1-10	QUGR 25/Jun/13 RATING 1-10
1	halosulfuron	75	WG	.047	lb ai/a	LPRE, LPOS	1.0	1.5	5.8	1.0	7.8
	NIS	100	SL	0.25	% v/v	LPRE, LPOS					
2	halosulfuron	75	WG	.094	lb ai/a	LPRE, LPOS	1.0	2.5	4.3	1.0	7.5
	NIS	100	SL	0.25	% v/v	LPRE, LPOS					
3	halosulfuron	75	WG	.188	lb ai/a	LPRE, LPOS	1.5	2.8	5.5	1.0	7.0
	NIS	100	SL	0.25	% v/v	LPRE, LPOS					
4	flumioxazin	51	WDG	.383	lb ai/a	LPRE, LPOS	1.8	10.0	10.0	1.0	8.5
	glufosinate	2.34	L	1	lb ai/a	LPRE, LPOS					
LSD (P=.05)							1.07	2.75	5.57	0.00	7.10
Standard Deviation							0.67	1.72	3.48	0.00	4.44
CV							51.19	41.03	54.65	0.0	57.78

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COMW 25/Jun/13 RATING 1-10	DAND 25/Jun/13 RATING 1-10	WHCL 25/Jun/13 RATING 1-10	GRAPE 26/Jul/13 RATING 1-10	QUGR 26/Jul/13 RATING 1-10	DAND 26/Jul/13 RATING 1-10
1	halosulfuron	75	WG	.047	lb ai/a	LPRE, LPOS	6.0	3.3	4.8	2.0	7.8	4.5
	NIS	100	SL	0.25	% v/v	LPRE, LPOS						
2	halosulfuron	75	WG	.094	lb ai/a	LPRE, LPOS	5.5	3.8	7.8	1.0	7.3	4.5
	NIS	100	SL	0.25	% v/v	LPRE, LPOS						
3	halosulfuron	75	WG	.188	lb ai/a	LPRE, LPOS	6.8	5.8	3.3	3.8	8.3	6.5
	NIS	100	SL	0.25	% v/v	LPRE, LPOS						
4	flumioxazin	51	WDG	.383	lb ai/a	LPRE, LPOS	4.0	10.0	10.0	1.0	8.3	9.5
	glufosinate	2.34	L	1	lb ai/a	LPRE, LPOS						
LSD (P=.05)							7.05	5.50	5.71	0.93	6.62	4.04
Standard Deviation							4.41	3.44	3.57	0.58	4.14	2.53
CV							79.29	60.5	55.42	30.11	52.57	40.44

Weed Control in Third-year Concord Grape with Sandea – Plant Pathology Farm - 2013

Trt No.	1-10 Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	EBNS	GRAPE	QUGR	DAND	HOWE	WHCL
Pest Code												
Crop Code												
Rating Date								4/Sep/13	4/Sep/13	4/Sep/13	4/Sep/13	4/Sep/13
Rating Type							26/Jul/13	RATING	RATING	RATING	RATING	RATING
Rating Unit							RATING	1-10	1-10	1-10	1-10	1-10
1	halosulfuron	75	WG	.047	lb ai/a	LPRE, LPOS	9.8	2.3	7.8	4.3	7.8	7.3
	NIS	100	SL	0.25	% v/v	LPRE, LPOS						
2	halosulfuron	75	WG	.094	lb ai/a	LPRE, LPOS	7.5	3.3	7.5	5.0	8.8	6.5
	NIS	100	SL	0.25	% v/v	LPRE, LPOS						
3	halosulfuron	75	WG	.188	lb ai/a	LPRE, LPOS	5.3	5.0	7.0	6.3	8.3	8.8
	NIS	100	SL	0.25	% v/v	LPRE, LPOS						
4	flumioxazin	51	WDG	.383	lb ai/a	LPRE, LPOS	10.0	1.8	8.5	9.3	10.0	10.0
	glufosinate	2.34	L	1	lb ai/a	LPRE, LPOS						
LSD (P=.05)							4.07	1.89	6.87	3.00	4.57	4.32
Standard Deviation							2.54	1.18	4.30	1.87	2.86	2.70
CV							31.31	38.58	55.88	30.27	32.91	33.27

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	GRAPE
Pest Code								
Crop Code								
Rating Date							4/Sep/13	4/Sep/13
Rating Type							FRUIT	FRUIT SIZE*
Rating Unit							% RIPE	RATING
1	halosulfuron	75	WG	.047	lb ai/a	LPRE, LPOS	67.5	2.8
	NIS	100	SL	0.25	% v/v	LPRE, LPOS		
2	halosulfuron	75	WG	.094	lb ai/a	LPRE, LPOS	47.5	3.3
	NIS	100	SL	0.25	% v/v	LPRE, LPOS		
3	halosulfuron	75	WG	.188	lb ai/a	LPRE, LPOS	37.5	4.8
	NIS	100	SL	0.25	% v/v	LPRE, LPOS		
4	flumioxazin	51	WDG	.383	lb ai/a	LPRE, LPOS	82.5	1.8
	glufosinate	2.34	L	1	lb ai/a	LPRE, LPOS		
LSD (P=.05)							23.99	2.12
Standard Deviation							15.00	1.32
CV							25.53	42.33

*1 = large (normal) fruit
2 = a few smaller fruit
3 = 50% of fruit are smaller
4 = many fruit are small
5 = all fruit are small

IR-4 Weed Control in Grape with Mesotrione - HTRC - 2013

Project Code: IR4-132-13-6 **Location: East Lansing, MI Block 37**

Personnel: Bernard H. Zandstra, Nicole Schroeder
Crop: Grape **Variety: Concord**
Planting Method: Seedling **Planting Date: 1967** **Harvest Date: 9/30/13**
Spacing: 7 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 4**
Plot Size: 11 ft wide x 50 ft long

Soil Type: Capac Loam **OM: 2.2%** **pH: 6.7**
Sand: 53% **Silt: 31%** **Clay: 15%** **CEC: 6.6**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	5/2/13	3:00 pm	84/64	F	Dry	3-4 SE	38	45% Cloudy	N
PO1	6/18/13	10:00 am	63/69	F	Moist	3-5 NE	79	5% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/2	GRAPE		1f buds open	good
5/2	ANBG = annual bluegrass	2-3"	4-6 leaf	few
5/2	DAND = dandelion	4-5″	some flowers	moderate
5/2	WHCL = white clover	3-4″	foliar	moderate
5/2	PERG = perennial ryegrass	3-6″	foliar	many
5/2	QUGR = quackgrass	4-6″	foliar	moderate
5/2	CABR = California brome	4-6″	foliar	moderate
5/2	COMA = common mallow	4-5″	foliar	moderate
5/2	FIBW = field bindweed	4-5″	foliar	many
5/2	WICA = wild carrot			
6/18	GRAPE		fruit dev.	good

