HORTICULTURAL REPORT

2019 WEED CONTROL RESEARCH ON FRUIT & VEGETABLE CROPS

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By

Bernard H. Zandstra
Nicole M. Soldan
Monique K. Hemker
William R. Chase
Colin J. Phillippo
Carolyn G. Fitzgibbon

Department of Horticulture
Michigan State University
East Lansing, Michigan

WEED CONTROL IN HORTICULTURAL CROPS – 2019
FOREWORD

This report summarizes the results of weed control experiments on horticultural crops in Michigan in 2019. 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) 353-6637. zandstra@msu.edu

Monique Hemker, 1066 Bogue St., A438 Plant and Soil Science Building, Michigan State University, East Lansing, Michigan 48824-1325. (517) 353-0415. hemkermo@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 still a 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 9.2014.7, 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)*
ASDF	asiatic dayflower	*Commelina communis L.*
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.
BLCA	bladder campion	*Silene latifolia* Pior.
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.
CABG	Canada bluegrass	*Poa compressa* L.
CABR	California brome	*Bromus carinatus* L.
CAGE	Carolina geranium	*Geranium carolinianam L.*
CATH	Canada thistle	*Cirsium arvense* (L.) Scop.
CAWE	carpetweed	*Mollugo verticillata* L.
CEPR	common evening primrose	*Oenothera biennis* 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 mullein	*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, hairy	*Galinsoga ciliata (Raf.) Blake*

WEED LIST

Abbr.	Common Name	Botanical Name
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.
HAFE	hard fescue	*Festuca brevipila* Tracey
HANS	hairy nightshade	*Solanum sarrachoides* Sendtner
HAVE	hairy vetch	*Vicia villosa* Roth
HEBW	hedge bindweed	*Calystegia sepium* (L.) R. Br.
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* L.
JABR	Japanese brome	*Bromus japonicas* L.
JIWE	jimsonweed	*Datura stramonium* L.
LACG	large crabgrass	*Digitaria sanguinalis* (L.) Scop
LATH	ladysthumb	*Polygonum persicaria* L.
MAYC	marsh yellowcress	*Rorippa islandica* (Oeder) Barbs
MECW	mouseear chickweed	*Cerastium vulgatum* L.
MECR	mouseear cress	Arabidopsis thaliana (L.) Heynh
MONO	monolepis	*Monolepis nuttaliana* Greene
MUTH	musk thistle	*Carduus nutans* L.
MWCH	mayweed chamomile	*Anthemis cotula* L.
NIMB	nimblewill	*Muhlenbergia schreberi* J.F. Gmel.
NLLQ	narrowleaf lambsquarters	*Chenopodium desiccatum* A. Nels
OEDA	oxeye daisy	*Chrysanthemum leucanthemum* L.
ORGR	orchardgrass	*Dactylis glomerata* L.
PAAS	Panicled aster	*Symphyotrichum lanceolatum (Wild.)G.L.Nesom*
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.
RFCL	rabbitfoot clover	*Trifolium arvenso L.*
ROCI	rough cinquefoil	*Potentilla norvegica L.*
ROFB	rough fleabane	*Erigeron asper* Nutt.
RRPW	redroot pigweed	*Amaranthus retroflexus* L.

WEED LIST

Abbr.	Common Name	Botanical Name
RSFI	redstem filaree	*Erodium cicutarium* (L.) L'Hér. ex Ait.
RUTH	Russian thistle	*Salsola iberica* L.
SFGE	smallflower geranium	*Geranium pusillum* L.
SHPU	shepherdspurse	*Capsella bursa-pastoris* (L.) Medic.
SLSW	slender speedwell	*Veronica filiformis* Sm.
SMGC	smooth groundcherry	*Physalis subglabrata Mackenzt Bush*
SPKW	spotted knapweed	*Centaurea stoebe* L.
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.
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.
WHHA	white heath aster	*Symphyotrichum ericoides* L.
WIBW	wild buckwheat	*Polygonum convolvulus* L.
WICA	wild carrot	*Daucus carota* L.
WICH	wild chamomile	*Matricaria chamomilla* L.
WIGA	wild garlic	*Allium vineale* 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
2,4-D choline salt	Embed, GF3335	3.8 L	Corteva
acetochlor	Breakfree	6.4 EC	DuPont
acetochlor	Harness	7.0 E	Bayer Cropscience
acetochlor	Surpass	6.4 E	Corteva
acetochlor	Warrant	3 EC	Bayer Cropscience
acifluorfen	Ultra Blazer	2 L	UPLNA
ammonium soap of fatty acid	Finalsan	22.1% L	Neudorff
atrazine	AAtrex	4 L	Syngenta
atrazine 4.006 lb ai + pyroxasulfone 0.485 lb ai + fluthiacet-methyl 0.014 lb ai	Anthem ATZ	4.5 SE	FMC
bensulide	Prefar	4 EC	Gowan
bentazon	Basagran	4 L	UPLNA
bicyclopyrone	A 16003E	1.67 SL	Syngenta
bicyclopyrone 0.06 lb ai + mesotrione 0.24 lb ai + *S*-metolachlor 2.14 lb ai + atrazine 1 lb ai + benoxacor 0.107 lb ai	Acuron	3.547 CS	Syngenta
bromoxynil	Moxy	2 EC	Winfield Solutions
carfentrazone	Aim	2 EC	FMC
chlorimuron-ethyl	Classic	25 WDG	Corteva
clethodim	Intensity One	0.97 EC	Loveland
clethodim	Select Max	0.97 EC	Valent
clethodim	WE1557	2 EC	Wilbur Ellis
clomazone	Command	3 ME	FMC
clopyralid	Spur	3 EC	Albaugh
clopyralid	Stinger	3 EC	Corteva
cloransulam-methyl	Firstrate	84 WDG	Corteva
cycloate	Ro-Neet	6 EC	Helm Agro
DCPA	Dacthal	75 WP	AMVAC
dicamba	Clarity	4 L	BASF
diclobenil	Casoron G	4 G	UPLNA
diclobenil	Casoron L	1.4 CS	UPLNA
diflufenzopyr 21.4% + dicamba 55%	Distinct	76.4 WG	BASF
dimethenamid-P	Outlook	6 EC	BASF
dimethenamid-P	Tower	6 EC	BASF
diquat	Reglone	2 EC	Syngenta
diuron	Karmex	80 DF	Adama
EPTC	Eptam	7 EC	Gowan
ethalfluralin	Curbit	3 EC	Loveland
ethalfluralin 1.6 lb ai + clomazone 0.5 lb ai	Strategy	2.1 EC	Loveland
ethofumesate	Nortron SC	4 SC	Bayer CropScience
FeHEDTA	Fiesta	4.43% L	Neudorff
flazasulfuron	Mission	25 WG	ISK Bioscience
fluazifop-P	Fusilade DX	2 EC	Syngenta
flucarbazone	Everest	70 WDG	UPLNA
flufenacet 54.5% + metribuzin 13.6 %	Axiom	68 DF	Bayer CropScience
flumetsulam	Python	80 WDG	Corteva
flumioxazin	Chateau SW	51 WG	Valent

CHEMICAL LIST

COMMON NAME	TRADE NAME	FORMULATION	MANUFACTURER
flumioxazin	Sureguard	51 WDG	Valent
fluthiacet	Cadet	0.91 EC	FMC
fluthiacet + mesotrione	Solstice	4L	FMC
fluroxypyr	Starane Ultra	2.8 L	Corteva
fomesafen	Reflex	2 EC	Syngenta
fomesafen 10.2% + *S*-metolachlor 46.4%	Prefix	5.29 L	Syngenta
glufosinate	Rely 280, Liberty 280	2.34 L	BASF
glufosinate-ammonium	Lifeline	2.34 L	UPLNA
glufosinate-ammonium	Reckon 280	2.34 L	Solera
glyphosate	Durango	5.4 L	Corteva
glyphosate	Roundup PowerMax	5.5 L	Bayer Cropscience
glyphosate	Roundup Ultra	4 L	Bayer Cropscience
glyphosate	Roundup UltraMax	5 L	Bayer Cropscience
glyphosate	Roundup WeatherMax	5.5 L	Bayer Cropscience
glyphosate	Touchdown Total	4.17 L	Syngenta
halosulfuron	Permit	75 WG	Gowan
halosulfuron	Sandea	75 WG	Gowan
hexazinone	Velpar	2 L	TKI Novasource
hexazinone	Velpar ULV	75 SG	TKI Novasource
hexazinone + sulfometuron	Westar	75 WDG	Bayer Cropscience
imazamox	Raptor	1 AS	BASF
imazapic	Plateau	70 WG	BASF
imazethapyr	Pursuit	2 EC	BASF
imazosulfuron	League	75 WDG	Valent
indaziflam	Alion 200	1.67 SC	Bayer CropScience
indaziflam	Alion 500	4.17 SC	Bayer CropScience
isoxaben	Trellis	75 DF	Corteva
linuron	Lorox	50 DF	TKI NovaSource
mesotrione	Callisto	4 SC	Syngenta
metribuzin	Tricor	75 DF	UPLNA
napropamide	Devrinol DF-XT	50 DF	UPLNA
nicosulfuron	Accent	75 WDG	Corteva
nicosulfuron + mesotrione + isoxadifen-ethyl	Revulin Q	51.2 WDG	Corteva
norflurazon	Solicam	80 DF	TKI NovaSource
oryzalin	Surflan	4 AS	UPLNA
oxyfluorfen	Goal 2XL	2 EC	Nutrichem
oxyfluorfen	GoalTender	4 SC	Nutrichem
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
pendimethalin	Satellite Hydrocap	3.8 SC	UPLNA
penoxsulam 0.083 lb ai + oxyfluorfen 3.93 lb ai	Pindar GT	4.013	Corteva
phenmedipham	Spin-Aid	1.3 L	Bayer CropScience

CHEMICAL LIST

COMMON NAME	TRADE NAME	FORMULATION	MANUFACTURER
phenmedipham 0.6 lb ai + desmedipham 0.6 lb ai	Betamix	1.3 L	Bayer CropScience
prometryn	Caparol	4 L	Syngenta
pronamide	Kerb	3.3 SC	Corteva
pyraflufen-ethyl	Venue	0.17 SC	Nichino
pyroxasulfone	Zidua	85 WDG	BASF
pyroxasulfone 2.087 lb ai + fluthiacet-methyl 0.063 lb ai	Anthem	2.15 SE	FMC
pyroxasulfone 4.174 lb ai + fluthiacet-methyl 0.126 lb ai	Anthem MAXX	4.30 SC	FMC
quinclorac	Quinstar	3.8 L	Albaugh
quizalofop-P-ethyl	Assure II	0.88 EC	Corteva
quizalofop-P-ethyl	Targa	0.88 EC	Gowan
rimsulfuron	Matrix	25 DF	Corteva
rimsulfuron	Solida	25 DF	FMC
saflufenacil	Sharpen	2.85 SC	BASF
saflufenacil	Treevix	70 WG	BASF
sethoxydim	Poast	1.53 EC	BASF
simazine	Princep	90 DF	Syngenta
S-metolachlor	Cinch	7.64 EC	Corteva
S-metolachlor	Dual Magnum	7.62 EC	Syngenta
S-metolachlor 3.34 lb ai + mesotrione 0.33 lb ai	Camix	3.67 L	Syngenta
S-metolachlor 2.68 lb ai + mesotrione 0.268 lb ai + atrazine 1.0 lb ai	Lumax	3.948 L	Syngenta
S-metolachlor II	Dual II Magnum	7.64 EC	Syngenta
sodium soap of asulam	Asulox	3.34 L	UPL
sulfentrazone	Spartan, Zeus	4 F	FMC
sulfentrazone + metribuzin	F4242	4 L	FMC
sulfentrazone 3.15 lb ai + carfentrazone 0.35 lb ai	Spartan Charge, Zeus Prime XC	3.5 SE	FMC
sulfentrazone 0.18 lb ai + metribuzin 0. 27 lb ai	Authority MTZ	45 DF	FMC
sulfometuron	Oust XP	75 WDG	Bayer CropScience
tembotrione	Laudis	3.5 SC	Bayer CropScience
terbacil	Sinbar	80 WDG	TKI NovaSource
tolpyralate	Shieldex 400 SC	3.33 L	Summit Agro USA
topramezone	Impact	2.8 L	Amvac
triclopyr	Garlon	3 SC	Corteva
trifloxysulfuron	Envoke	75 WG	Syngenta
trifluralin	Treflan	4 EC	Helena
triflusulfuron	Upbeet	50 WDG	Corteva

ADJUVANTS

TRADE NAME	ABBREVIATION	DESCRIPTION	MANUFACTURER
Activator 90	NIS	nonionic surfactant	Loveland
Agri-dex	COC	heavy range paraffinic oil	Helena
ammonium nitrate	AN	100% salt	
ammonium sulfate	AMS	spray grade fertilizer	
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	Helena
28% Nitrogen	UAN	28% urea ammonium nitrate solution	
N-Pak	AMS	34% ammonium sulfate liquid	Winfield Solution
Preference	NIS	90% fatty acid	Winfield
Silwet L-77		organosilicone surfactant	Loveland
Sylgard 309		organosilicone surfactant	Dow Corning

ABBREVIATIONS USED IN THE REPORT

A =	Acre
a.i. / ai =	Active Ingredient
Amt =	Amount
ACS =	Aqueous Capsule Suspension
AMS =	Ammonium Sulfate
AS =	Aqueous Solution
ASPA =	Asparagus
BIR =	Bicyclopyrone
CEC =	Cation Exchange Capacity
CRC =	Clarksville Research Center
CS =	Capsule Suspension
CV =	Coefficient of Variability
DF =	Dry Flowable
DIA =	Diameter
DIR =	Directed
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 Center
IN =	Inch
KG =	Kilogram
L =	Liquid
LPRE =	Late PRE
LPOS =	Late POST
LO =	Low Odor
LS =	Leaf Stage
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
POST =	Postemergence
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
RCB / RCBD =	Randomized Complete Block Design
RH =	Relative Humidity
REPS =	Replication
SC =	Suspension Concentrate
SE =	Suspoemulsion
SNBE =	Snapbean
SP =	Soluble Powder
SPRING =	Spring Application
STBE =	Strawberry
SURF =	Surface
SWMREC =	Southwest Michigan Research and Extension Center
T =	Temperature
TNRC =	Trevor Nichols Research Complex
TRT =	Treatment
UNMKTBL =	Unmarketable
UNTRT. =	Untreated
VEG =	Vegetative
WDG =	Water Dispersible Granule
WSG =	Water Soluble Granule
WP =	Wettable Powder
WT =	Weight
' =	Feet
" =	Inches
Y =	Yes

TEMPERATURE AND PRECIPITATION DATA

MSU Horticulture Teaching and Research Center

Recorded at
MSU Horticulture Teaching and Research Center (HTRC)
East Lansing, Michigan
2019