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

IR-4 Weed Control in Grape with Mesotrione - HTRC - 2013

IR4 Weed Control in Grape with Mesotrione - HTRC - 2013

Trial ID: IR4-132-13-6 Location: HTRC block 37
Protocol ID: IR4-132-13-6 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	ANBG	PERG	DAND	WHCL
	Pest Code							ANBG	PERG	DAND	WHCL
	Crop Code						GRAPE				
	Rating Date						9/May/13	9/May/13	9/May/13	9/May/13	9/May/13
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
1	Untreated						1.0	1.3	1.0	1.0	1.0
2	mesotrione	4	SC	.195	lb ai/a	EPRE, EPOS	1.0	2.8	3.0	5.8	6.3
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
3	mesotrione	4	SC	0.25	lb ai/a	EPRE, EPOS	1.0	1.8	2.5	5.0	8.3
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
4	diuron	80	DF	3	lb ai/a	EPRE, EPOS	1.0	7.0	6.8	4.8	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE, EPOS					
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
LSD (P=.05)							0.00	3.72	1.85	1.79	2.27
Standard Deviation							0.00	2.32	1.16	1.12	1.42
CV							0.0	72.88	34.95	27.1	22.9

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	ANBG	DAND	PERG	QUGR
	Pest Code							ANBG	DAND	PERG	QUGR
	Crop Code						GRAPE				
	Rating Date						17/May/13	17/May/13	17/May/13	17/May/13	17/May/13
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
1	Untreated						1.0	3.8	3.3	5.5	2.8
2	mesotrione	4	SC	.195	lb ai/a	EPRE, EPOS	1.0	5.0	8.0	2.0	1.5
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
3	mesotrione	4	SC	0.25	lb ai/a	EPRE, EPOS	1.0	7.8	8.8	3.5	4.3
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
4	diuron	80	DF	3	lb ai/a	EPRE, EPOS	1.0	9.3	6.5	9.0	7.8
	glyphosate	5.5	L	1	lb ai/a	EPRE, EPOS					
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
LSD (P=.05)							0.00	2.56	4.03	3.86	3.07
Standard Deviation							0.00	1.60	2.52	2.42	1.92
CV							0.0	24.87	38.07	48.3	47.18

IR-4 Weed Control in Grape with Mesotrione - HTRC - 2013

Pest Code								CABR	COMA	FIBW	PERG
Crop Code							GRAPE				
Rating Date							12/Jun/13	12/Jun/13	12/Jun/13	12/Jun/13	12/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
1	Untreated						1.0	1.5	7.8	6.5	4.8
2	mesotrione	4	SC	.195	lb ai/a	EPRE, EPOS	1.0	1.3	8.3	5.0	5.0
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
3	mesotrione	4	SC	0.25	lb ai/a	EPRE, EPOS	1.0	1.0	9.5	6.0	3.5
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
4	diuron	80	DF	3	lb ai/a	EPRE, EPOS	1.0	10.0	6.8	1.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE, EPOS					
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
LSD (P=.05)							0.00	0.93	5.17	3.65	4.70
Standard Deviation							0.00	0.58	3.23	2.28	2.94
CV							0.0	16.97	40.1	49.28	50.51

Pest Code											CABR
Crop Code							QUGR	WHCL	WICA	GRAPE	
Rating Date										25/Jun/13	25/Jun/13
Rating Type							12/Jun/13	12/Jun/13	12/Jun/13	RATING	RATING
Rating Unit							RATING	RATING	RATING	1-10	1-10
Trt No.	1-10 Name	1-10 Conc	1-10 Type	Rate	Rate Unit	Growth Stage					
1	Untreated						5.0	1.0	5.5	1.0	1.8
2	mesotrione	4	SC	.195	lb ai/a	EPRE, EPOS	5.0	7.5	7.0	1.0	3.3
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
3	mesotrione	4	SC	0.25	lb ai/a	EPRE, EPOS	7.0	10.0	9.5	1.0	1.5
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
4	diuron	80	DF	3	lb ai/a	EPRE, EPOS	9.8	10.0	10.0	1.0	9.3
	glyphosate	5.5	L	1	lb ai/a	EPRE, EPOS					
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
LSD (P=.05)							6.24	2.65	4.89	0.00	2.77
Standard Deviation							3.90	1.66	3.06	0.00	1.73
CV							58.35	23.27	38.19	0.0	44.04

Pest Code							FIBW	PERG	QUGR		CABR
Crop Code										GRAPE	
Rating Date							25/Jun/13	25/Jun/13	25/Jun/13	2/Jul/13	2/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
1	Untreated						4.3	3.0	4.3	1.0	4.0
2	mesotrione	4	SC	.195	lb ai/a	EPRE, EPOS	5.3	1.5	2.3	1.8	3.3
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
3	mesotrione	4	SC	0.25	lb ai/a	EPRE, EPOS	3.0	4.3	3.8	1.5	3.0
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
4	diuron	80	DF	3	lb ai/a	EPRE, EPOS	1.5	10.0	9.0	1.0	10.0
	glyphosate	5.5	L	1	lb ai/a	EPRE, EPOS					
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
LSD (P=.05)							4.06	3.13	5.24	0.85	3.62
Standard Deviation							2.54	1.96	3.28	0.53	2.26
CV							72.53	41.81	68.06	40.65	44.69

IR-4 Weed Control in Grape with Mesotrione - HTRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	DAND	FIBW	QUGR	WICA	GRAPE	FIBW
Crop Code												
Rating Date							2/Jul/13	2/Jul/13	2/Jul/13	2/Jul/13	16/Jul/13	16/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated						2.8	3.3	4.5	5.5	1.0	3.0
2	mesotrione	4	SC	.195	lb ai/a	EPRE, EPOS	10.0	4.8	3.3	7.3	1.0	6.3
	NIS	100	SL	0.25	% v/v	EPRE, EPOS						
3	mesotrione	4	SC	0.25	lb ai/a	EPRE, EPOS	10.0	5.8	5.3	10.0	1.3	5.8
	NIS	100	SL	0.25	% v/v	EPRE, EPOS						
4	diuron	80	DF	3	lb ai/a	EPRE, EPOS	10.0	6.8	8.8	10.0	1.3	6.0
	glyphosate	5.5	L	1	lb ai/a	EPRE, EPOS						
	NIS	100	SL	0.25	% v/v	EPRE, EPOS						
LSD (P=.05)							1.37	3.61	5.89	4.77	0.60	4.21
Standard Deviation							0.85	2.25	3.68	2.98	0.37	2.64
CV							10.43	43.99	67.73	36.43	33.13	50.19