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	43.9	20.1	0	**1**	64	43	0.22	**1**	71.7	57.4	0.83
2	55.9	35.1	0	**2**	59.1	43.7	0.02	**2**	67.9	49.3	0.02
3	50.9	35.9	0	**3**	50.9	41.6	0.01	**3**	66.4	40.8	0
4	43.3	33.1	0.01	**4**	63.6	43.3	0	**4**	74.4	43.4	0
5	50.2	32.3	0.07	**5**	69.9	37.9	0	**5**	78.4	58.7	0.2
6	64.8	33.2	0	**6**	72.6	44.2	0.06	**6**	75.7	57.3	0
7	71.3	44.1	0.01	**7**	55	37.9	0.76	**7**	79.6	53	0
8	68.6	50.7	0	**8**	57.7	37.2	0.02	**8**	80.4	53.1	0
9	62.7	42.4	0	**9**	74	50.7	0.72	**9**	69.7	60.4	0.48
10	45.1	30.8	0	**10**	55.7	43.5	0	**10**	64.4	51.3	0
11	49	29.1	0.11	**11**	52.1	33.6	0	**11**	75.6	45.5	0
12	58.2	40.2	0.26	**12**	53	40.6	0	**12**	74.9	50.3	0
13	52.8	34.6	0	**13**	55.1	37.8	0	**13**	60.7	50	0.34
14	37.2	30.2	0.45	**14**	67.3	32.3	0	**14**	72.4	42.6	0
15	49.6	30.2	0.06	**15**	72.1	38.4	0	**15**	70.5	61.1	0
16	63.9	31.7	0.08	**16**	76.8	42.3	0	**16**	62.1	50.4	0.71
17	61.9	43.6	0	**17**	67.6	55.9	0	**17**	68.3	53.9	0
18	67.5	40.9	0.35	**18**	75.6	45.6	0.3	**18**	79	58.8	0
19	41.6	38.7	0.16	**19**	74.7	56.4	0.37	**19**	76.5	58.6	0.54
20	48.2	37.4	0.08	**20**	60.5	39.8	0	**20**	65.6	54.6	1.23
21	69	30.7	0	**21**	61.2	35	0	**21**	75.7	49.3	0
22	74.4	45.3	0	**22**	72.5	48.5	0.32	**22**	76.1	51.2	0
23	65.5	45	0.02	**23**	73.1	53.6	0.1	**23**	80.1	50.7	0
24	61.2	34.5	0	**24**	62.4	45.7	0.07	**24**	77.9	62.1	0.12
25	64.4	48	0	**25**	80.4	56.8	0.01	**25**	82.2	61	0.05
26	62.1	43.8	0	**26**	70.3	54.1	0.02	**26**	83.9	61.2	0
27	49.2	33.8	0.14	**27**	74	51.9	0.01	**27**	86.1	60.3	0
28	54.6	33.8	0.05	**28**	72	53.9	0.11	**28**	87.3	64.7	0
29	43.7	38.4	0.62	**29**	67.1	51.4	0.17	**29**	86.3	67.2	0
30	50.1	39	0.38	**30**	68.3	53.7	0.07	**30**	83.4	65.2	0
				31	80.6	47.5	0.01				

TEMPERATURE AND PRECIPITATION DATA

MSU Horticulture Teaching and Research Center

Recorded at
MSU Horticulture Teaching and Research Center (HTRC)
East Lansing, Michigan
2019

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	89.6	64.4	0	**1**	79.2	51	0	**1**	69.6	54.3	0.05
2	89.1	68.6	0.32	**2**	81.8	50	0	**2**	80.5	57.8	0
3	84.8	68.1	0.01	**3**	85.5	53.4	0	**3**	78.9	59.1	0.1
4	86.5	67.4	0.86	**4**	85.5	58.1	0	**4**	70.2	51.1	0.01
5	88.6	68.6	0.09	**5**	86.4	59.5	0	**5**	74.3	44.9	0
6	85.4	67.7	0	**6**	80.5	67.4	0.12	**6**	68.5	54.5	0.02
7	79.4	61	0	**7**	84.4	59.5	0.01	**7**	74.7	57.3	0
8	79.4	49.8	0	**8**	80.7	59.8	0.08	**8**	67.7	51.1	0
9	81.7	54.8	0	**9**	78.8	52.2	0	**9**	72.2	52.2	0.02
10	90.1	59.3	0	**10**	80.7	51.4	0	**10**	84.5	61.3	0.24
11	83.5	64.2	0	**11**	84.4	52	0	**11**	88.1	63.8	0.52
12	79.9	55.3	0	**12**	86.1	64.8	0	**12**	69	60.3	0.14
13	89.1	58.5	0	**13**	84.6	67.2	0	**13**	83	62.1	0.11
14	83.8	58.1	0	**14**	80.4	60.3	0	**14**	73.9	54.9	0
15	89.9	59.3	0	**15**	72.5	57.1	0.01	**15**	73.7	54.7	0.07
16	82.9	70	0.05	**16**	81	55.1	0	**16**	78.1	61.4	0
17	87.6	69	0	**17**	85.5	63.1	0	**17**	74.7	52.5	0
18	85	67.5	0	**18**	82.4	65.8	0	**18**	80	51.7	0
19	92.3	74.9	0.16	**19**	84.7	61.5	0	**19**	80.8	55	0
20	92.4	70.7	0.02	**20**	84.9	64.9	0	**20**	83.6	54.9	0
21	80.4	67.1	0.39	**21**	85.7	62.9	0	**21**	86.6	61	0.46
22	75.9	62.1	0	**22**	76.8	52.6	0	**22**	83.7	67.2	0.16
23	77.9	52.1	0.28	**23**	74.4	46.7	0	**23**	71.3	53	0.1
24	78.4	53.2	0	**24**	73.9	44	0	**24**	75.9	49.9	0
25	82.4	54.9	0	**25**	75.4	50	0	**25**	73.9	60.7	0
26	82.2	58.6	0	**26**	75.6	56.5	0.15	**26**	68.3	45.3	0
27	85.3	65.5	0	**27**	79.6	58.5	0.23	**27**	72.8	44.9	0.34
28	87.2	70.2	0	**28**	73.4	54.7	0	**28**	65.6	53.5	0.47
29	83.3	67.7	0.12	**29**	81	50.7	0.1	**29**	58.1	50.5	0.82
30	82.9	66.2	0	**30**	73.8	56.7	0.02	**30**	80.4	56.6	0.01
31	77.5	57.2	0	**31**	73.5	44	0				

TEMPERATURE AND PRECIPITATION DATA

MSU Clarksville Research Center

Recorded at
MSU Clarksville Research Center (Clarksville)
Clarksville, Michigan
2019

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	43.4	18.9	0	**1**	57	41.4	0.97	**1**	70.3	57.8	0.81
2	56.3	35.3	0	**2**	47.6	41.7	0.31	**2**	67.1	47.9	0
3	49.2	33.9	0	**3**	50.5	42.5	0.02	**3**	66.1	38.6	0
4	45.1	31.2	0.06	**4**	66	38.9	0	**4**	72.9	44.5	0
5	54.2	30.6	0.08	**5**	68.8	39.2	0	**5**	77.5	61.7	0.1
6	64.2	32.4	0	**6**	68.1	49.4	0.05	**6**	78.7	57.5	0
7	71.5	45.2	0.08	**7**	57.3	39.8	0.06	**7**	81.7	56.6	0
8	66.3	51.1	0	**8**	56.6	37.5	0	**8**	80.8	50.6	0
9	61	40.2	0	**9**	71.7	46.9	0.71	**9**	67.4	57	0.57
10	43.1	30.5	0.17	**10**	55.2	38	0	**10**	65.6	52.1	0.23
11	47.7	27.6	0.03	**11**	51.8	33.8	0.05	**11**	76	49	0
12	55.2	36.4	0.69	**12**	54.5	39.9	0.01	**12**	77.1	55.9	0
13	46.7	32.7	0	**13**	57.8	41.9	0.05	**13**	61.6	49.3	0.79
14	34.8	28.5	0.48	**14**	66.3	34.2	0	**14**	73.9	43.9	0
15	45.8	28.4	0	**15**	71	44.7	0	**15**	70.6	59.2	0.03
16	60.7	37.3	0.06	**16**	75.1	45.5	0	**16**	60.4	50.7	0.01
17	61.9	39.1	0	**17**	67.9	55.5	0	**17**	69.4	52.5	0
18	61.4	38.6	0.56	**18**	75.2	47.8	0.63	**18**	81.7	55.3	0
19	47.4	37.4	0.03	**19**	72.3	54.3	0.36	**19**	79.4	57	0
20	63.6	34.9	0	**20**	55.8	42.2	0	**20**	70.7	57.1	1.87
21	71.5	32.8	0	**21**	61.7	37.5	0	**21**	78.3	52.3	0
22	75.9	47	0	**22**	74.8	47	0.18	**22**	79	51.7	0
23	64.6	41.3	0.03	**23**	68.4	53.1	0.03	**23**	82	53.1	0
24	62.6	31	0	**24**	62	47.3	0.17	**24**	76.9	60.6	0.68
25	69.6	46.4	0	**25**	77.6	55.2	0.06	**25**	80.2	59.4	0.11
26	59.7	42.2	0.01	**26**	76	58.2	0.08	**26**	81.1	62.2	0
27	45.7	30.5	0.09	**27**	74	49.3	0.15	**27**	86.3	61.3	0
28	56.6	29.3	0.04	**28**	66	53.3	0.33	**28**	83.9	66.9	0.02
29	43.4	36.8	0.52	**29**	66.5	51.1	0.16	**29**	87.2	65.2	0
30	44	38.3	0.3	**30**	65.7	51.9	0.17	**30**	85.9	64.4	0
				31	78.1	49.5	0				

TEMPERATURE AND PRECIPITATION DATA

MSU Clarksville Research Center

Recorded at
MSU Clarksville Research Center (Clarksville)
Clarksville, Michigan
2019

	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	88.1	64.3	0	**1**	82.3	52.3	0	**1**	67.9	55.2	0.11
2	87.6	66.8	0.66	**2**	83.9	53.1	0	**2**	77.3	55.8	0
3	88.2	67.3	0.02	**3**	83.6	57.1	0	**3**	76.9	60.5	0
4	90.6	67.5	0.03	**4**	84.8	58.1	0.08	**4**	69	55	0
5	86.8	70.5	0.01	**5**	83.5	57.1	0	**5**	72.6	46.5	0.01
6	88.9	67.4	0	**6**	79.9	63.6	0.25	**6**	66.8	53.9	0
7	82	59.6	0.15	**7**	82.7	56.8	0	**7**	72.9	50.1	0.01
8	81.9	52.9	0	**8**	78.9	58.6	0.19	**8**	65.8	49	0
9	85.1	55	0	**9**	76.8	55	0	**9**	67.4	51.1	0.02
10	89.1	61.7	0	**10**	80.2	52.8	0	**10**	84.4	61.6	0.21
11	81.5	59.1	0	**11**	82.9	53.7	0	**11**	86	63.7	0.75
12	79.9	51.4	0	**12**	85	66.4	0	**12**	67.4	59.9	0.09
13	85.3	61	0	**13**	85.5	65.7	0	**13**	78.5	60.7	0.65
14	86.7	57.4	0	**14**	81.8	57.2	0	**14**	70.7	55.1	0
15	87.5	63.1	0	**15**	69.6	56	0.26	**15**	71	58.7	0.03
16	79.9	68.1	0.58	**16**	80.4	50.3	0	**16**	78.9	61.7	0.01
17	90.2	69.3	0	**17**	83.4	59.7	0.74	**17**	68.8	56.2	0
18	84.5	67.4	0.06	**18**	81.3	63.2	0.26	**18**	80.2	55.2	0
19	88.7	75.5	0	**19**	82.5	62.2	0	**19**	81.4	57.1	0
20	89.5	68.1	0.5	**20**	82	65.7	0	**20**	83.2	58.8	0
21	85.3	67.7	0.22	**21**	82.9	65.6	0	**21**	84.1	63	0
22	77.7	58.3	0	**22**	77.3	56.6	0	**22**	79.4	67.1	2.7
23	76.2	51.5	0	**23**	74	49.5	0	**23**	69	54.4	0
24	78.8	50.9	0	**24**	73.7	47.6	0	**24**	74.4	52.8	0
25	81.4	56.6	0	**25**	75.8	49.5	0	**25**	72.9	62.6	0
26	81.3	58.3	0	**26**	72.4	57.3	0.13	**26**	67.2	50.2	0
27	83.8	68.4	0	**27**	76.7	64.3	0.03	**27**	68.6	51	1.19
28	84.2	68.5	0	**28**	70.8	56.9	0	**28**	65.5	52.8	0.48
29	76.3	63.9	0.64	**29**	80.1	52.7	0.77	**29**	57.2	51.6	1.07
30	80.1	63.4	0	**30**	72.5	54	0	**30**	NA	NA	NA
31	80.2	56	0	**31**	72	45.6	0				

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
2019

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	46.3	21.2	0	**1**	59.9	45.9	0.69	**1**	79.4	51.2	0.13
2	57	35.1	0	**2**	58.4	41.8	0.27	**2**	64.5	46.5	0
3	55.8	37.8	0	**3**	54.4	40.8	0	**3**	66.4	44.3	0
4	48.9	35.7	0.08	**4**	59.6	39.4	0.02	**4**	75.7	49.9	0.15
5	52.4	35.2	0.01	**5**	69.2	37.6	0	**5**	76.6	57	0.29
6	68.4	37.8	0	**6**	69.8	44.9	0	**6**	77.2	51.8	0
7	70.4	50.6	0.28	**7**	52.9	45.2	0.51	**7**	82	58.6	0
8	67	49.6	0	**8**	63.9	45.2	0.01	**8**	83.3	56.8	0
9	65.3	40.3	0	**9**	71.4	46.8	0.46	**9**	72.2	64.5	1.03
10	45	32.5	0.07	**10**	49.4	37.2	0.01	**10**	67.7	51.1	0.06
11	55.3	35.8	0	**11**	53.7	34.4	0.07	**11**	78.9	47.4	0
12	53.8	42.1	0.49	**12**	55.6	40.3	0.13	**12**	75.8	56	0
13	48.5	36.3	0	**13**	54	40.3	0.18	**13**	59.5	47.3	0.74
14	39	30.9	0.55	**14**	65.6	34.7	0	**14**	76.4	45.9	0
15	49.3	31.5	0.25	**15**	69.2	44.6	0	**15**	68.7	58.6	0.37
16	67.9	44	0	**16**	72.8	52.4	0.07	**16**	69.2	59.5	0.12
17	69.8	50.3	0	**17**	62.7	44.9	0.04	**17**	68.5	58.7	0
18	70.1	39	0.55	**18**	83.3	45	0.27	**18**	73.9	56.3	0
19	45.5	37.3	0	**19**	74.2	58	0.05	**19**	75.5	57.5	0
20	52.7	36	0	**20**	58.4	39.5	0	**20**	67.4	54.2	0.52
21	73.3	34.7	0	**21**	55.7	37.1	0	**21**	71.1	48.1	0
22	77.1	51.6	0.01	**22**	79.2	49.4	0.17	**22**	79.5	58.9	0
23	64.7	37.8	0.02	**23**	71.3	55.9	0.01	**23**	82	59.2	0.44
24	65.6	32.7	0	**24**	69.2	49.9	0.32	**24**	76.6	60.3	0.39
25	64	46.5	0	**25**	78.9	65.9	0	**25**	83.9	62.4	0.22
26	56.3	39	0.01	**26**	68.4	52.1	0	**26**	85.9	62.4	0
27	40.4	31.4	0.06	**27**	74	46.7	0.95	**27**	85.8	63.3	0.04
28	53	31.8	0.38	**28**	69.8	47.8	0	**28**	85.7	67.2	0
29	48.5	38.7	0.64	**29**	64.1	48.8	0.35	**29**	83.4	65.1	0
30	50.2	40.2	0.76	**30**	71.8	56	0.57	**30**	84.4	60.2	0
				31	79.2	53.6	0				

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
2019

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	86.5	64.1	0	**1**	80.7	55.9	0	**1**	71.4	57.7	0.15
2	90	69.3	0.13	**2**	81.3	55.4	0	**2**	77.1	55.5	0
3	81.8	68.4	0.01	**3**	82.6	55.5	0	**3**	79.1	62.5	0.13
4	88.3	67.5	0	**4**	82	60	0	**4**	71.8	52.9	0
5	88.6	71	0	**5**	87.7	59.7	0	**5**	69.7	49.6	0
6	85.4	67.6	0	**6**	76.2	63.2	0.9	**6**	68.1	54	0
7	83.3	64.4	0	**7**	82.7	57.5	0	**7**	73.5	53.2	0
8	81.5	56.6	0	**8**	78.4	60.4	0.42	**8**	64.1	54.1	0
9	85.5	58.7	0	**9**	75.5	55.5	0	**9**	76.7	57.2	0.04
10	91.5	66.7	0.35	**10**	77.6	54.9	0	**10**	88	66.4	0
11	77.6	62.9	0	**11**	82.5	59.4	0.01	**11**	89.7	67.4	0.29
12	79.3	54	0	**12**	82.6	67.4	0	**12**	82.5	66.8	0.32
13	87.2	63	0	**13**	83.4	66.1	0	**13**	78.7	63.3	0.23
14	88.5	65.6	0	**14**	82.9	61.1	0	**14**	76.4	57.3	0
15	89.9	67.1	0	**15**	75.5	60.2	0	**15**	76.9	61	0.2
16	83.5	68	0.62	**16**	80.3	54.4	1.58	**16**	78.1	61.9	0
17	87.5	71.6	0	**17**	78.2	61.3	0.06	**17**	77	58.1	0
18	85.5	70.8	0.28	**18**	83.6	66.1	0.24	**18**	80.9	58	0
19	91.7	77.5	0	**19**	86.1	62.4	0	**19**	83.7	59.6	0
20	93.4	70.8	0.47	**20**	81.7	68.3	0	**20**	84	61.7	0
21	82.7	69.4	0.11	**21**	80.6	62.3	0	**21**	82.5	65.7	0.04
22	71.4	61.9	0	**22**	77.3	59.3	0	**22**	80.3	67	1.13
23	76.4	52.7	0	**23**	73.1	53.5	0	**23**	69.8	55.8	0.01
24	75.3	50.8	0	**24**	74.2	54.4	0	**24**	76.5	53.8	0
25	83	54.8	0	**25**	75.6	54.8	0	**25**	74.4	61.5	0
26	82.7	60.4	0	**26**	71.4	62.2	0.28	**26**	67.8	51.8	0
27	85.7	68.8	0	**27**	78.1	66.8	0.01	**27**	68.9	51.7	1.06
28	88	70.3	0	**28**	73.3	58	0	**28**	66	57.2	0.43
29	78.3	69.2	0.37	**29**	83.8	53.8	0	**29**	64.3	55.4	0.96
30	76.7	58.4	0.01	**30**	73.6	53.5	0	**30**	86.1	63.2	0.04
31	73.3	55.7	0	**31**	74.3	48.9	0				

TEMPERATURE AND PRECIPITATION DATA

Hudsonville

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2019

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	44.2	20.7	0	**1**	55	42.2	1.11	**1**	70.4	55.4	0.25
2	54.8	35.6	0	**2**	49.4	41.9	0.21	**2**	67.7	48.7	0.01
3	50.7	34	0	**3**	53.7	46.3	0.03	**3**	66.6	40.1	0
4	47.4	35.4	0	**4**	63.3	40	0	**4**	75	44.6	0
5	54.6	34.4	0.08	**5**	68.5	38.6	0.01	**5**	75.7	56.6	0.12
6	64.8	31.6	0	**6**	64.9	53.7	0.08	**6**	78.2	58.7	0
7	72.9	46	0.36	**7**	59.8	46.2	0.01	**7**	82.4	54.4	0
8	64.7	49.1	0	**8**	58.6	42.8	0.01	**8**	81.4	55.9	0
9	62.7	41.8	0	**9**	69.8	48.1	0.68	**9**	69.8	61.2	0.62
10	43.1	32.2	0.16	**10**	52.8	39.5	0	**10**	69.9	50.9	0.29
11	50.3	30.8	0.07	**11**	54.2	35.4	0.04	**11**	76.3	47.4	0
12	51.4	37.7	0.65	**12**	55.7	43.1	0.05	**12**	76	57.8	0.03
13	46	35.3	0	**13**	57.1	42.6	0.01	**13**	63.2	46.8	0.57
14	38.4	30.4	0.11	**14**	65.4	35.4	0.01	**14**	74.7	41.8	0
15	45.6	30.2	0	**15**	69.3	44.8	0.02	**15**	71	59.8	0
16	61.2	39	0.03	**16**	73.9	50.9	0.05	**16**	64	57.4	0
17	62.7	42.4	0	**17**	67.4	53.9	0.02	**17**	70.8	55.1	0
18	63.9	40.9	0.36	**18**	78.8	52.6	0.69	**18**	79.5	53.7	0
19	52.5	40.1	0	**19**	70.6	54.3	0.19	**19**	78.1	54.8	0
20	67.3	36.8	0	**20**	53.5	41.8	0	**20**	69.2	57.5	0.62
21	73.2	39.1	0	**21**	60.8	37.4	0	**21**	78	51.7	0
22	77.6	52.9	0	**22**	77.3	49.3	0.1	**22**	77.9	56.5	0
23	66.8	40.1	0.01	**23**	71.2	52.6	0.25	**23**	81.2	57.6	0.05
24	64.5	32.1	0	**24**	65.9	46.4	0.27	**24**	76	59.9	0.32
25	69.4	42.5	0	**25**	75.1	59.6	0.23	**25**	79.9	59.6	0.05
26	58.2	42.4	0.04	**26**	75.3	55.2	0.04	**26**	84.6	60.5	0
27	44.1	33.3	0.3	**27**	74.3	47.2	0.04	**27**	86.9	61.7	0
28	56.3	31.3	0	**28**	64.4	53.4	0.25	**28**	84.9	65.9	0
29	45.4	40.2	0.48	**29**	64	53.1	0.15	**29**	88.3	65.7	0
30	45.4	42.6	0.27	**30**	68.1	52.2	0.13	**30**	86.1	61.4	0
				31	77.5	49.3	0				

TEMPERATURE AND PRECIPITATION DATA

Hudsonville

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2019

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	85.6	64.6	0	**1**	84.9	50.1	0	**1**	68.6	57.1	0.16
2	87.8	68.5	0.09	**2**	84.3	52.8	0	**2**	78.5	55.3	0
3	91.4	66.9	0	**3**	84.6	56.2	0	**3**	77.7	63.2	0.02
4	89.3	67.9	0	**4**	85.9	58.4	0	**4**	69.2	52.8	0
5	87.7	72.6	0.16	**5**	85.3	56	0	**5**	75	43.4	0
6	89.6	68.7	0.03	**6**	80.4	63.8	0.18	**6**	68.4	53.7	0
7	83.9	62.6	0.06	**7**	84.4	57.6	0	**7**	73.3	48.5	0
8	81.9	58.1	0	**8**	78.8	59.6	0.35	**8**	65.8	51.7	0
9	84.1	56.1	0	**9**	78	55.4	0	**9**	69.5	54.1	0
10	89.4	68.2	0	**10**	81.6	56	0	**10**	85.1	64	0.26
11	80.4	61.6	0	**11**	83.4	53.8	0	**11**	87.4	62.5	0.64
12	79.1	51	0	**12**	85.1	66.7	0	**12**	70.2	61.7	0.16
13	85.6	64.8	0	**13**	87	68.4	0	**13**	77.2	61.3	0.62
14	87.9	59.3	0	**14**	80	63.8	0	**14**	70.4	56.8	0.11
15	88.1	65.3	0	**15**	76.3	57.9	1.34	**15**	72	61.9	0.05
16	83	70.8	0	**16**	80.7	54.9	0	**16**	82	59.7	0.28
17	90.9	70.4	0	**17**	84	60.9	0	**17**	74.2	58	0.02
18	87	71.6	0.06	**18**	81.9	64.3	0.07	**18**	80.4	57.1	0.01
19	88.5	76.1	0	**19**	84.3	62.1	0	**19**	83.3	57.8	0.06
20	88.6	69	0.92	**20**	83.3	67.8	0	**20**	82.6	61.6	0.02
21	86.1	68.5	0.22	**21**	82.9	62.9	0	**21**	82.3	64	0
22	79.2	58.8	0	**22**	78.4	59.4	0	**22**	79.3	66.7	0.3
23	76.2	52	0	**23**	76.3	49.1	0	**23**	68.9	54.8	0.79
24	81.5	49.2	0	**24**	74.6	48.7	0	**24**	74.2	51.9	0.05
25	80.8	56.8	0	**25**	76.9	54.8	0	**25**	72.9	62	0.11
26	81.9	59.1	0	**26**	72.8	60.4	0.27	**26**	67.2	53.7	0.53
27	84.1	69.5	0	**27**	77.5	64.7	0.16	**27**	67.1	52.9	0.43
28	85.7	70.6	0	**28**	71.7	56.9	0.02	**28**	69.8	55.9	0.06
29	77.8	66.5	0.06	**29**	82.2	51.1	0.17	**29**	59.5	52.7	0.03
30	80.9	61.8	0	**30**	72.8	49.1	0.01	**30**	84.8	57.9	0.06
31	81.1	55.6	0	**31**	72.5	44.5	0				

TEMPERATURE AND PRECIPITATION DATA

Momence

Recorded at
Stelle, Illinois Climate Network Station
Stelle, Illinois
2019

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	47.3	22.6	0.00	**1**	67.5	49.4	0.68	**1**	83.6	61.2	0.29
2	55.5	31.8	0.00	**2**	66.1	45.3	0.72	**2**	72.4	54.0	0.00
3	59.6	33.0	0.00	**3**	59.1	45.1	0.00	**3**	76.3	50.5	0.00
4	50.5	38.9	0.19	**4**	63.3	42.5	0.00	**4**	83.4	60.8	0.04
5	54.3	38.9	0.00	**5**	72.6	39.6	0.00	**5**	86.2	65.8	0.17
6	69.0	40.1	0.00	**6**	78.0	47.3	0.01	**6**	85.2	61.1	0.00
7	70.7	49.5	0.33	**7**	58.0	46.3	0.01	**7**	83.5	58.4	0.00
8	71.9	51.8	0.00	**8**	79.7	44.9	0.29	**8**	81.4	60.8	0.01
9	67.1	43.1	0.00	**9**	67.7	46.0	1.09	**9**	78.1	66.3	0.00
10	48.1	36.2	0.19	**10**	59.6	43.5	0.00	**10**	76.1	52.8	0.00
11	74.5	39.6	0.20	**11**	51.3	41.7	0.24	**11**	83.8	50.1	0.00
12	53.7	36.4	0.12	**12**	50.7	43.3	0.05	**12**	75.2	54.7	0.39
13	54.4	29.0	0.00	**13**	63.7	42.9	0.00	**13**	67.9	47.7	0.00
14	42.4	31.6	0.93	**14**	70.2	40.2	0.00	**14**	80.5	46.5	0.01
15	54.0	31.1	0.00	**15**	75.9	53.2	0.00	**15**	71.7	62.1	0.89
16	74.4	43.5	0.00	**16**	76.1	52.6	0.84	**16**	78.0	57.1	0.02
17	77.7	50.2	0.00	**17**	71.3	47.9	0.11	**17**	71.7	56.3	0.00
18	62.9	43.4	0.56	**18**	84.1	48.4	0.17	**18**	78.2	55.7	0.00
19	51.3	39.1	0.00	**19**	78.1	54.1	0.00	**19**	78.4	58.2	0.54
20	64.4	36.6	0.00	**20**	54.2	45.6	0.05	**20**	69.9	56.0	0.44
21	76.7	36.2	0.00	**21**	56.3	43.6	0.68	**21**	73.4	54.0	0.03
22	78.8	46.7	0.03	**22**	80.4	50.2	0.35	**22**	78.6	61.6	0.00
23	60.6	44.7	0.00	**23**	75.5	58.8	2.22	**23**	82.0	66.3	0.09
24	62.2	39.6	0.00	**24**	82.6	57.3	0.03	**24**	78.1	62.0	0.24
25	66.1	50.8	0.07	**25**	84.2	67.7	0.03	**25**	84.6	60.5	0.04
26	64.0	45.8	0.11	**26**	74.5	61.1	0.25	**26**	89.9	63.3	0.00
27	47.7	34.6	0.08	**27**	83.8	58.4	1.04	**27**	90.5	65.4	0.00
28	57.9	32.2	0.00	**28**	75.2	55.1	0.03	**28**	90.6	68.3	0.00
29	56.6	44.0	1.36	**29**	77.0	55.2	0.20	**29**	92.4	66.2	0.00
30	51.0	45.4	2.17	**30**	77.7	60.6	0.46	**30**	92.5	66.7	0.36
				31	80.2	59.1	0.00				