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PERG	WICA	GRAPE	GRAPE	GRAPE
Crop Code											
Rating Date							16/Jul/13	16/Jul/13	4/Oct/13	30/Sep/13	30/Sep/13
Rating Type							RATING	RATING	RATING	#/2 VINES	KG/2 VINES
Rating Unit							1-10	1-10	1-10	#CLUSTER	KG
1	Untreated						1.5	2.0	2.3	176.3	17.02
2	mesotrione	4	SC	.195	lb ai/a	EPRE, EPOS	2.0	7.5	2.3	143.0	10.51
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
3	mesotrione	4	SC	0.25	lb ai/a	EPRE, EPOS	5.0	10.0	2.0	187.0	15.86
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
4	diuron	80	DF	3	lb ai/a	EPRE, EPOS	10.0	10.0	2.5	218.3	19.68
	glyphosate	5.5	L	1	lb ai/a	EPRE, EPOS					
	NIS	100	SL	0.25	% v/v	EPRE, EPOS					
LSD (P=.05)							3.61	2.91	0.92	121.44	12.61
Standard Deviation							2.25	1.82	0.58	75.92	7.88
CV							48.75	24.65	25.66	41.92	50.01

Season-long Weed Control in Grapes – Cronenwett Farms - 2013

Project Code: 132-13-7 **Location: Lawton, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Grape **Variety: Concord**
Planting Method: **Planting Date:** **Harvest Date: 10/4/13**
Spacing: 8 ft **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 30 ft long

Soil Type: Coloma Loamy Sand **OM: 2.8%** **pH: 6.3**
Sand: 76% **Silt: 15%** **Clay: 9%** **CEC: 7.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/16/13	10:00am	46/46	F	Wet	4-6 NW	68	100% Cloudy	Y
EPOS	6/11/13	4:00pm	83/65	F	Damp	1-3 SW	44	80% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/16	GRAPE		Dormant	
4/16	PUDN = purple deadnettle	1-2″	Some flower	Many
4/16	COCW = common chickweed	1″	Flower	Many
4/16	HOWE = horseweed	0.5″		Moderate
4/16	HAVE = hairy vetch	1-2″		Moderate
4/16	ANBG = annual bluegrass	1-2″		Many
4/16	WHCL = white clover	1-2″		Many
6/11	GRAPE	3-4′ vine	Fruit	
6/11	QUGR = quackgrass	6-12″		Few
6/11	SFGE = smallflower geranium	6-7″		Many
6/11	HOWE = horseweed	6-10″	16-20 leaves	Moderate
6/11	HAVE = hairy vetch	6-18″	Flower	Many
	DOBG = downy bromegrass			
	RECL = red clover			
	TRCV = trailing crownvetch			
	FIPA = field pansy			
	WHCL = white clover			
	FAPA = fall panicum			
	LACG = large crabgrass			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Season-long Weed Control in Grapes – Cronenwett Farms - 2013

Season-long Weed Control in Grapes - Cronenwett Farms - 2013

Trial ID: 132-13-7 Location: Lawton
Protocol ID: 132-13-7 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE 22/May/13 RATING 1-10	DOBG 22/May/13 RATING 1-10	RECL 22/May/13 RATING 1-10	SFGE 22/May/13 RATING 1-10	TRCV 22/May/13 RATING 1-10
1	Untreated						1.0	3.3	3.0	7.0	4.0
2	flumioxazin	51	WDG	.383	lb ai/a	EPRE	1.0	10.0	9.3	9.3	5.7
3	oxyfluorfen	4	SC	2	lb ai/a	EPRE	1.0	10.0	9.3	10.0	4.0
4	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	1.0	10.0	10.0	10.0	9.0
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	1.0	8.7	8.7	10.0	7.3
6	halosulfuron	75	WG	.094	lb ai/a	EPRE	1.0	9.0	9.3	8.7	7.7
7	diuron	80	DF	4	lb ai/a	EPRE	1.0	10.0	9.7	9.3	6.7
8	rimsulfuron	25	SG	0.063	lb ai/a	EPRE	1.0	10.0	9.7	9.3	6.7
9	isoxaben	75	DF	1	lb ai/a	EPRE	1.0	9.3	8.0	10.0	5.7
10	sulfentrazone	4	F	0.375	lb ai/a	EPRE	1.0	7.0	6.0	7.0	6.7
11	diuron	80	DF	4	lb ai/a	EPRE	1.0	10.0	10.0	10.0	6.0
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS					
LSD (P=.05)							0.00	3.35	3.23	3.42	6.25
Standard Deviation							0.00	1.97	1.89	2.01	3.67
CV							0.0	22.26	22.41	21.94	58.26

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCL 22/May/13 RATING 1-10	GRAPE 11/Jun/13 RATING 1-10	DOBG 11/Jun/13 RATING 1-10	QUGR 11/Jun/13 RATING 1-10	FIPA 11/Jun/13 RATING 1-10	HAVE 11/Jun/13 RATING 1-10
1	Untreated						3.3	1.0	4.0	7.0	1.0	1.6
2	flumioxazin	51	WDG	.383	lb ai/a	EPRE	5.3	1.0	10.0	10.0	8.3	3.0
3	oxyfluorfen	4	SC	2	lb ai/a	EPRE	8.0	1.0	10.0	10.0	10.0	2.3
4	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	9.3	1.0	10.0	10.0	8.7	9.3
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	6.3	1.0	9.0	8.3	6.3	4.3
6	halosulfuron	75	WG	.094	lb ai/a	EPRE	5.0	1.0	9.3	7.7	6.0	7.7
7	diuron	80	DF	4	lb ai/a	EPRE	9.3	1.0	10.0	10.0	4.7	7.0
8	rimsulfuron	25	SG	0.063	lb ai/a	EPRE	7.7	1.0	10.0	10.0	5.0	4.7
9	isoxaben	75	DF	1	lb ai/a	EPRE	3.0	1.0	8.7	10.0	4.0	5.0
10	sulfentrazone	4	F	0.375	lb ai/a	EPRE	4.0	1.0	7.0	7.7	4.7	7.0
11	diuron	80	DF	4	lb ai/a	EPRE	10.0	1.0	9.3	10.0	7.3	5.3
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS						
LSD (P=.05)							3.37	0.00	3.68	3.60	4.84	6.10
Standard Deviation							1.98	0.00	2.16	2.11	2.84	3.57
CV							30.51	0.0	24.45	23.1	47.33	68.62