TEMPERATURE AND PRECIPITATION DATA

Momence

Recorded at
Stelle, Illinois Climate Network Station
Stelle, Illinois
2019

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	91.8	65.6	0.00	**1**	81.9	53.6	0.00	**1**	70.3	60.0	0.34
2	93.1	70.2	0.94	**2**	82.8	56.5	0.00	**2**	81.7	55.2	0.00
3	87.1	68.6	1.05	**3**	84.5	56.7	0.00	**3**	82.5	59.6	0.47
4	89.1	69.0	0.05	**4**	86.6	60.4	0.00	**4**	73.8	56.7	0.00
5	89.8	70.0	0.00	**5**	88.8	62.9	0.00	**5**	72.8	50.8	0.00
6	90.3	67.5	0.00	**6**	82.5	63.5	0.05	**6**	74.3	57.1	0.00
7	82.3	64.6	0.00	**7**	86.2	59.8	0.00	**7**	77.3	52.9	0.00
8	85.2	62.4	0.00	**8**	87.5	61.0	0.00	**8**	70.3	59.0	0.19
9	87.8	63.6	0.00	**9**	80.5	55.1	0.00	**9**	82.3	58.4	0.00
10	93.4	71.9	0.08	**10**	84.3	56.8	0.00	**10**	87.4	65.3	0.00
11	85.4	63.1	0.00	**11**	80.1	58.2	0.00	**11**	87.2	66.1	0.04
12	86.5	58.9	0.00	**12**	80.6	67.4	0.07	**12**	90.5	66.8	0.00
13	91.9	64.2	0.00	**13**	82.8	65.9	0.00	**13**	78.1	57.6	0.12
14	91.0	71.5	0.00	**14**	82.9	62.9	0.00	**14**	83.4	50.7	0.02
15	88.7	69.7	0.07	**15**	80.7	60.5	0.00	**15**	80.8	62.0	1.01
16	86.1	69.9	0.12	**16**	85.4	60.4	0.03	**16**	79.5	62.5	0.00
17	90.3	71.5	0.00	**17**	79.6	65.7	0.19	**17**	80.7	62.1	0.00
18	90.3	71.0	0.23	**18**	85.6	65.8	0.49	**18**	82.8	57.2	0.00
19	93.1	77.3	0.00	**19**	88.3	63.8	0.81	**19**	86.5	56.9	0.00
20	93.5	75.5	0.00	**20**	81.1	64.7	0.57	**20**	87.0	63.5	0.03
21	84.9	66.8	1.19	**21**	82.9	60.8	0.00	**21**	77.7	65.1	0.64
22	76.2	56.9	0.00	**22**	81.6	63.4	0.00	**22**	78.3	67.5	0.44
23	80.2	56.0	0.00	**23**	76.3	55.7	0.00	**23**	73.1	52.0	0.00
24	80.0	56.5	0.00	**24**	75.3	55.9	0.00	**24**	78.7	50.1	0.00
25	82.2	54.2	0.00	**25**	78.8	54.2	0.15	**25**	80.1	60.8	0.04
26	84.3	60.2	0.00	**26**	80.2	65.0	0.33	**26**	73.4	49.7	0.00
27	86.7	62.0	0.01	**27**	81.1	59.6	0.00	**27**	70.7	48.7	1.99
28	87.8	63.8	0.00	**28**	76.3	53.9	0.00	**28**	72.6	62.0	0.44
29	82.1	66.4	0.75	**29**	82.1	50.7	0.00	**29**	79.0	62.0	0.55
30	81.4	61.4	0.00	**30**	74.7	57.1	0.00	**30**	88.0	64.5	0.00
31	76.9	56.0	0.00	**31**	74.4	54.2	0.02				

Weed Control in Asparagus - HTRC - 2019

Project Code: 120-19-1 **Location: East Lansing, MI**
Block: 115

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Asparagus **Variety: Millennium**
Planting Method: Transplant **Planting Date: 2009** **Harvest Date: 5/2/19-6/14/19**
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: 2.4%** **pH: 6.2**
Sand: 54% **Silt: 31%** **Clay: 16%** **CEC: 5.9**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
EPRE	4/5/19	10:15 am	36/38	F	Damp	3-4 SE	86	100% Cloudy	Y
PRE	4/16/19	1:30 pm	60/44	F	Wet	3-5 S	60	75% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/5/19	ANBG = annual bluegrass	2-3″	Veg	Moderate
4/5/19	QUGR = quackgrass	3-4″	Veg	Moderate
4/5/19	COMU = common mullein	3-4″	Rosette	Few
4/5/19	HOWE = horseweed	1-2″	Rosette	Many
4/5/19	MECR = mouseear cress	1-2″	Flower	Moderate
4/5/19	WICA = wild carrot	2-3″	Veg	Many
4/16/19	QUGR = quackgrass	3-4″	Veg	Moderate
4/16/19	HOWE = horseweed	1-3″	Veg	Few
4/16/19	MECR = mouseear cress	1-3″	Flower	Moderate
4/16/19	WICA = wild carrot	2-4″	Veg	Moderate
6/14/19	CATH = Canada thistle			
6/14/19	COMW = common milkweed			
6/14/19	WIRA = wild radish			
7/11/19	LACG = large crabgrass			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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. EPRE (Appl. Code A): 30 days before first harvest.
4. PRE (Appl. Code B): 14 days before first harvest.
5. Plots in 2019 are the same as 2018. Fall 2017 plots are sprayed EPRE in 2019.

Michigan State University

Weed Control in Asparagus - HTRC - 2019

Trial ID: 120-19-1 Location: HTRC Trial Year: 2019
Protocol ID: 120-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								WICA		CATH	COMW	WICA
Crop Code							ASPA		ASPA			
Rating Date							02Jun19	02Jun19	14Jun19	14Jun19	14Jun19	14Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.046	lb ai/a	EPRE	2.0	9.3	2.0	10.0	7.0	8.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
2	Alion 200	1.67	SC	0.065	lb ai/a	EPRE	1.7	10.0	1.0	7.0	7.7	9.7
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
3	Alion 200	1.67	SC	0.085	lb ai/a	EPRE	2.0	10.0	1.0	9.0	8.7	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
4	Alion 200	1.67	SC	0.13	lb ai/a	EPRE	4.0	10.0	1.7	10.0	8.0	9.7
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
5	Chateau SW	51	WDG	0.192	lb ai/a	EPRE	2.0	10.0	1.3	9.0	7.0	8.3
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
6	Karmex	80	DF	3	lb ai/a	EPRE	1.7	8.7	1.7	9.0	7.3	6.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
7	Tricor	75	DF	1	lb ai/a	EPRE	2.0	10.0	1.3	7.7	4.7	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
8	Solicam	80	DF	4	lb ai/a	EPRE	2.3	10.0	1.0	10.0	6.3	8.3
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
9	Sinbar	80	WDG	1	lb ai/a	EPRE	3.0	10.0	1.3	10.0	6.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
10	Command	3	ME	1	lb ai/a	EPRE	2.7	8.3	1.7	10.0	5.3	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
11	Spartan	4	F	0.375	lb ai/a	EPRE	2.0	6.7	1.3	10.0	4.7	5.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
12	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	2.0	10.0	2.7	10.0	7.3	4.7
13	Chateau SW	51	WDG	0.192	lb ai/a	PRE	1.7	9.3	2.0	7.0	7.7	9.3
	Gramoxone SL	2	SL	1	lb ai/a	PRE						
14	Karmex	80	DF	3	lb ai/a	PRE	1.3	9.3	2.0	7.0	4.7	8.7
	Prowl H20	3.8	CS	3	lb ai/a	PRE						
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
15	Handweeded						2.7	1.0	2.7	7.0	2.0	1.0
16	Alion 200	1.67	SC	0.065	lb ai/a	PRE	2.0	6.7	1.7	9.0	6.7	3.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
17	Alion 200	1.67	SC	0.026	lb ai/a	EPRE	2.7	5.7	2.3	10.0	4.3	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
18	Alion 200	1.67	SC	0.046	lb ai/a	EPRE	2.3	7.0	2.3	7.0	5.3	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
19	Alion 200	1.67	SC	0.065	lb ai/a	EPRE	2.0	9.3	1.7	10.0	8.0	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE						
LSD P=.05							2.06	3.18	0.94	4.22	5.95	3.93
Standard Deviation							1.25	1.93	0.57	2.56	3.60	2.38
CV							56.58	22.73	33.14	28.78	57.53	35.58

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Weed Control in Asparagus - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WIRA	ASPA	LACG	WIRA
	Pest Code						WIRA		LACG	WIRA
	Crop Code							ASPA		
	Rating Date						14Jun19	11Jul19	11Jul19	11Jul19
	Rating Type						RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.046	lb ai/a	EPRE	10.0	2.3	9.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
2	Alion 200	1.67	SC	0.065	lb ai/a	EPRE	10.0	1.0	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
3	Alion 200	1.67	SC	0.085	lb ai/a	EPRE	10.0	1.3	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
4	Alion 200	1.67	SC	0.13	lb ai/a	EPRE	10.0	1.3	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
5	Chateau SW	51	WDG	0.192	lb ai/a	EPRE	8.0	1.3	9.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
6	Karmex	80	DF	3	lb ai/a	EPRE	9.7	1.3	4.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
7	Tricor	75	DF	1	lb ai/a	EPRE	10.0	1.0	4.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
8	Solicam	80	DF	4	lb ai/a	EPRE	10.0	1.3	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
9	Sinbar	80	WDG	1	lb ai/a	EPRE	9.7	1.3	6.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
10	Command	3	ME	1	lb ai/a	EPRE	6.3	2.3	4.0	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
11	Spartan	4	F	0.375	lb ai/a	EPRE	7.7	1.3	5.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
12	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	2.3	2.3	2.3	8.0
13	Chateau SW	51	WDG	0.192	lb ai/a	PRE	9.7	2.0	10.0	10.0
	Gramoxone SL	2	SL	1	lb ai/a	PRE				
14	Karmex	80	DF	3	lb ai/a	PRE	9.7	1.3	8.3	10.0
	Prowl H20	3.8	CS	3	lb ai/a	PRE				
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE				
15	Handweeded						10.0	1.7	5.3	9.3
16	Alion 200	1.67	SC	0.065	lb ai/a	PRE	10.0	2.0	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE				
17	Alion 200	1.67	SC	0.026	lb ai/a	EPRE	10.0	2.0	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
18	Alion 200	1.67	SC	0.046	lb ai/a	EPRE	10.0	1.7	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
19	Alion 200	1.67	SC	0.065	lb ai/a	EPRE	10.0	2.3	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
LSD P=.05							2.65	1.05	3.84	0.99
Standard Deviation							1.60	0.64	2.33	0.60
CV							17.62	38.57	29.51	6.12

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Weed Control in Asparagus - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 2018 TOTAL GOOD NO./PLOT	ASPA 2018 TOTAL GOOD KG/PLOT	ASPA 2018 TOTAL CULL NO./PLOT	ASPA 2018 TOTAL CULL KG/PLOT
1	Alion 200	1.67	SC	0.046	lb ai/a	FALL	456.0	9.83	23.0	0.48
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
2	Alion 200	1.67	SC	0.065	lb ai/a	FALL	599.3	13.60	30.0	0.64
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
3	Alion 200	1.67	SC	0.085	lb ai/a	FALL	569.0	12.74	43.0	0.93
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
4	Alion 200	1.67	SC	0.13	lb ai/a	FALL	540.3	12.37	54.0	1.17
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
5	Chateau SW	51	WDG	0.192	lb ai/a	FALL	519.7	12.28	37.7	0.82
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
6	Karmex	80	DF	3	lb ai/a	FALL	496.7	11.36	30.0	0.67
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
7	Tricor	75	DF	1	lb ai/a	FALL	494.3	12.11	20.3	0.44
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
8	Solicam	80	DF	4	lb ai/a	FALL	557.3	13.13	37.7	0.79
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
9	Sinbar	80	WDG	1	lb ai/a	FALL	534.0	12.33	27.0	0.59
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
10	Command	3	ME	1	lb ai/a	FALL	458.7	10.28	23.0	0.47
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
11	Spartan	4	F	0.375	lb ai/a	FALL	581.0	12.35	29.0	0.67
	Roundup PowerMax	5.5	L	1	lb ai/a	FALL				
12	Roundup PowerMax	5.5	L	1	lb ai/a	FALL	449.0	10.17	35.0	0.82
13	Chateau SW	51	WDG	0.192	lb ai/a	PRE	551.3	12.65	61.0	1.52
	Gramoxone SL	2	SL	1	lb ai/a	PRE				
14	Karmex	80	DF	3	lb ai/a	PRE	600.7	13.06	24.7	0.49
	Prowl H20	3.8	CS	3	lb ai/a	PRE				
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE				
15	Handweeded						461.7	10.77	27.0	0.58
16	Alion 200	1.67	SC	0.065	lb ai/a	PRE	542.7	11.50	37.7	0.74
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE				
17	Alion 200	1.67	SC	0.026	lb ai/a	EPRE	487.0	10.95	28.3	0.63
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
18	Alion 200	1.67	SC	0.046	lb ai/a	EPRE	572.7	13.08	30.0	0.63
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
19	Alion 200	1.67	SC	0.065	lb ai/a	EPRE	482.0	11.54	21.0	0.50
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
LSD P=.05							140.41	3.15	27.46	0.66
Standard Deviation							85.09	1.91	16.64	0.40
CV							16.24	16.06	51.06	56.21

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Weed Control in Asparagus - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ASPA 2019 TOTAL GOOD NO./PLOT	ASPA 2019 TOTAL GOOD KG/PLOT	ASPA 2019 TOTAL CULL NO./PLOT	ASPA 2019 TOTAL CULL KG/PLOT
1	Alion 200	1.67	SC	0.046	lb ai/a	EPRE	330.3	7.640	38.7	0.843
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
2	Alion 200	1.67	SC	0.065	lb ai/a	EPRE	407.0	9.940	45.3	1.017
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
3	Alion 200	1.67	SC	0.085	lb ai/a	EPRE	389.7	9.633	46.0	1.050
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
4	Alion 200	1.67	SC	0.13	lb ai/a	EPRE	362.0	8.493	59.3	1.353
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
5	Chateau SW	51	WDG	0.192	lb ai/a	EPRE	313.0	7.453	73.0	1.640
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
6	Karmex	80	DF	3	lb ai/a	EPRE	363.3	8.560	46.0	1.007
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
7	Tricor	75	DF	1	lb ai/a	EPRE	362.7	9.370	36.3	0.893
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
8	Solicam	80	DF	4	lb ai/a	EPRE	385.3	9.230	37.3	0.907
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
9	Sinbar	80	WDG	1	lb ai/a	EPRE	356.0	9.403	41.0	1.060
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
10	Command	3	ME	1	lb ai/a	EPRE	333.0	7.683	28.3	0.707
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
11	Spartan	4	F	0.375	lb ai/a	EPRE	352.3	8.493	32.3	0.640
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
12	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	297.7	7.183	31.7	0.743
13	Chateau SW	51	WDG	0.192	lb ai/a	PRE	438.3	8.367	87.0	1.920
	Gramoxone SL	2	SL	1	lb ai/a	PRE				
14	Karmex	80	DF	3	lb ai/a	PRE	380.0	9.113	47.7	1.073
	Prowl H20	3.8	CS	3	lb ai/a	PRE				
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE				
15	Handweeded						280.0	6.897	32.3	0.733
16	Alion 200	1.67	SC	0.065	lb ai/a	PRE	368.0	8.740	33.0	0.687
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE				
17	Alion 200	1.67	SC	0.026	lb ai/a	EPRE	346.0	7.970	41.3	0.830
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
18	Alion 200	1.67	SC	0.046	lb ai/a	EPRE	352.7	8.520	33.3	0.710
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
19	Alion 200	1.67	SC	0.065	lb ai/a	EPRE	339.7	8.103	39.3	0.860
	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE				
LSD P=.05							100.06	1.9821	19.97	0.4767
Standard Deviation							60.64	1.2012	12.10	0.2889
CV							17.05	14.19	27.72	29.39

Weed Control in Basil- Van Drunen - 2019

Project Code: 117-19-1 **Location: Momence, IL**

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Basil **Variety: Obsession**
Planting Method: Seeded **Planting Date: 6/4/19** **Harvest Date: 8/21/19**
Spacing: 1 inch **Row Spacing: 10 inches; 4 rows/plot**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Jasper loam **OM: 5.3%** **pH: 6.2**
Sand: 32% **Silt: 38%** **Clay: 30%** **CEC: 15.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/6/19	11:45 am	80/68	F	Damp	2-4 NE	57	20% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
7/12/19	LACG = large crabgrass			
7/12/19	COPU = common purslane			
7/12/19	RRPW = redroot pigweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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: 30 ft of 4 rows.

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Weed Control in Basil - Van Drunen - 2019

Trial ID: 117-19-1 Location: Momence, IL Trial Year: 2019
Protocol ID: 117-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BASIL 12Jul19 RATING 1-10	COPU 12Jul19 RATING 1-10	RRPW 12Jul19 RATING 1-10	LACG 12Jul19 RATING 1-10	BASIL 08Aug19 RATING 1-10	BASIL 21Aug19 HARVEST KG/PLOT
1	Devrinol DF-XT	50	DF	2	lb ai/a	PRE	1.3	1.3	7.0	7.7	1.7	36.24
2	Lorox	50	DF	0.25	lb ai/a	PRE	5.7	5.7	9.7	3.0	3.7	18.06
3	Lorox	50	DF	0.5	lb ai/a	PRE	7.0	5.0	9.7	3.3	6.0	8.34
4	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	9.0	9.7	10.0	9.0	7.7	3.38
5	Spartan	4	F	0.125	lb ai/a	PRE	4.3	9.0	10.0	7.3	1.7	27.56
6	Spartan	4	F	0.25	lb ai/a	PRE	8.3	9.3	10.0	9.0	6.7	7.01
7	Spartan	4	F	0.5	lb ai/a	PRE	8.7	10.0	10.0	9.3	7.3	3.84
8	Spartan	4	F	0.75	lb ai/a	PRE	9.0	10.0	10.0	9.7	9.0	0.433
9	Ultra Blazer	2	L	0.375	lb ai/a	PRE	3.3	8.7	9.7	7.3	1.7	34.42
10	Untreated						1.7	1.0	3.3	1.0	2.7	29.19
LSD P=.05							2.72	1.30	1.01	1.80	2.24	9.54
Standard Deviation							1.59	0.76	0.59	1.05	1.31	5.56
CV							27.23	10.84	6.57	15.71	27.22	33.0

Weed Control in Cauliflower and Cabbage- HTRC- 2019

Project Code: 114-19-1 Location: East Lansing, MI
Block 69

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Cauliflower, Cabbage Variety: Candid Charm, Blue Vantage
Planting Method: Transplant Planting Date:5/17/19 Harvest Date: see data
Spacing: 22 in Row Spacing: 36 in
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Marlette fine sandy loam OM: 2.2% pH: 6.7
Sand: 54% Silt: 28% Clay: 18% CEC: 9.9

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRT	5/16/19	9:15 am	62/52	F	Dry	5-8 S	56	50% Cloudy	N
PO1	6/27/19	10:00 am	78/68	F	Moist	1-2 SW	62	50% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/16/19	YEFT = yellow foxtail	6-8″	Veg	Moderate
6/25/19	COGR = common groundsel			
5/16/19	COLQ = common lambsquarters	2-6″	Veg	Many
6/12/19	CORW = common ragweed			
5/16/19	LATH = ladysthumb	4-6″	Veg	Many
5/16/19	RRPW = redroot pigweed	2-6″	Flower	Many
7/9/19	YEFT = yellow foxtail			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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. PO1 4-5 weeks after transplanting.
4. Treatments 1-6: Select Max 0.12 + GoalTender 0.125 postemergence as needed.

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Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CABBAGE	CAULI	COLQ	CORW	LATH	RRPW
Pest Code									COLQ	CORW	LATH	RRPW
Crop Code							CABBAGE	CAULI				
Rating Date							12Jun19	12Jun19	12Jun19	12Jun19	12Jun19	12Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.0	2.0	9.3	10.0	9.3	10.0
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	1.0	1.0	10.0	9.3	9.0	10.0
3	GoalTender	4	SC	0.5	lb ai/a	PRT	3.0	3.0	10.0	10.0	10.0	10.0
	Command	3	ME	0.5	lb ai/a	PRT						
4	GoalTender	4	SC	0.5	lb ai/a	PRT	2.3	3.3	10.0	10.0	10.0	10.0
	Spartan	4	F	0.188	lb ai/a	PRT						
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	3.0	2.7	10.0	10.0	10.0	10.0
	GoalTender	4	SC	0.5	lb ai/a	PRT						
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	2.0	1.3	10.0	10.0	10.0	10.0
	GoalTender	4	SC	0.5	lb ai/a	PRT						
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.3	2.7	9.7	9.7	9.0	10.0
	GoalTender	4	SC	0.125	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.3	2.3	9.7	9.3	9.7	10.0
	BIR	1.67	SL	0.033	lb ai/a	PO1						
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.3	2.7	9.7	9.7	9.7	10.0
	BIR	1.67	SL	0.045	lb ai/a	PO1						
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.7	2.3	10.0	9.7	10.0	10.0
	Tough	5	EC	0.625	lb ai/a	PO1						
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.3	2.7	9.7	9.7	9.7	10.0
	Tough	5	EC	0.9	lb ai/a	PO1						
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.0	2.3	9.3	9.7	9.7	10.0
	Lentagran	45	WP	0.624	lb ai/a	PO1						
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.7	1.7	9.0	9.7	10.0	10.0
	Lentagran	45	WP	0.894	lb ai/a	PO1						
14	Untreated						1.0	1.0	1.0	1.0	1.0	1.0
LSD P=.05							1.12	0.89	0.85	0.57	0.93	0.00
Standard Deviation							0.67	0.53	0.51	0.34	0.56	0.00
CV							31.26	24.06	5.57	3.72	6.13	0.0

Michigan State University

Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CABBAGE 18Jun19 STAND NO./PLOT	CAULI 18Jun19 STAND NO./PLOT	CABBAGE 25Jun19 RATING 1-10	CAULI 25Jun19 RATING 1-10	COGR 25Jun19 RATING 1-10
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	15.0	14.3	1.7	1.7	8.3
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	15.7	16.0	1.0	1.0	7.3
3	GoalTender	4	SC	0.5	lb ai/a	PRT	15.7	15.7	2.7	2.0	10.0
	Command	3	ME	0.5	lb ai/a	PRT					
4	GoalTender	4	SC	0.5	lb ai/a	PRT	16.0	14.7	1.7	2.0	10.0
	Spartan	4	F	0.188	lb ai/a	PRT					
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	15.0	15.0	2.3	1.7	10.0
	GoalTender	4	SC	0.5	lb ai/a	PRT					
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	14.7	15.7	2.0	1.3	10.0
	GoalTender	4	SC	0.5	lb ai/a	PRT					
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	15.0	14.3	1.3	1.7	8.7
	GoalTender	4	SC	0.125	lb ai/a	PO1					
	Select Max	.97	EC	0.12	lb ai/a	PO1					
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	15.3	15.7	2.0	1.7	9.0
	BIR	1.67	SL	0.033	lb ai/a	PO1					
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	16.0	15.0	2.0	2.3	8.0
	BIR	1.67	SL	0.045	lb ai/a	PO1					
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	16.0	15.3	1.7	1.3	7.3
	Tough	5	EC	0.625	lb ai/a	PO1					
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	16.0	16.0	2.7	2.3	8.3
	Tough	5	EC	0.9	lb ai/a	PO1					
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	15.7	14.7	2.0	2.0	8.3
	Lentagran	45	WP	0.624	lb ai/a	PO1					
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	15.3	16.3	2.0	1.7	8.3
	Lentagran	45	WP	0.894	lb ai/a	PO1					
14	Untreated						16.7	15.3	1.0	1.0	8.7
LSD P=.05							1.53	1.93	0.96	1.11	1.42
Standard Deviation							0.91	1.15	0.57	0.66	0.85
CV							5.84	7.54	30.83	39.14	9.71

Michigan State University

Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COLQ	CORW	LATH	RRPW	CABBAGE	CAULI
	Pest Code											
	Crop Code											
	Rating Date						25Jun19	25Jun19	25Jun19	25Jun19	09Jul19	09Jul19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	7.7	8.7	8.3	9.0	2.3	2.3
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	7.7	7.3	8.0	7.3	1.3	1.3
3	GoalTender	4	SC	0.5	lb ai/a	PRT	10.0	10.0	10.0	10.0	2.3	2.0
	Command	3	ME	0.5	lb ai/a	PRT						
4	GoalTender	4	SC	0.5	lb ai/a	PRT	10.0	10.0	10.0	10.0	2.3	2.0
	Spartan	4	F	0.188	lb ai/a	PRT						
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	10.0	10.0	10.0	2.7	2.3
	GoalTender	4	SC	0.5	lb ai/a	PRT						
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	10.0	10.0	10.0	10.0	1.7	1.3
	GoalTender	4	SC	0.5	lb ai/a	PRT						
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	8.3	8.3	9.0	10.0	2.3	2.7
	GoalTender	4	SC	0.125	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	8.3	7.3	9.0	9.7	3.0	2.7
	BIR	1.67	SL	0.033	lb ai/a	PO1						
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	7.3	8.0	10.0	10.0	2.7	2.7
	BIR	1.67	SL	0.045	lb ai/a	PO1						
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	7.7	7.7	9.7	9.3	3.7	3.7
	Tough	5	EC	0.625	lb ai/a	PO1						
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	8.3	8.3	10.0	9.7	4.3	3.7
	Tough	5	EC	0.9	lb ai/a	PO1						
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	7.7	9.0	10.0	10.0	2.7	2.7
	Lentagran	45	WP	0.624	lb ai/a	PO1						
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	7.0	7.7	9.3	9.7	3.0	2.7
	Lentagran	45	WP	0.894	lb ai/a	PO1						
14	Untreated						7.0	9.7	8.3	8.0	1.3	1.3
LSD P=.05							1.23	1.15	1.62	1.00	1.39	1.05
Standard Deviation							0.74	0.68	0.97	0.59	0.83	0.63
CV							8.8	7.86	10.29	6.26	32.62	26.36

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Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	YEFT 09Jul19 RATING 1-10	COLQ 09Jul19 RATING 1-10	CORW 09Jul19 RATING 1-10	LATH 09Jul19 RATING 1-10	CABBAGE 23Jul19 HARVEST NO./PLOT	CABBAGE 23Jul19 HARVEST KG/PLOT
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	6.3	6.3	8.7	1.3	1.893
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	7.7	8.3	3.7	6.0	1.3	2.220
3	GoalTender	4	SC	0.5	lb ai/a	PRT	10.0	9.7	9.7	10.0	2.3	4.027
	Command	3	ME	0.5	lb ai/a	PRT						
4	GoalTender	4	SC	0.5	lb ai/a	PRT	10.0	10.0	10.0	10.0	1.7	2.950
	Spartan	4	F	0.188	lb ai/a	PRT						
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	10.0	10.0	10.0	0.3	0.437
	GoalTender	4	SC	0.5	lb ai/a	PRT						
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	9.7	10.0	10.0	10.0	0.7	1.017
	GoalTender	4	SC	0.5	lb ai/a	PRT						
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	7.7	8.0	9.0	1.7	2.940
	GoalTender	4	SC	0.125	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	6.3	5.7	9.0	1.0	1.400
	BIR	1.67	SL	0.033	lb ai/a	PO1						
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	6.7	8.7	9.7	0.0	0.000
	BIR	1.67	SL	0.045	lb ai/a	PO1						
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	9.3	7.7	10.0	0.0	0.000
	Tough	5	EC	0.625	lb ai/a	PO1						
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	10.0	6.7	10.0	1.3	2.070
	Tough	5	EC	0.9	lb ai/a	PO1						
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	7.7	8.7	10.0	1.0	1.697
	Lentagran	45	WP	0.624	lb ai/a	PO1						
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	9.0	5.7	8.7	1.3	1.970
	Lentagran	45	WP	0.894	lb ai/a	PO1						
14	Untreated						4.0	1.7	4.7	3.0	0.7	0.780
LSD P=.05							1.94	2.17	2.79	2.33	1.80	3.1024
Standard Deviation							1.15	1.29	1.66	1.39	1.07	1.8481
CV							12.29	16.08	22.08	15.68	102.13	110.57

Michigan State University

Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CABBAGE 30Jul19 HARVEST NO./PLOT	CABBAGE 30Jul19 HARVEST KG/PLOT	CABBAGE 02Aug19 HARVEST NO./PLOT	CABBAGE 02Aug19 HARVEST KG/PLOT	CABBAGE 06Aug19 HARVEST NO./PLOT	CABBAGE 06Aug19 HARVEST KG/PLOT
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	9.3	15.0137	3.0	5.0033	1.3	1.8467
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	8.0	13.1267	1.7	3.4700	3.0	4.1683
3	GoalTender	4	SC	0.5	lb ai/a	PRT	7.7	12.4033	2.7	5.6800	1.3	1.5983
	Command	3	ME	0.5	lb ai/a	PRT						
4	GoalTender	4	SC	0.5	lb ai/a	PRT	10.0	18.5083	1.7	3.0400	2.0	2.9717
	Spartan	4	F	0.188	lb ai/a	PRT						
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	7.3	11.2950	3.0	7.1550	2.3	3.1450
	GoalTender	4	SC	0.5	lb ai/a	PRT						
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	7.3	11.7067	1.7	3.3833	2.3	3.2033
	GoalTender	4	SC	0.5	lb ai/a	PRT						
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	7.7	13.9750	1.7	4.4250	2.0	3.1333
	GoalTender	4	SC	0.125	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	6.0	10.1683	3.0	8.7350	4.7	6.1767
	BIR	1.67	SL	0.033	lb ai/a	PO1						
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	9.3	15.4317	1.7	3.3500	3.0	3.7767
	BIR	1.67	SL	0.045	lb ai/a	PO1						
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	5.3	7.9083	2.3	3.3433	6.7	9.5750
	Tough	5	EC	0.625	lb ai/a	PO1						
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	6.7	10.0133	1.3	1.7217	4.3	5.7517
	Tough	5	EC	0.9	lb ai/a	PO1						
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	8.3	16.0850	2.3	3.8583	3.0	4.0600
	Lentagran	45	WP	0.624	lb ai/a	PO1						
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	9.3	18.1117	0.7	1.2100	2.3	3.3850
	Lentagran	45	WP	0.894	lb ai/a	PO1						
14	Untreated						11.7	20.3767	1.0	1.3950	1.7	2.1217
LSD P=.05							3.80	8.05694	2.43	6.49765	2.13	2.92889
Standard Deviation							2.26	4.79946	1.45	3.87060	1.27	1.74472
CV							27.8	34.61	73.15	97.16	44.41	44.48