Season-long Weed Control in Grapes – Cronenwett Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HOWE	SFGE	WHCL	GRAPE	FAPA	HAVE
Pest Code												
Crop Code										GRAPE		
Rating Date							11/Jun/13	11/Jun/13	11/Jun/13	15/Jul/13	15/Jul/13	15/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated						1.0	7.0	1.0	1.0	4.7	10.0
2	flumioxazin	51	WDG	.383	lb ai/a	EPRE	7.3	10.0	1.7	1.0	9.3	9.7
3	oxyfluorfen	4	SC	2	lb ai/a	EPRE	2.3	10.0	2.7	1.0	9.3	7.7
4	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	10.0	10.0	7.7	1.0	6.7	10.0
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	6.3	10.0	6.0	1.0	9.0	9.0
6	halosulfuron	75	WG	.094	lb ai/a	EPRE	6.7	8.3	1.0	1.0	1.7	10.0
7	diuron	80	DF	4	lb ai/a	EPRE	8.7	7.0	10.0	1.0	9.0	10.0
8	rimsulfuron	25	SG	0.063	lb ai/a	EPRE	7.7	10.0	7.0	1.0	2.7	8.0
9	isoxaben	75	DF	1	lb ai/a	EPRE	3.3	10.0	1.0	1.0	1.7	10.0
10	sulfentrazone	4	F	0.375	lb ai/a	EPRE	3.0	7.0	1.7	1.0	1.0	8.7
11	diuron	80	DF	4	lb ai/a	EPRE	10.0	10.0	9.3	1.0	6.3	9.7
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS						
LSD (P=.05)							4.79	3.83	3.28	0.00	2.81	2.41
Standard Deviation							2.81	2.25	1.93	0.00	1.65	1.41
CV							46.59	24.9	43.25	0.0	29.62	15.13

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HOWE	WHCL	GRAPE	LACG	HOWE	GRAPE
Pest Code												
Crop Code												
Rating Date							15/Jul/13	15/Jul/13	14/Aug/13	14/Aug/13	14/Aug/13	4/Oct/13
Rating Type							RATING	RATING	RATING	RATING	RATING	HARVEST
Rating Unit							1-10	1-10	1-10	1-10	1-10	KG/2vine
1	Untreated						1.0	6.0	1.3	5.0	1.3	39.970
2	flumioxazin	51	WDG	.383	lb ai/a	EPRE	7.0	2.7	1.0	9.0	6.7	33.923
3	oxyfluorfen	4	SC	2	lb ai/a	EPRE	2.0	6.0	1.0	9.7	1.0	29.503
4	flazasulfuron	25	WG	0.033	lb ai/a	EPRE	10.0	7.0	1.0	6.7	9.7	44.920
5	indaziflam	1.67	SC	.065	lb ai/a	EPRE	4.3	4.3	1.3	10.0	6.7	31.557
6	halosulfuron	75	WG	.094	lb ai/a	EPRE	5.7	1.0	1.3	2.0	4.0	39.723
7	diuron	80	DF	4	lb ai/a	EPRE	9.7	10.0	1.0	7.7	9.3	43.523
8	rimsulfuron	25	SG	0.063	lb ai/a	EPRE	3.7	5.3	1.0	2.3	7.3	39.037
9	isoxaben	75	DF	1	lb ai/a	EPRE	1.3	1.0	1.0	3.3	4.0	46.423
10	sulfentrazone	4	F	0.375	lb ai/a	EPRE	3.0	1.7	1.0	3.0	4.3	33.540
11	diuron	80	DF	4	lb ai/a	EPRE	10.0	10.0	1.3	6.0	10.0	41.427
	pyraflufen	.177	SC	0.0055	lb ai/a	EPOS						
LSD (P=.05)							3.06	3.61	0.57	3.65	4.82	13.6300
Standard Deviation							1.80	2.12	0.33	2.14	2.83	8.0025
CV							34.27	42.37	29.86	36.45	48.34	20.78

Preemergence and Postemergence Weed Control in Raspberry – CRC - 2013

Project Code: 131-13-2 **Location: Clarksville, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Raspberry **Variety: Caroline**
Planting Method: Plants **Planting Date: 2009** **Harvest Date:**
Spacing: Solid row **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 35 ft long

Soil Type: Lapeer Sandy Loam **OM: 2.8%** **pH: 6.3**
Sand: 44% **Silt: 39%** **Clay: 17%** **CEC: 9.1**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/15/13	1:00 pm	63/45.7	F	Wet	8-9 SW	60	100% Cloudy	N
EPOS	6/5/13	3:30 pm	70/66	F	Dry	4-6 NE	33	90% Cloudy	N
EPOSDIR	6/5/13	3:30 pm	70/66	F	Dry	4-6 NE	33	90% Cloudy	N
LPOSDIR	7/18/13	9:10 am	87/72	F	Damp	2-3 NW	72	0% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/15	RASP = raspberry			
4/15	DAND = dandelion	2-3″		Many
4/15	ANBG = annual bluegrass	2-3″		Many
6/5	RASP = raspberry	12-20″		30%
6/5	PERG = perennial ryegrass	6-10″		Moderate
6/5	QUGR = quackgrass	6-12″		Moderate
6/5	HOWE = horseweed	4-10″	12-20 leaves	Few
6/5	DAND = dandelion	6-10″	Post-flower	Moderate
7/18	RASP = raspberry	3-4′	Fruit set	50%
7/18	QUGR = quackgrass	10-18″		Few
7/18	HOWE = horseweed	20-30″		Few
7/18	PERG = perennial ryegrass			
7/18	YEFT = yellow foxtail			

Notes and Comments
1. Spray applied with 2 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. EPOS – applied over top of raspberry bushes.
EPOSDIR and LPOSDIR – applied as directed spray to base of raspberry plants, in one pass on each side of row.