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Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CABBAGE 12Aug19 HARVEST NO./PLOT	CABBAGE 12Aug19 HARVEST KG/PLOT	CABBAGE TOTAL NO./PLOT	CABBAGE TOTAL KG/PLOT
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.0	0.0000	15.0	23.7570
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	1.7	1.9833	15.7	24.9683
3	GoalTender	4	SC	0.5	lb ai/a	PRT	2.3	2.8333	16.3	26.5417
	Command	3	ME	0.5	lb ai/a	PRT				
4	GoalTender	4	SC	0.5	lb ai/a	PRT	1.3	1.7283	16.7	29.1983
	Spartan	4	F	0.188	lb ai/a	PRT				
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.7	1.6900	14.7	23.7217
	GoalTender	4	SC	0.5	lb ai/a	PRT				
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	2.3	2.5367	14.3	21.8467
	GoalTender	4	SC	0.5	lb ai/a	PRT				
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.3	1.6633	14.3	26.1367
	GoalTender	4	SC	0.125	lb ai/a	PO1				
	Select Max	.97	EC	0.12	lb ai/a	PO1				
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.7	0.7517	15.3	27.2317
	BIR	1.67	SL	0.033	lb ai/a	PO1				
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.7	2.1833	15.7	24.7417
	BIR	1.67	SL	0.045	lb ai/a	PO1				
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.3	3.1133	16.7	23.9400
	Tough	5	EC	0.625	lb ai/a	PO1				
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.0	2.4033	15.7	21.9600
	Tough	5	EC	0.9	lb ai/a	PO1				
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.0	1.3550	15.7	27.0550
	Lentagran	45	WP	0.624	lb ai/a	PO1				
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.3	2.1483	15.0	26.8250
	Lentagran	45	WP	0.894	lb ai/a	PO1				
14	Untreated						1.3	1.5950	16.3	26.2683
LSD P=.05							2.14	2.78743	2.03	6.85925
Standard Deviation							1.28	1.66045	1.21	4.08601
CV							85.07	89.46	7.78	16.15

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Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CAULI 23Jul19 HARVEST NO./PLOT	CAULI 23Jul19 HARVEST KG/PLOT	CAULI 29Jul19 HARVEST NO./PLOT	CAULI 29Jul19 HARVEST KG/PLOT	CAULI 01Aug19 HARVEST NO./PLOT	CAULI 01Aug19 HARVEST KG/PLOT
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.7	0.5667	4.3	3.5917	4.0	3.1800
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	2.3	2.1717	6.0	4.7900	6.7	4.1383
3	GoalTender	4	SC	0.5	lb ai/a	PRT	1.3	1.3267	5.7	5.5117	3.3	2.7050
	Command	3	ME	0.5	lb ai/a	PRT						
4	GoalTender	4	SC	0.5	lb ai/a	PRT	0.0	0.0000	2.0	1.6900	6.0	4.6433
	Spartan	4	F	0.188	lb ai/a	PRT						
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.3	0.2450	3.7	3.1517	4.7	3.4017
	GoalTender	4	SC	0.5	lb ai/a	PRT						
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	0.3	0.2333	5.0	4.4183	5.3	4.1067
	GoalTender	4	SC	0.5	lb ai/a	PRT						
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.3	0.1367	3.0	2.5467	4.7	3.8417
	GoalTender	4	SC	0.125	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.7	0.4933	4.0	3.7950	4.3	3.5500
	BIR	1.67	SL	0.033	lb ai/a	PO1						
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.0	0.0000	1.0	0.7667	4.7	3.5100
	BIR	1.67	SL	0.045	lb ai/a	PO1						
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.0	0.0000	1.7	1.2850	5.0	4.0750
	Tough	5	EC	0.625	lb ai/a	PO1						
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.3	0.2500	1.7	1.6050	5.0	3.7550
	Tough	5	EC	0.9	lb ai/a	PO1						
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	0.0	0.0000	2.3	2.1817	4.3	3.5233
	Lentagran	45	WP	0.624	lb ai/a	PO1						
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.3	0.8117	1.3	1.2100	5.3	4.0067
	Lentagran	45	WP	0.894	lb ai/a	PO1						
14	Untreated						0.7	0.4717	6.7	5.4233	5.0	3.4817
LSD P=.05							2.20	1.98109	3.22	2.95208	3.65	3.00075
Standard Deviation							1.31	1.18012	1.92	1.75853	2.17	1.78752
CV							219.73	246.35	55.58	58.66	44.53	48.2

Michigan State University

Weed Control in Cauliflower & Cabbage - HTRC - 2019

Trial ID: 114-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 114-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CAULI 06Aug19 HARVEST NO./PLOT	CAULI 06Aug19 HARVEST KG/PLOT	CAULI 12Aug19 HARVEST NO./PLOT	CAULI 12Aug19 HARVEST KG/PLOT	CAULI TOTAL NO./PLOT	CAULI TOTAL KG/PLOT
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	3.7	2.8833	2.3	1.1717	15.0	11.3933
2	Prowl H20	3.8	CS	1	lb ai/a	PRT	1.7	1.1450	0.7	0.4900	17.3	12.7350
3	GoalTender	4	SC	0.5	lb ai/a	PRT	4.0	3.5033	1.7	1.1900	16.0	14.2367
	Command	3	ME	0.5	lb ai/a	PRT						
4	GoalTender	4	SC	0.5	lb ai/a	PRT	1.7	1.6883	2.3	1.8267	12.0	9.8483
	Spartan	4	F	0.188	lb ai/a	PRT						
5	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	3.7	3.2133	1.7	1.1833	14.0	11.1950
	GoalTender	4	SC	0.5	lb ai/a	PRT						
6	Satellite Hydrocap	3.8	ME	1	lb ai/a	PRT	2.3	1.8067	1.7	1.1433	17.0	11.9583
	GoalTender	4	SC	0.5	lb ai/a	PRT						
7	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	5.0	3.4700	0.7	0.3633	13.7	10.3583
	GoalTender	4	SC	0.125	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
8	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	3.3	2.4917	2.0	1.6117	14.3	11.9417
	BIR	1.67	SL	0.033	lb ai/a	PO1						
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	4.0	3.1317	3.3	2.0533	13.0	9.4617
	BIR	1.67	SL	0.045	lb ai/a	PO1						
10	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	4.7	3.7050	3.0	1.3800	14.3	10.4450
	Tough	5	EC	0.625	lb ai/a	PO1						
11	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.3	1.8167	2.3	1.7067	11.7	9.1333
	Tough	5	EC	0.9	lb ai/a	PO1						
12	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	4.0	2.7317	2.3	1.8717	13.0	10.3083
	Lentagran	45	WP	0.624	lb ai/a	PO1						
13	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	3.3	1.9367	2.0	1.1517	13.3	9.1167
	Lentagran	45	WP	0.894	lb ai/a	PO1						
14	Untreated						3.3	2.0717	0.7	0.2817	16.3	11.7300
LSD P=.05							3.08	2.29750	3.33	2.14283	4.58	3.76800
Standard Deviation							1.84	1.36861	1.98	1.27647	2.73	2.24457
CV							54.7	53.83	104.06	102.56	19.01	20.42

Weed Control in Seeded Green Onion and Chive – Van Drunen - 2019

Project Code: 112-19-2 **Location: Momence, IL**

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Green Onion & Chive **Variety: Tokyo Long White, Pearl**
Planting Method: **Planting Date: 6/4/19** **Harvest Date:**
Spacing: **Row Spacing:**
Tillage Type: **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Jasper Loam **OM: 5.3%** **pH: 6.2**
Sand: 32% **Silt: 38%** **Clay: 30%** **CEC: 15.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/16/19	12:15 pm	84/78	F	Damp	1-3 NE	48	20% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
7/12/19	LACG = large crabgrass			
7/12/19	COPU = common purslane			
7/12/19	LATH = ladysthumb			
7/12/19	RRPW = redroot pigweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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. Control weeds with GoalTender 0.063 lb (1.5 ml) + Select Max 0.12 (11.71 ml) at 3-4 weeks after seeding.
4. There was soil on the green onion roots at harvest.

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Weed Control in Seeded Green Onion and Chive - Van Drunen - 2019

Trial ID: 112-19-2 Location: Momence, IL Trial Year: 2019
Protocol ID: 112-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRONION 12Jul19 RATING 1-10	CHIVE 12Jul19 RATING 1-10	COPU 12Jul19 RATING 1-10	LACG 12Jul19 RATING 1-10	LATH 12Jul19 RATING 1-10	RRPW 12Jul19 RATING 1-10
1	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	1.3	2.3	7.0	8.0		8.7
2	Prowl H20	3.8	CS	1.43	lb ai/a	PRE	1.3	3.0	6.7	8.7		8.3
3	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	1.0	2.7	7.3	8.0		9.7
	Chateau SW	51	WDG	0.016	lb ai/a	PRE						
4	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	1.0	3.0	7.7	9.3		10.0
	Zidua	4.17	SC	0.016	lb ai/a	PRE						
5	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	2.3	3.7	8.3	9.3	8.0	10.0
	Zidua	4.17	SC	0.033	lb ai/a	PRE						
6	Prowl H20	3.8	CS	0.71	lb ai/a	PRE	1.3	7.0	8.7	9.7	9.0	10.0
	Zidua	4.17	SC	0.053	lb ai/a	PRE						
7	Zidua	4.17	SC	0.033	lb ai/a	PRE	1.3	3.0	7.7	9.3		9.3
8	Zidua	4.17	SC	0.053	lb ai/a	PRE	1.7	5.3	8.7	9.7	9.0	10.0
9	Zidua	4.17	SC	0.066	lb ai/a	PRE	1.7	8.7	8.7	9.7		9.7
10	Untreated						1.0	2.0	1.0	1.0	8.0	6.3
LSD P=.05							0.80	2.08	0.89	1.11	.	1.47
Standard Deviation							0.46	1.21	0.52	0.65	.	0.86
CV							33.11	29.82	7.26	7.86	.	9.31

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRONION 08Aug19 RATING 1-10	CHIVE 08Aug19 RATING 1-10	CHIVE 27Sep19 HARVEST KG/PLOT	GRONION 21Aug19 HARVEST KG/PLOT
1	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	1.0	1.7	0.7970	259.23
2	Prowl H20	3.8	CS	1.43	lb ai/a	PRE	1.3	3.3	0.4383	236.38
3	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	1.3	2.3	0.7317	249.02
	Chateau SW	51	WDG	0.016	lb ai/a	PRE				
4	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	1.7	2.7	0.4727	257.51
	Zidua	4.17	SC	0.016	lb ai/a	PRE				
5	Prowl H20	3.8	CS	0.95	lb ai/a	PRE	2.3	6.7	0.1037	234.84
	Zidua	4.17	SC	0.033	lb ai/a	PRE				
6	Prowl H20	3.8	CS	0.71	lb ai/a	PRE	2.0	8.3	0.0840	248.45
	Zidua	4.17	SC	0.053	lb ai/a	PRE				
7	Zidua	4.17	SC	0.033	lb ai/a	PRE	1.7	4.3	0.1530	241.91
8	Zidua	4.17	SC	0.053	lb ai/a	PRE	2.3	7.3	0.1370	236.61
9	Zidua	4.17	SC	0.066	lb ai/a	PRE	2.7	9.7	0.0243	238.29
10	Untreated						1.7	5.0	0.2277	251.57
LSD P=.05							1.43	2.83	0.28858	23.12
Standard Deviation							0.83	1.65	0.16822	13.48
CV							46.36	32.18	53.08	5.49

Preemergence Weed Control in Hops – SWMREC - 2019

Project Code: 135-19-1 **Location: Benton Harbor, MI**

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Hops **Variety: Cascade, Centennial, Willamette, Santiam**
Planting Method: Transplant **Planting Date: 2013, 2016** **Harvest Date:**
Spacing: 6 ft **Row Spacing: 10 ft**
Tillage Type: **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Spinks Loamy Fine Sand **OM: 1.9%** **pH: 5.2**
Sand: 89% **Silt: 4%** **Clay: 7%** **CEC: 4.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/24/19	2:00 pm	62/59	F	Dry	2-3 SE	34	60% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/24/19	HOPS	2-4″		Few
4/24/19	QUGR = quackgrass	6-12″	Veg	Very Many
4/24/19	HOAL = hoary alyssum	3-4″	Rosette	Moderate
6/11/19	RESO = red sorrel			
9/4/19	HONE = horsenettle			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. One pass over each row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

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Preemergence Weed Control in Hops - SWMREC - 2019

Trial ID: 135-19-1 Location: Benton Harbor, MI Trial Year: 2019
Protocol ID: 135-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage							
Pest Code								QUGR	HOAL	RESO		QUGR	HOAL
Crop Code							HOPS				HOPS		
Rating Date							11Jun19	11Jun19	11Jun19	11Jun19	16Jul19	16Jul19	16Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10	1-10
1	Chateau SW	51	WDG	0.191	lb ai/a	PRE	3.0	3.0	10.0	7.0	3.0	1.7	8.7
	Rely 280	2.34	L	1	lb ai/a	PRE							
2	Solicam	80	DF	5	lb ai/a	PRE	1.3	7.3	10.0	10.0	1.0	8.7	8.3
	Rely 280	2.34	L	1	lb ai/a	PRE							
3	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	1.7	2.7	8.3	9.3	2.0	1.7	4.0
	Rely 280	2.34	L	1	lb ai/a	PRE							
4	Alion 200	1.67	SC	0.065	lb ai/a	PRE	2.7	3.3	10.0	9.3	4.0	3.0	8.7
	Rely 280	2.34	L	1	lb ai/a	PRE							
5	Outlook	6	EC	0.98	lb ai/a	PRE	2.7	3.0	9.0	7.0	4.0	1.3	4.3
	Rely 280	2.34	L	1	lb ai/a	PRE							
6	Trellis SC	4.16	SC	1	lb ai/a	PRE	2.3	2.7	9.7	10.0	2.7	1.3	9.3
	Rely 280	2.34	L	1	lb ai/a	PRE							
7	Zidua	4.17	SC	0.267	lb ai/a	PRE	2.0	3.0	9.7	10.0	1.7	1.3	4.0
	Rely 280	2.34	L	1	lb ai/a	PRE							
8	Rely 280	2.34	L	1	lb ai/a	PRE	3.0	4.0	7.0	10.0	2.3	1.7	3.3
LSD P=.05							2.08	3.09	3.84	4.00	2.23	2.71	5.46
Standard Deviation							1.19	1.77	2.19	2.28	1.27	1.55	3.12
CV							50.9	48.72	23.83	25.14	49.25	59.95	49.2

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage		
Pest Code								HONE
Crop Code							HOPS	
Rating Date							04Sep19	04Sep19
Rating Type							RATING	RATING
Rating Unit							1-10	1-10
1	Chateau SW	51	WDG	0.191	lb ai/a	PRE	4.3	3.3
	Rely 280	2.34	L	1	lb ai/a	PRE		
2	Solicam	80	DF	5	lb ai/a	PRE	2.0	4.3
	Rely 280	2.34	L	1	lb ai/a	PRE		
3	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	3.0	1.7
	Rely 280	2.34	L	1	lb ai/a	PRE		
4	Alion 200	1.67	SC	0.065	lb ai/a	PRE	4.3	1.7
	Rely 280	2.34	L	1	lb ai/a	PRE		
5	Outlook	6	EC	0.98	lb ai/a	PRE	5.7	1.0
	Rely 280	2.34	L	1	lb ai/a	PRE		
6	Trellis SC	4.16	SC	1	lb ai/a	PRE	3.0	2.3
	Rely 280	2.34	L	1	lb ai/a	PRE		
7	Zidua	4.17	SC	0.267	lb ai/a	PRE	3.0	1.0
	Rely 280	2.34	L	1	lb ai/a	PRE		
8	Rely 280	2.34	L	1	lb ai/a	PRE	3.7	1.0
LSD P=.05							3.19	3.92
Standard Deviation							1.82	2.24
CV							50.23	109.72

Performance of Prometryn on Transplanted Leek – IR4 – Schreur - 2019

Project Code: 112-19-4 **Location: Hudsonville, MI**
Block:

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Leek **Variety: American Flag**
Planting Method: Transplant **Planting Date: 5/3/19** **Harvest Date: 8/29/19**
Spacing: 6 in **Row Spacing: 20 in; 2 rows/plot**
Tillage Type: **Study Design: RCB** **Replications: 3**
Plot Size: 2.7 ft wide x 30 ft long

Soil Type: Carlisle Musk **OM: 51.6%** **pH: 5.9**
Sand: 52% **Silt: 16%** **Clay: 2%** **CEC:**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PO1	5/21/19	9:45 am	50/51	F	Damp	6-7 NE	69	80% Cloudy	Y
PO2	7/12/19	10:15 am	68/74	F	Dry	3-5 NW	68	5% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/21/19	LEEK	6″	3-4 LS	Good
5/21/19	LATH = ladysthumb	0.25″	Cot	Many
6/5/19	LEEK	8-12″	4-5 LS	Good
7/12/19	COLQ = common lambsquarters	4-12″	Veg	Few
7/12/19	COPU = common purslane	6-10″	Flower	Few
7/12/19	MAYC = marsh yellowcress	6-10″	Veg	Few
7/12/19	RRPW = redroot pigweed	8-16″	Veg	Moderate

Notes and Comments
1. Spray applied with 2 nozzle shielded boom. FF11002, 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. Apply all PO1 treatments after plants have 1-3 new leaves.
4. Apply PO2 50 days before harvest.
5. Handweeded broadleaves as needed.

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Performance of Prometryn on Transplanted Leek - IR4 - Schreur - 2019

Trial ID: 112-19-4 Location: Hudsonville, MI Trial Year: 2019
Protocol ID: 112-19-4 Investigator: Dr. Bernard Zandstra
Project ID: Study Director: Nicole Soldan

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								COLQ	LATH			COLQ
Crop Code							LEEK			LEEK	LEEK	
Rating Date							28May19	28May19	28May19	11Jun19	21Jun19	21Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated Handweeded						1.0	1.7	2.3	1.0	1.3	9.0
2	Caparol	4	L	1.6	lb ai/a	PO1,PO2	1.3	8.7	8.7	1.0	2.0	9.7
3	Caparol	4	L	3.2	lb ai/a	PO1,PO2	2.0	9.7	9.7	1.7	2.3	10.0
4	Caparol	4	L	1.6	lb ai/a	PO1,PO2	2.0	9.3	9.0	1.7	1.7	10.0
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
5	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2	1.0	7.0	6.0	1.0	1.3	10.0
6	Outlook	6	EC	0.98	lb ai/a	PO1,PO2	1.3	7.7	7.3	1.7	2.0	9.0
7	Dual Magnum	7.62	EC	1.26	lb ai/a	PO1,PO2	1.7	7.0	7.7	2.0	2.7	9.3
8	Zidua	85	WDG	0.133	lb ai/a	PO1,PO2	1.7	8.0	8.7	1.0	2.3	8.3
9	Zidua	85	WDG	0.267	lb ai/a	PO1,PO2	1.3	8.7	9.0	1.3	2.3	9.3
10	GoalTender	4	SC	0.25	lb ai/a	PO1,PO2	2.7	9.7	9.7	1.7	1.7	9.7
LSD P=.05							0.79	3.04	2.51	0.72	1.01	1.70
Standard Deviation							0.46	1.77	1.46	0.42	0.59	0.99
CV							28.72	22.93	18.74	29.8	30.0	10.5

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code							CORW	LATH	MAYC		
Crop Code										LEEK	LEEK
Rating Date							21Jun19	21Jun19	21Jun19	02Jul19	12Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Untreated Handweeded						5.0	6.7	4.3	1.0	1.3
2	Caparol	4	L	1.6	lb ai/a	PO1,PO2	8.3	9.7	9.3	1.3	1.7
3	Caparol	4	L	3.2	lb ai/a	PO1,PO2	10.0	10.0	10.0	2.0	1.3
4	Caparol	4	L	1.6	lb ai/a	PO1,PO2	9.0	10.0	9.0	2.0	1.7
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2					
5	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2	5.7	9.0	4.0	1.3	1.7
6	Outlook	6	EC	0.98	lb ai/a	PO1,PO2	7.0	10.0	7.3	1.3	1.7
7	Dual Magnum	7.62	EC	1.26	lb ai/a	PO1,PO2	5.3	9.0	8.3	1.7	2.7
8	Zidua	85	WDG	0.133	lb ai/a	PO1,PO2	6.3	9.0	8.7	1.0	1.7
9	Zidua	85	WDG	0.267	lb ai/a	PO1,PO2	5.7	9.3	9.0	1.7	1.7
10	GoalTender	4	SC	0.25	lb ai/a	PO1,PO2	6.7	9.0	7.3	1.3	2.0
LSD P=.05							5.30	2.09	2.46	0.72	1.14
Standard Deviation							3.09	1.22	1.44	0.42	0.66
CV							44.77	13.29	18.57	28.45	38.3

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Performance of Prometryn on Transplanted Leek - IR4 - Schreur - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COLQ 12Jul19 RATING 1-10	RRPW 12Jul19 RATING 1-10	LEEK 29Aug19 RATING 1-10	LEEK 29Aug19 HARVEST NO./PLOT	LEEK 29Aug19 HARVEST KG/PLOT
1	Untreated Handweeded						8.3	2.7	1.3	121.0	48.10
2	Caparol	4	L	1.6	lb ai/a	PO1,PO2	7.7	3.7	1.3	123.0	44.26
3	Caparol	4	L	3.2	lb ai/a	PO1,PO2	9.3	7.7	2.0	120.0	35.06
4	Caparol	4	L	1.6	lb ai/a	PO1,PO2	9.7	6.3	2.0	124.0	42.49
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2					
5	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2	8.3	8.0	1.0	124.3	51.68
6	Outlook	6	EC	0.98	lb ai/a	PO1,PO2	7.3	8.7	1.3	128.0	48.45
7	Dual Magnum	7.62	EC	1.26	lb ai/a	PO1,PO2	8.7	7.7	1.0	121.7	48.42
8	Zidua	85	WDG	0.133	lb ai/a	PO1,PO2	8.3	8.3	1.3	124.0	48.97
9	Zidua	85	WDG	0.267	lb ai/a	PO1,PO2	8.7	8.7	1.3	121.3	45.79
10	GoalTender	4	SC	0.25	lb ai/a	PO1,PO2	9.0	6.3	1.7	119.7	45.20
LSD P=.05							2.70	2.64	0.80	11.59	6.78
Standard Deviation							1.57	1.54	0.47	6.75	3.95
CV							18.43	22.62	32.61	5.51	8.63

Weed Control in Mint – Irrer - 2019

Project Code: 121-19-1 **Location: St. Johns, MI**

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Mint **Variety: Native Spearmint**
Planting Method: Roots **Planting Date: 2017**
Spacing: Meadow **Row Spacing: Solid**
Tillage Type: **Study Design: RCB Replications: 3**
Plot Size: 6 ft wide x 30 ft long

Soil Type: Capac Loam **OM: 2.6%** **pH: 6.5**
Sand: 81% **Silt: 11%** **Clay: 8%** **CEC: 5.4**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/5/19	1:15 pm	39/41	F	Damp	2-3 NE	81	100% Cloudy	N
PO1	5/24/19	1:15 pm	60/60	F	Damp	3-4 NE	77	100% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/5/19	MINT		Not up	
4/5/19	FIPA = field pansy	1-2″	Cot – 3 lfs	Many
5/24/19	MINT	3-4″		Moderate
5/24/19	FIPA = field pansy	3-6″	Flower	Many
6/5/19	FIPA = field pansy			
6/20/19	FIPA = field pansy			
7/2/19	FIPA = field pansy			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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.

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Weed Control in Mint - Irrer - 2019

Trial ID: 121-19-1 Location: St. Johns, MI Trial Year: 2019
Protocol ID: 121-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								FIPA		FIPA		FIPA
Crop Code							MINT		MINT		MINT	
Rating Date							24May19	24May19	05Jun19	05Jun19	20Jun19	20Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Goal 2XL	2	EC	0.31	lb ai/a	PRE	2.0	10.0	2.7	10.0	2.0	10.0
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE						
	Sinbar	80	WDG	0.32	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
2	Gramoxone SL	2	SL	0.56	lb ai/a	PRE	1.3	9.3	2.3	8.3	1.3	8.7
	Zidua	85	WDG	0.098	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
3	Gramoxone SL	2	SL	0.56	lb ai/a	PRE	2.3	10.0	3.0	9.3	2.7	9.3
	Zidua	85	WDG	0.195	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
4	Sharpen	2.85	SC	0.175	lb ai/a	PRE	7.7	10.0	7.0	10.0	5.7	10.0
	Zidua	85	WDG	0.098	lb ai/a	PRE						
	MSO	100	SL	1	% v/v	PRE						
	N Pak (AMS)	100	L	2	% v/v	PRE						
5	Aim	2	EC	0.023	lb ai/a	PRE	2.3	7.7	2.0	7.3	2.0	7.3
	Zidua	85	WDG	0.195	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
6	Aim	2	EC	0.023	lb ai/a	PRE	1.7	6.7	2.0	2.7	1.7	3.3
	Zidua	85	WDG	0.098	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
7	Gramoxone SL	2	SL	0.56	lb ai/a	PRE	3.3	9.3	4.0	10.0	4.0	10.0
	Chateau SW	51	WDG	0.128	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
8	Chateau SW	51	WDG	0.128	lb ai/a	PRE	5.3	10.0	4.7	9.7	4.3	10.0
	Zidua	85	WDG	0.098	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE						
	NIS	100	SL	0.25	lb ai/a	PRE						
9	Sharpen	2.85	SC	0.26	lb ai/a	PRE	8.3	10.0	8.0	10.0	5.7	9.7
	MSO	100	SL	1	% v/v	PRE						
	N Pak (AMS)	100	L	2	% v/v	PRE						
10	BIR	1.67	SL	0.044	lb ai/a	PRE	7.3	10.0	6.7	10.0	5.0	10.0
	Goal 2XL	2	EC	0.312	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
11	Chateau SW	51	WDG	0.128	lb ai/a	PRE	7.3	10.0	6.3	10.0	5.7	10.0
	Zidua	85	WDG	0.098	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE						
	NIS	100	SL	0.25	lb ai/a	PRE						
	Tough	5	EC	0.94	lb ai/a	PO1						
	Poast	1.53	EC	0.19	lb ai/a	PO1						

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Weed Control in Mint - Irrer - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								FIPA		FIPA		FIPA
Crop Code							MINT		MINT		MINT	
Rating Date							24May19	24May19	05Jun19	05Jun19	20Jun19	20Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
12	Sharpen	2.85	SC	0.26	lb ai/a	PRE	6.3	10.0	5.3	10.0	5.0	10.0
	MSO	100	SL	1	% v/v	PRE						
	N Pak (AMS)	100	L	2	% v/v	PRE						
	Basagran	4	L	1	lb ai/a	PO1						
	Sinbar	80	WDG	0.4	lb ai/a	PO1						
	Assure II	.88	EC	0.04	lb ai/a	PO1						
LSD P=.05							1.17	1.74	1.98	2.07	1.86	2.08
Standard Deviation							0.69	1.03	1.17	1.22	1.10	1.23
CV							14.94	10.9	25.95	13.68	29.27	13.62

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage		
Pest Code								FIPA
Crop Code							MINT	
Rating Date							02Jul19	02Jul19
Rating Type							RATING	RATING
Rating Unit							1-10	1-10
1	Goal 2XL	2	EC	0.31	lb ai/a	PRE	1.0	10.0
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE		
	Sinbar	80	WDG	0.32	lb ai/a	PRE		
	NIS	100	SL	0.25	% v/v	PRE		
2	Gramoxone SL	2	SL	0.56	lb ai/a	PRE	1.7	9.3
	Zidua	85	WDG	0.098	lb ai/a	PRE		
	NIS	100	SL	0.25	% v/v	PRE		
3	Gramoxone SL	2	SL	0.56	lb ai/a	PRE	1.7	10.0
	Zidua	85	WDG	0.195	lb ai/a	PRE		
	NIS	100	SL	0.25	% v/v	PRE		
4	Sharpen	2.85	SC	0.175	lb ai/a	PRE	5.0	9.3
	Zidua	85	WDG	0.098	lb ai/a	PRE		
	MSO	100	SL	1	% v/v	PRE		
	N Pak (AMS)	100	L	2	% v/v	PRE		
5	Aim	2	EC	0.023	lb ai/a	PRE	2.7	8.7
	Zidua	85	WDG	0.195	lb ai/a	PRE		
	NIS	100	SL	0.25	% v/v	PRE		
6	Aim	2	EC	0.023	lb ai/a	PRE	1.7	7.0
	Zidua	85	WDG	0.098	lb ai/a	PRE		
	NIS	100	SL	0.25	% v/v	PRE		
7	Gramoxone SL	2	SL	0.56	lb ai/a	PRE	2.7	10.0
	Chateau SW	51	WDG	0.128	lb ai/a	PRE		
	NIS	100	SL	0.25	% v/v	PRE		
8	Chateau SW	51	WDG	0.128	lb ai/a	PRE	4.0	10.0
	Zidua	85	WDG	0.098	lb ai/a	PRE		
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE		
	NIS	100	SL	0.25	lb ai/a	PRE		