Preemergence and Postemergence Weed Control in Raspberry – CRC - 2013

Preemergence and Postemergence Weed Control in Raspberry - CRC - 2013

Trial ID: WC131-13-2 Location: Clarksville
Protocol ID: WC131-13-2 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RASP 15/May/13 RATING 1-10	PERG 15/May/13 RATING 1-10	QUGR 15/May/13 RATING 1-10	DAND 15/May/13 RATING 1-10	RASP 5/Jun/13 RATING 1-10
1	Untreated						1.0	4.0	4.0	1.7	2.3
2	halosulfuron	75	WG	.047	lb ai/a	EPRE,LPOSDIR	1.0	9.0	6.3	8.0	1.7
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
3	halosulfuron	75	WG	.094	lb ai/a	EPRE,LPOSDIR	2.3	7.3	7.0	6.7	2.7
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
4	halosulfuron	75	WG	.094	lb ai/a	EPRE	1.3	9.3	9.3	10.0	2.0
	NIS	100	SL	0.25	% v/v	EPRE					
5	terbacil	80	WDG	1.6	lb ai/a	EPRE	1.0	9.0	10.0	9.7	1.3
6	isoxaben	75	DF	1	lb ai/a	EPRE	2.0	8.0	7.7	7.0	3.0
7	flumioxazin	51	WDG	0.255	lb ai/a	EPRE	3.3	10.0	10.0	10.0	2.7
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	5.3	9.7	10.0	10.0	5.0
9	sulfentrazone	4	F	0.375	lb ai/a	EPRE	1.7	7.0	4.7	5.3	4.0
10	pyroxasulfone	85	WDG	0.21	lb ai/a	EPRE	3.7	9.3	4.7	3.7	4.3
11	diuron	80	DF	3	lb ai/a	EPRE	1.0	8.7	6.0	6.0	2.7
	clopyralid	3	L	0.125	lb ai/a	EPOS					
	clethodim	.97	EC	.12	lb ai/a	EPOS					
12	diuron	80	DF	3	lb ai/a	EPRE	1.3	9.0	9.3	8.3	2.3
	clopyralid	3	L	0.125	lb ai/a	EPOSDIR					
	clethodim	.97	EC	.12	lb ai/a	EPOSDIR					
LSD (P=.05)							1.69	3.28	6.21	4.66	2.51
Standard Deviation							1.00	1.94	3.66	2.75	1.48
CV							48.0	23.18	49.41	38.21	52.22

Preemergence and Postemergence Weed Control in Raspberry – CRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	QUGR	DAND	HOWE	RASP	QUGR
Pest Code							QUGR	DAND	HOWE		QUGR
Crop Code										RASP	
Rating Date							5/Jun/13	5/Jun/13	5/Jun/13	13/Jun/13	13/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Untreated						4.0	3.7	7.0	2.0	4.7
2	halosulfuron	75	WG	.047	lb ai/a	EPRE,LPOSDIR	7.0	6.0	9.0	1.3	7.0
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
3	halosulfuron	75	WG	.094	lb ai/a	EPRE,LPOSDIR	7.0	7.7	10.0	2.3	7.0
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
4	halosulfuron	75	WG	.094	lb ai/a	EPRE	8.3	8.3	7.7	2.0	9.3
	NIS	100	SL	0.25	% v/v	EPRE					
5	terbacil	80	WDG	1.6	lb ai/a	EPRE	10.0	9.0	10.0	1.3	10.0
6	isoxaben	75	DF	1	lb ai/a	EPRE	7.0	9.0	10.0	2.0	7.3
7	flumioxazin	51	WDG	0.255	lb ai/a	EPRE	9.3	10.0	10.0	2.7	9.7
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	10.0	9.3	3.7	4.0	10.0
9	sulfentrazone	4	F	0.375	lb ai/a	EPRE	4.0	6.3	7.0	3.3	5.0
10	pyroxasulfone	85	WDG	0.21	lb ai/a	EPRE	4.3	4.0	4.0	3.7	5.0
11	diuron	80	DF	3	lb ai/a	EPRE	6.3	7.7	10.0	3.0	8.3
	clopyralid	3	L	0.125	lb ai/a	EPOS					
	clethodim	.97	EC	.12	lb ai/a	EPOS					
12	diuron	80	DF	3	lb ai/a	EPRE	8.7	8.3	9.7	2.3	8.3
	clopyralid	3	L	0.125	lb ai/a	EPOSDIR					
	clethodim	.97	EC	.12	lb ai/a	EPOSDIR					
LSD (P=.05)							6.52	5.10	5.41	1.91	5.65
Standard Deviation							3.85	3.01	3.19	1.13	3.34
CV							53.73	40.43	39.12	45.13	43.68

Preemergence and Postemergence Weed Control in Raspberry – CRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HOWE	RASP	QUGR	HOWE	RASP
Pest Code											
Crop Code								RASP			RASP
Rating Date							13/Jun/13	16/Jul/13	16/Jul/13	16/Jul/13	16/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Untreated						9.7	2.0	6.3	9.0	2.3
2	halosulfuron	75	WG	.047	lb ai/a	EPRE,LPOSDIR	10.0	1.0	7.0	9.0	1.3
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
3	halosulfuron	75	WG	.094	lb ai/a	EPRE,LPOSDIR	9.0	2.0	7.0	10.0	2.7
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
4	halosulfuron	75	WG	.094	lb ai/a	EPRE	9.3	1.3	7.3	8.0	1.3
	NIS	100	SL	0.25	% v/v	EPRE					
5	terbacil	80	WDG	1.6	lb ai/a	EPRE	10.0	1.3	10.0	10.0	1.3
6	isoxaben	75	DF	1	lb ai/a	EPRE	10.0	2.0	5.0	9.0	2.3
7	flumioxazin	51	WDG	0.255	lb ai/a	EPRE	10.0	1.7	9.0	9.0	2.3
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	1.7	4.0	9.7	4.0	3.3
9	sulfentrazone	4	F	0.375	lb ai/a	EPRE	9.0	3.3	4.3	7.0	3.0
10	pyroxasulfone	85	WDG	0.21	lb ai/a	EPRE	6.3	5.3	4.3	7.0	4.0
11	diuron	80	DF	3	lb ai/a	EPRE	10.0	2.7	9.0	10.0	2.0
	clopyralid	3	L	0.125	lb ai/a	EPOS					
	clethodim	.97	EC	.12	lb ai/a	EPOS					
12	diuron	80	DF	3	lb ai/a	EPRE	10.0	2.0	10.0	10.0	2.0
	clopyralid	3	L	0.125	lb ai/a	EPOSDIR					
	clethodim	.97	EC	.12	lb ai/a	EPOSDIR					
LSD (P=.05)							2.12	2.05	5.03	3.46	1.88
Standard Deviation							1.25	1.21	2.97	2.04	1.11
CV							14.31	50.7	40.02	24.04	47.62

Preemergence and Postemergence Weed Control in Raspberry – CRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	YEFT	HOWE	RASP	RASP	RASP
Pest Code											
Crop Code									RASP	RASP	RASP
Rating Date							16/Aug/13	16/Aug/13	16/Aug/13	26/Aug/13	10/Sep/13
Rating Type							RATING	RATING	HARVEST	HARVEST	HARVEST
Rating Unit							1-10	1-10	KG/10FT	KG/10FT	KG/10FT
1	Untreated						8.3	7.0	0.473	0.297	0.654
2	halosulfuron	75	WG	.047	lb ai/a	EPRE,LPOSDIR	5.3	8.7	0.355	0.447	1.132
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
3	halosulfuron	75	WG	.094	lb ai/a	EPRE,LPOSDIR	9.7	10.0	0.297	0.294	0.606
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
4	halosulfuron	75	WG	.094	lb ai/a	EPRE	7.0	7.0	0.529	0.451	0.725
	NIS	100	SL	0.25	% v/v	EPRE					
5	terbacil	80	WDG	1.6	lb ai/a	EPRE	10.0	10.0	0.336	0.541	1.175
6	isoxaben	75	DF	1	lb ai/a	EPRE	3.7	9.3	0.241	0.419	0.857
7	flumioxazin	51	WDG	0.255	lb ai/a	EPRE	8.7	9.0	0.219	0.257	0.947
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	10.0	4.0	0.157	0.077	0.325
9	sulfentrazone	4	F	0.375	lb ai/a	EPRE	9.0	7.7	0.161	0.203	0.599
10	pyroxasulfone	85	WDG	0.21	lb ai/a	EPRE	9.3	6.7	0.192	0.269	0.565
11	diuron	80	DF	3	lb ai/a	EPRE	7.7	10.0	0.354	0.386	0.831
	clopyralid	3	L	0.125	lb ai/a	EPOS					
	clethodim	.97	EC	.12	lb ai/a	EPOS					
12	diuron	80	DF	3	lb ai/a	EPRE	10.0	10.0	0.389	0.450	0.861
	clopyralid	3	L	0.125	lb ai/a	EPOSDIR					
	clethodim	.97	EC	.12	lb ai/a	EPOSDIR					
LSD (P=.05)							4.14	4.02	0.3539	0.3050	0.7019
Standard Deviation							2.44	2.37	0.2090	0.1801	0.4145
CV							29.71	28.67	67.73	52.84	53.61

Preemergence and Postemergence Weed Control in Raspberry – CRC - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RASP 17/Sep/13 HARVEST KG/10FT	RASP 24/Sep/13 HARVEST KG/10FT	RASP 1/Oct/13 HARVEST KG/10FT	RASP 8/Oct/13 HARVEST KG/10FT	RASP TOTAL KG/10FT
	Pest Code										
	Crop Code										
	Rating Date										
	Rating Type										
	Rating Unit										
1	Untreated						2.160	0.859	1.041	1.111	6.595
2	halosulfuron	75	WG	.047	lb ai/a	EPRE,LPOSDIR	3.170	1.198	1.095	0.951	8.348
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
3	halosulfuron	75	WG	.094	lb ai/a	EPRE,LPOSDIR	2.220	0.623	0.564	0.563	5.167
	NIS	100	SL	0.25	% v/v	EPRE,LPOSDIR					
4	halosulfuron	75	WG	.094	lb ai/a	EPRE	1.980	0.724	0.526	0.655	5.590
	NIS	100	SL	0.25	% v/v	EPRE					
5	terbacil	80	WDG	1.6	lb ai/a	EPRE	3.260	1.082	1.021	1.149	8.564
6	isoxaben	75	DF	1	lb ai/a	EPRE	2.910	0.965	0.825	0.715	6.932
7	flumioxazin	51	WDG	0.255	lb ai/a	EPRE	2.133	0.607	0.639	0.879	5.681
8	rimsulfuron	25	DF	.063	lb ai/a	EPRE	0.830	0.375	0.383	0.495	2.642
9	sulfentrazone	4	F	0.375	lb ai/a	EPRE	2.543	0.850	0.770	0.909	6.034
10	pyroxasulfone	85	WDG	0.21	lb ai/a	EPRE	1.645	0.436	0.485	0.412	4.004
11	diuron	80	DF	3	lb ai/a	EPRE	1.603	0.493	0.385	0.335	4.387
	clopyralid	3	L	0.125	lb ai/a	EPOS					
	clethodim	.97	EC	.12	lb ai/a	EPOS					
12	diuron	80	DF	3	lb ai/a	EPRE	3.133	1.160	0.869	0.921	7.785
	clopyralid	3	L	0.125	lb ai/a	EPOSDIR					
	clethodim	.97	EC	.12	lb ai/a	EPOSDIR					
LSD (P=.05)							1.6238	0.5787	0.5876	0.6272	3.6932
Standard Deviation							0.9589	0.3417	0.3470	0.3703	2.1809
CV							41.71	43.75	48.39	48.88	36.49

Weed Control in Fir Christmas Trees with Alion – Wahmhoff Farms - 2013

Project Code: XMAS-2013-1 **Location: Gobles, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Fir **Variety: Fraser Fir**
Planting Method: Transplant **Planting Date: 2009** **Harvest Date:**
Spacing: 6 ft **Row Spacing: 6 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 35 ft long

Soil Type: Belleville Loamy Sand **OM: 3.5%** **pH: 6.6**
Sand: 84% **Silt: 8%** **Clay: 8%** **CEC: 5.1**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/4/2013	11:20am	46/40	F	Dry	6-8 SW	20	10% Cloudy	N
LPRE	5/14/2013	11:00am	68/60	F	Dry	8-9 SW	30	10% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/4	FIR	3-4′		
4/4	No weeds present			
5/14	FIR		10% buds open	
5/14	WICA = wild carrot	2-4″		Moderate
	CORW = common ragweed			
	HOWE = horseweed			
	HONE = horse nettle			
	GRASS = unknown grass			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. All sprays applied in a 5.3′ band over the top of trees.

Weed Control in Fir Christmas Trees with Alion – Wahmhoff Farms - 2013

Weed Control in Fir Christmas Trees with Alion - Wahmhoff Farms 2013

Trial ID: XMAS 2013-01 Location: Gobles, MI
Protocol ID: XMAS 2013-01 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								WICA		CORW	HOWE	WICA
Crop Code							FIR		FIR			
Rating Date							14/May/13	14/May/13	19/Jun/13	19/Jun/13	19/Jun/13	19/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	1.0	10.0	1.0	10.0	10.0	8.7
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	1.0	8.7	1.0	10.0	7.3	1.7
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	1.0	9.7	1.0	10.0	10.0	9.3
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	1.0	9.0	1.0	10.0	8.7	5.0
5	Westar		WP	6	oz/a	EPRE	1.3	9.7	2.0	10.0	9.3	9.0
	sulfometuron	75	DG	.0244	lb ai/a	EPRE						
	hexazinone	75	DF	0.257	lb ai/a	EPRE						
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	1.0	8.7	2.3	10.0	10.0	9.3
7	Untreated						1.0	8.7	1.3	7.7	1.0	1.0
LSD (P=.05)							0.39	1.79	1.38	2.72	1.88	1.68
Standard Deviation							0.22	1.00	0.78	1.53	1.05	0.94
CV							20.83	10.92	56.24	15.8	13.1	15.0

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								CORW	HONE	HOWE	WICA	
Crop Code							FIR					FIR
Rating Date							15/Jul/13	15/Jul/13	15/Jul/13	15/Jul/13	15/Jul/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	1.3	9.3	2.0	9.3	7.0	1.0
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	1.3	8.7	5.0	4.0	2.3	1.0
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	1.0	10.0	3.0	10.0	8.7	1.0
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	1.0	9.3	5.0	6.7	3.3	1.7
5	Westar		WP	6	oz/a	EPRE	1.3	8.0	2.0	4.0	7.7	1.3
	sulfometuron	75	DG	.0244	lb ai/a	EPRE						
	hexazinone	75	DF	0.257	lb ai/a	EPRE						
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	1.7	7.7	1.0	8.7	8.3	2.0
7	Untreated						1.0	1.0	1.7	1.0	1.7	1.3
LSD (P=.05)							1.03	2.18	3.11	2.12	2.11	0.85
Standard Deviation							0.58	1.23	1.75	1.19	1.19	0.48
CV							46.63	15.92	62.14	19.11	21.27	35.98

Weed Control in Fir Christmas Trees with Alion - Wahmhoff Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRASS	HONE	HOWE	WICA
Pest Code										
Crop Code										
Rating Date							14/Aug/13	14/Aug/13	14/Aug/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	10.0	2.3	8.7	8.0
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	10.0	3.3	2.0	2.0
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	10.0	1.7	9.3	8.0
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	10.0	6.0	4.3	1.7
5	Westar		WP	6	oz/a	EPRE	8.7	1.3	2.0	6.0
	sulfometuron	75	DG	.0244	lb ai/a	EPRE				
	hexazinone	75	DF	0.257	lb ai/a	EPRE				
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	9.3	1.7	8.3	9.3
7	Untreated						9.0	2.3	1.0	2.3
LSD (P=.05)							1.75	2.50	2.18	3.04
Standard Deviation							0.98	1.40	1.22	1.71
CV							10.28	52.61	24.04	32.04

Weed Control in Spruce Christmas Trees with Alion – Wahmhoff Farms - 2013

Project Code: XMAS-2013-2 **Location: Gobles, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Spruce **Variety: Blue spruce**
Planting Method: Transplant **Planting Date: 2009** **Harvest Date:**
Spacing: 6 ft **Row Spacing: 6 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 35 ft long

Soil Type: Thetford Sandy Loam **OM: 3.6%** **pH: 6.2**
Sand: 79% **Silt: 12%** **Clay: 9%** **CEC: 7.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/4/2013	10:15am	46/36	F	Dry	4-6 SW	31	10% Cloudy	N
LPRE	5/14/2013	10:00am	63/50	F	Dry	5-7 SW	45	50% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/4	SPRUCE	2-3′	Dormant – pre bud break	10%
4/4	No weeds present			
5/14	SPRUCE		50% buds green	
5/14	WICA = wild carrot GIFT = giant foxtail CORW = common ragweed HOWE = horseweed HONE = horsenettle	2-4″		Moderate

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. All treatments applied in a 5.3′ band over the top of trees.

Weed Control in Spruce Christmas Trees with Alion – Wahmhoff Farms - 2013

Weed Control in Spruce Christmas Trees with Alion - Wahmhoff Farms 2013

Trial ID: XMAS 2013-02 Location: Gobles, MI
Protocol ID: XMAS 2013-02 Investigator: Dr. Bernard Zandstra
Study Director: Colin Phillippo

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								WICA		GIFT	CORW	HOWE
Crop Code							SPRUCE		SPRUCE			
Rating Date							14/May/13	14/May/13	19/Jun/13	19/Jun/13	19/Jun/13	19/Jun/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	1.0	9.3	1.0	10.0	10.0	10.0
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	1.0	6.7	1.7	10.0	10.0	10.0
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	1.0	10.0	1.0	10.0	10.0	10.0
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	1.0	5.7	1.3	10.0	10.0	9.0
5	Westar		WP	6	oz/a	EPRE	2.0	10.0	3.0	10.0	10.0	10.0
	sulfometuron	75	DG	.0244	lb ai/a	EPRE						
	hexazinone	75	DF	0.257	lb ai/a	EPRE						
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	1.0	10.0	1.0	9.0	10.0	10.0
7	Untreated						1.0	9.7	1.0	2.3	10.0	6.7
LSD (P=.05)							0.67	3.64	0.90	1.45	0.00	3.62
Standard Deviation							0.38	2.05	0.50	0.82	0.00	2.04
CV							33.07	23.36	35.28	9.32	0.0	21.7

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code							WICA		GIFT	HONE	HOWE	WICA
Crop Code								SPRUCE				
Rating Date							19/Jun/13	15/Jul/13	15/Jul/13	15/Jul/13	15/Jul/13	15/Jul/13
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	8.0	1.0	10.0	6.7	10.0	8.7
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	3.7	1.0	10.0	3.0	10.0	2.7
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	9.7	1.0	10.0	7.3	10.0	9.7
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	4.7	1.0	10.0	4.0	10.0	4.0
5	Westar		WP	6	oz/a	EPRE	10.0	2.3	9.0	5.0	9.7	9.0
	sulfometuron	75	DG	.0244	lb ai/a	EPRE						
	hexazinone	75	DF	0.257	lb ai/a	EPRE						
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	9.3	1.0	7.3	2.7	8.7	9.0
7	Untreated						1.7	1.0	1.3	1.0	4.7	1.7
LSD (P=.05)							4.96	0.39	2.04	3.49	2.41	4.00
Standard Deviation							2.79	0.22	1.15	1.96	1.35	2.25
CV							41.54	18.33	13.93	46.29	15.04	35.21

Weed Control in Spruce Christmas Trees with Alion - Wahmhoff Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SPRUCE 14/Aug/13 RATING 1-10	GIFT 14/Aug/13 RATING 1-10	HONE 14/Aug/13 RATING 1-10	HOWE 14/Aug/13 RATING 1-10	WICA 14/Aug/13 RATING 1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	1.0	9.0	3.0	10.0	7.0
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	1.3	10.0	1.7	9.7	1.7
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	1.3	9.7	3.7	10.0	9.0
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	2.0	10.0	4.7	9.3	3.3
5	Westar		WP	6	oz/a	EPRE	2.3	5.7	2.0	8.0	7.7
	sulfometuron	75	DG	.0244	lb ai/a	EPRE					
	hexazinone	75	DF	0.257	lb ai/a	EPRE					
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	1.0	3.0	1.3	9.0	7.0
7	Untreated						1.0	1.7	1.0	1.7	1.0
LSD (P=.05)							0.99	2.72	2.59	2.14	2.98
Standard Deviation							0.56	1.53	1.46	1.20	1.67
CV							38.94	21.82	58.79	14.59	31.95

Weed Control in Pine Christmas Trees with Alion – Wahmhoff Farms - 2013

Project Code: XMAS-2013-3 **Location: Gobles, MI**

Personnel: Bernard H. Zandstra, Colin Phillippo
Crop: Pine **Variety: White pine**
Planting Method: Transplant **Planting Date: 2009** **Harvest Date:**
Spacing: 6 ft **Row Spacing: 6 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft wide x 35 ft long

Soil Type: Thetford Loamy Sand **OM: 4.5%** **pH:6.4**
Sand: 82% **Silt: 9%** **Clay: 9%** **CEC: 7.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/4/13	11:00am	46/36	F	Dry	3-5 SW	31	10% Cloudy	N
LPRE	5/14/13	10:30am	65/50	F	Dry	4-6 SW	40	10% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/4	PINE	5′	Dormant – pre bud break	
4/4	No weeds present			
5/14	PINE	3-5′	100% buds broken	
5/14	WICA = wild carrot GIFT = giant foxtail CORW = common ragweed HOWE = horseweed HONE = horsenettle GRASS = unknown grass	3-4″		Few

Notes and Comments
1. Spray applied with 4 nozzle boom. FF8002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. All applications applied in a 5.3′ band over the top of trees.

Weed Control in Pine Christmas Trees with Alion – Wahmhoff Farms - 2013

Weed Control in Pine Christmas Trees with Alion - Wahmhoff Farms 2013

Trial ID:	XMAS 2013-03	Location:	Gobles, MI
Protocol ID:	XMAS 2013-03	Investigator:	Dr. Bernard Zandstra
Study Director:	Colin Phillippo		

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PINE 14/May/13 RATING 1-10	WICA 14/May/13 RATING 1-10	PINE 19/Jun/13 RATING 1-10	GIFT 19/Jun/13 RATING 1-10	CORW 19/Jun/13 RATING 1-10	HOWE 19/Jun/13 RATING 1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	1.0	7.7	1.0	8.0	10.0	10.0
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	1.0	9.3	1.0	9.3	10.0	10.0
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	1.0	10.0	1.0	7.7	10.0	10.0
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	1.0	9.7	1.7	8.7	10.0	10.0
5	Westar		WP	6	oz/a	EPRE	1.0	10.0	1.7	8.0	9.3	10.0
	-sulfometuron	75	DG	.0244	lb ai/a	EPRE						
	-hexazinone	75	DF	0.257	lb ai/a	EPRE						
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	1.0	10.0	1.3	8.0	10.0	9.7
7	Untreated						1.0	9.0	1.3	7.3	9.3	9.0
LSD (P=.05)							0.00	2.17	0.63	2.27	1.00	1.16
Standard Deviation							0.00	1.22	0.36	1.28	0.56	0.65
CV							0.0	13.02	27.72	15.66	5.74	6.67

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA 19/Jun/13 RATING 1-10	PINE 15/Jul/13 RATING 1-10	GIFT 15/Jul/13 RATING 1-10	WICA 15/Jul/13 RATING 1-10	HONE 15/Jul/13 RATING 1-10	HOWE 15/Jul/13 RATING 1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	6.0	1.0	8.7	6.0	4.3	9.0
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	7.7	1.0	8.0	6.0	4.7	10.0
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	9.3	1.0	7.3	8.7	6.7	10.0
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	8.7	1.0	6.3	7.3	5.0	10.0
5	Westar		WP	6	oz/a	EPRE	9.3	1.0	4.3	9.3	2.3	10.0
	-sulfometuron	75	DG	.0244	lb ai/a	EPRE						
	-hexazinone	75	DF	0.257	lb ai/a	EPRE						
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	9.3	1.0	6.3	10.0	2.7	10.0
7	Untreated						5.0	1.0	6.7	4.0	2.7	4.7
LSD (P=.05)							4.47	0.00	2.74	4.15	3.38	3.33
Standard Deviation							2.51	0.00	1.54	2.33	1.90	1.87
CV							31.8	0.0	22.62	31.82	46.95	20.57

Weed Control in Pine Christmas Trees with Alion - Wahmhoff Farms - 2013

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code								GRASS	HONE	HOWE	WICA
Crop Code							PINE				
Rating Date							14/Aug/13	14/Aug/13	14/Aug/13	14/Aug/13	14/Aug/13
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	indaziflam	1.67	SC	0.085	lb ai/a	EPRE	1.0	6.7	4.3	10.0	5.7
2	indaziflam	1.67	SC	0.085	lb ai/a	LPRE	1.3	6.7	4.7	10.0	4.3
3	indaziflam	1.67	SC	0.13	lb ai/a	EPRE	1.0	5.3	4.0	10.0	8.3
4	indaziflam	1.67	SC	0.13	lb ai/a	LPRE	1.3	4.0	3.0	10.0	6.0
5	Westar		WP	6	oz/a	EPRE	1.3	2.0	3.0	10.0	9.0
	-sulfometuron	75	DG	.0244	lb ai/a	EPRE					
	-hexazinone	75	DF	0.257	lb ai/a	EPRE					
6	flumioxazin	51	WDG	.383	lb ai/a	EPRE	1.0	3.7	2.3	10.0	7.7
7	Untreated						1.0	2.7	3.0	7.0	3.0
LSD (P=.05)							0.67	3.62	2.81	3.49	4.97
Standard Deviation							0.38	2.03	1.58	1.96	2.80
CV							33.07	45.92	45.41	20.52	44.48