Weed Control in Mint – Irrer - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage		
Pest Code								FIPA
Crop Code							MINT	
Rating Date							02Jul19	02Jul19
Rating Type							RATING	RATING
Rating Unit							1-10	1-10
9	Sharpen	2.85	SC	0.26	lb ai/a	PRE	6.0	8.7
	MSO	100	SL	1	% v/v	PRE		
	N Pak (AMS)	100	L	2	% v/v	PRE		
10	BIR	1.67	SL	0.044	lb ai/a	PRE	4.7	10.0
	Goal 2XL	2	EC	0.312	lb ai/a	PRE		
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE		
	NIS	100	SL	0.25	% v/v	PRE		
11	Chateau SW	51	WDG	0.128	lb ai/a	PRE	5.7	10.0
	Zidua	85	WDG	0.098	lb ai/a	PRE		
	Gramoxone SL	2	SL	0.56	lb ai/a	PRE		
	NIS	100	SL	0.25	lb ai/a	PRE		
	Tough	5	EC	0.94	lb ai/a	PO1		
	Poast	1.53	EC	0.19	lb ai/a	PO1		
12	Sharpen	2.85	SC	0.26	lb ai/a	PRE	4.7	10.0
	MSO	100	SL	1	% v/v	PRE		
	N Pak (AMS)	100	L	2	% v/v	PRE		
	Basagran	4	L	1	lb ai/a	PO1		
	Sinbar	80	WDG	0.4	lb ai/a	PO1		
	Assure II	.88	EC	0.04	lb ai/a	PO1		
LSD P=.05							1.72	1.37
Standard Deviation							1.01	0.81
CV							29.43	8.62

Preemergence Weed Control in Onion – Keilen - 2019

Project Code: 112-19-1 **Location: Bath, MI**

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Onion **Variety: Champ**
Planting Method: Seeded **Planting Date:4/15/19 Harvest Date:10/9/19**
Spacing: 1 in **Row Spacing: 10 in, 2 rows/plot**
Tillage Type: **Study Design: RCB Replications: 3**
Plot Size: 2.7 ft wide x 30 ft long

Soil Type: Houghton Muck **OM: 76.4%** **pH: 5.6**
Sand: 11% **Silt: 12%** **Clay: 0.3%** **CEC:**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/25/19	10:00 am	61/51	F	Dry	1-3 SE	51	80% Cloudy	N
DPRE	5/14/19	9:00 am	51/45	F	Wet	2-3 W	72	0% Cloudy	Y
PO1	5/29/19	1:06 pm	61/60	F	Wet	3-6 NW	85	100% Cloudy	N
PO2	6/18/19	10:50 am	73/67	F	Moist	2-4 E	65	70% Cloudy	N
PO3	7/24/19	10:32 am	72/65	F	Wet	1-3 NW	56	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/14/19	ONION	¼″	Loop	Good
5/14/19	COPU = common purslane	¼″	Cot	Many
5/14/19	HANS = hairy nightshade	¼″	Cot	Many
5/14/19	LATH = ladysthumb	¼″	Cot	Many
5/29/19	ONION	6-7″	1 LS	Good
5/29/19	HANS = hairy nightshade	2-3″	Veg	Many
5/29/19	RRPW = redroot pigweed	2-3″	Veg	Many
5/29/19	Volunteer potato	1-3″	Veg	Few
6/18/19	ONION	8-10″	2 LS	Good
6/18/19	LATH = ladysthumb	3-4″	veg	Moderate
7/24/19	ONION	12-14″	4-6 LS	Good
7/24/19	COPU = common purslane	2-4″	Veg	Few
7/24/19	LATH = ladysthumb	3-4″	Veg	Few

Notes and Comments
1. Spray applied with 2 nozzle boom, shielded. FF11002, 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. PRE = 1-5 DAP
4. DPRE = 21-28 DAP
5. PO1 = 1 LS
6. PO2 = 2 LS
7. PO3 = 4-6 LS
8. 6/11/19 All weedy plots sprayed with Goal 9ml/gal.
9. 6/18/19 All weedy plots handweeded.

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Preemergence Weed Control in Onion - Keilen - 2019

Trial ID: 112-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 112-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ONION 28May19 RATING 1-10	LATH 28May19 RATING 1-10	RRPW 28May19 RATING 1-10	ONION 04Jun19 RATING 1-10	LATH 04Jun19 RATING 1-10	ONION 10Jun19 RATING 1-10
1	Zidua	4.17	SC	0.133	lb ai/a	PRE	1.7	1.7	2.3	3.0	7.3	1.7
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
2	Zidua	4.17	SC	0.267	lb ai/a	PRE	2.3	2.0	5.7	3.0	8.7	2.7
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
3	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	1.0	1.3	1.0	3.0	7.3	1.7
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						
4	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	1.0	2.0	2.3	3.0	8.3	2.0
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Zidua	4.17	SC	0.133	lb ai/a	PO1,PO2						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO3						
5	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	1.0	1.3	1.3	3.0	7.3	1.0
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.267	lb ai/a	PO3						
6	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	1.0	2.0	1.3	1.7	6.0	1.0
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.032	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.133	lb ai/a	PO3						
7	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	1.0	1.7	1.7	3.3	8.0	3.3
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.064	lb ai/a	PO1						
	Chateau SW	51	WDG	0.032	lb ai/a	PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						
8	Zidua	4.17	SC	0.133	lb ai/a	DPRE	2.3	10.0	10.0	3.7	10.0	3.3
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
9	Zidua	4.17	SC	0.267	lb ai/a	DPRE	2.7	10.0	10.0	3.7	10.0	3.7
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
10	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	2.0	9.7	10.0	3.0	10.0	2.3
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						

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Preemergence Weed Control in Onion - Keilen - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								LATH	RRPW		LATH	
Crop Code							ONION			ONION		ONION
Rating Date							28May19	28May19	28May19	04Jun19	04Jun19	10Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
11	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	1.7	10.0	10.0	2.7	10.0	2.3
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Zidua	4.17	SC	0.133	lb ai/a	PO1,PO2						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO3						
12	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	1.3	9.3	9.3	3.0	10.0	2.7
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.267	lb ai/a	PO3						
13	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	1.7	10.0	10.0	2.0	10.0	2.0
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.032	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.133	lb ai/a	PO3						
14	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	1.3	9.7	10.0	3.3	10.0	2.3
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.064	lb ai/a	PO1						
	Chateau SW	51	WDG	0.032	lb ai/a	PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						
LSD P=.05							1.06	1.20	1.60	0.84	1.59	0.84
Standard Deviation							0.63	0.71	0.95	0.50	0.95	0.50
CV							40.12	12.36	15.71	16.97	10.78	21.92

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Preemergence Weed Control in Onion - Keilen - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	LATH 10Jun19 RATING 1-10	ONION 09Jul19 RATING 1-10	LATH 09Jul19 RATING 1-10	ONION 07Aug19 RATING 1-10	ONION 20Sep19 RATING 1-10	ONION 09Oct19 HARVEST KG/PLOT
1	Zidua	4.17	SC	0.133	lb ai/a	PRE	3.0	3.0	8.0	1.3	5.7	26.84
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
2	Zidua	4.17	SC	0.267	lb ai/a	PRE	4.3	2.3	8.3	1.3	6.7	36.61
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
3	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	3.3	1.3	6.0	1.3	7.7	37.87
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						
4	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	6.7	2.0	9.0	1.7	7.0	41.34
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Zidua	4.17	SC	0.133	lb ai/a	PO1,PO2						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO3						
5	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	2.3	2.3	6.0	2.0	8.0	36.67
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.267	lb ai/a	PO3						
6	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	3.0	2.3	8.3	1.3	7.7	33.75
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.032	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.133	lb ai/a	PO3						
7	Prowl H20	3.8	CS	1.9	lb ai/a	PRE	7.7	3.7	9.7	1.7	4.3	22.42
	Buctril	2	EC	0.125	lb ai/a	PRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.064	lb ai/a	PO1						
	Chateau SW	51	WDG	0.032	lb ai/a	PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						
8	Zidua	4.17	SC	0.133	lb ai/a	DPRE	10.0	4.0	9.7	2.3	3.0	25.86
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
9	Zidua	4.17	SC	0.267	lb ai/a	DPRE	9.7	4.3	10.0	3.3	2.3	21.83
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2,PO3						
10	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	9.7	2.7	9.3	1.3	6.3	36.93
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						
11	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	10.0	3.0	9.3	1.7	4.7	27.26
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Zidua	4.17	SC	0.133	lb ai/a	PO1,PO2						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO3						

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Preemergence Weed Control in Onion - Keilen - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code							LATH		LATH			
Crop Code								ONION		ONION	ONION	ONION
Rating Date							10Jun19	09Jul19	09Jul19	07Aug19	20Sep19	09Oct19
Rating Type							RATING	RATING	RATING	RATING	RATING	HARVEST
Rating Unit							1-10	1-10	1-10	1-10	1-10	KG/PLOT
12	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	10.0	2.3	9.3	1.3	7.3	35.77
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.267	lb ai/a	PO3						
13	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	9.7	2.7	9.3	1.3	5.3	33.50
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.032	lb ai/a	PO1,PO2						
	Zidua	4.17	SC	0.133	lb ai/a	PO3						
14	Prowl H20	3.8	CS	1.9	lb ai/a	DPRE	10.0	2.0	9.7	1.3	5.7	40.53
	Buctril	2	EC	0.125	lb ai/a	DPRE						
	Prowl H20	3.8	CS	1.9	lb ai/a	PO1,PO2						
	Chateau SW	51	WDG	0.064	lb ai/a	PO1						
	Chateau SW	51	WDG	0.032	lb ai/a	PO2						
	Outlook	6	EC	0.98	lb ai/a	PO3						
LSD P=.05							1.77	1.96	1.37	1.30	3.67	12.77
Standard Deviation							1.05	1.16	0.82	0.77	2.19	7.61
CV							14.85	42.92	9.36	46.29	37.46	23.3

Weed Control in Bell Pepper and Tomato – HTRC - 2019

Project Code: 101-19-1 **Location: East Lansing, MI**
Block: 78

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Bell Pepper, Tomato **Variety: Aristotle, Sunbrite**
Planting Method: Transplants **Planting Date: 5/22/19** **Harvest Date:**
Spacing: 22 in **Row Spacing: 3 ft: 1 row each crop/plot**
Tillage Type: **Study Design: RCB** **Replications: 3**
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.5%** **pH: 5.5**
Sand: 60% **Silt: 21%** **Clay: 19%** **CEC: 6.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRT	5/21/19	9:00 am	47/40	F	Wet	2-4 NE	75	95% Cloudy	Y
PO1 DIR	7/1/19	10:50 am	80/74	F	Dry	3-5 SW	63	30% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/17/19	YEFT = yellow foxtail			
6/17/19	COLQ = common lambsquarters			
6/17/19	EBNS = eastern black nightshade			
6/17/19	RRPW = red root pigweed			
6/25/19	BYGR = barnyard grass			
7/1/19	PEPPER	6-8″	Veg	Good
7/1/19	TOMATO	10-14″	Veg	Good
7/1/19	COGR = common groundsel	2-4″	Flower	Moderate
7/1/19	CORW = common ragweed	6-8″	Veg	Moderate
7/1/19	DAND = dandelion	1-3″	Veg	Few
7/1/19	COLQ = common lambsquarters	4-6″	Veg	Moderate
7/1/19	LATH = ladysthumb	2-5″	Veg	Moderate
7/1/19	RRPW = redroot pigweed	1-2″	Veg	Few

Notes and Comments
1. PRE spray applied with 4 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. PO1 DIR applied with 2 nozzle shielded boom.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Treatments 1-8, 10: apply Matrix 0.031 + Select Max 0.12 + NIS 0.25% POST 4-6 weeks after transplanting. DO NOT SPRAY rep 3 treatments 1-4 (303, 308, 305, 310) with the POST spray. Not sprayed because of wet conditions.
4. 7/17/19 sprayed Select Max on weedy plots/ guards.
5. 8/2/19 sprayed Select Max and COC to weedy plots.

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Weed Control in Bell Pepper and Tomato - HTRC - 2019

Trial ID: 101-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 101-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code									YEFT	COLQ	CORW
Crop Code							PEPPER	TOMATO			
Rating Date							17Jun19	17Jun19	17Jun19	17Jun19	17Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	2.7	1.0	9.3	10.0	2.0
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	3.3	1.7	10.0	10.0	10.0
	Tricor	75	DF	0.28	lb ai/a	PRT					
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	8.0	1.7	10.0	10.0	10.0
4	Preview	3.28	SC	0.41	lb ai/a	PRT	4.0	2.7	10.0	10.0	10.0
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	3.0	1.7	10.0	10.0	10.0
	Reflex	2	SL	0.125	lb ai/a	PRT					
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	2.3	3.0	10.0	10.0	10.0
	Command	3	ME	0.5	lb ai/a	PRT					
7	Spartan	4	F	0.25	lb ai/a	PRT	3.0	3.7	10.0	10.0	10.0
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT					
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	2.7	2.7	10.0	10.0	10.0
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.0	1.7	10.0	8.0	4.7
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR					
10	Untreated - Handweeded						1.0	1.0	1.0	1.0	1.0
LSD P=.05							1.03	1.13	0.63	0.94	2.61
Standard Deviation							0.60	0.66	0.37	0.55	1.52
CV							18.73	31.85	4.04	6.15	19.57

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage					
Pest Code							EBNS	LATH	RRPW		
Crop Code										PEPPER	TOMATO
Rating Date							17Jun19	17Jun19	17Jun19	18Jun19	18Jun19
Rating Type							RATING	RATING	RATING	COUNT	COUNT
Rating Unit							1-10	1-10	1-10	NO./PLOT	NO./PLOT
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	10.0	8.7	10.0	15.0	16.3
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	10.0	10.0	10.0	16.0	15.7
	Tricor	75	DF	0.28	lb ai/a	PRT					
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	10.0	10.0	10.0	3.3	16.7
4	Preview	3.28	SC	0.41	lb ai/a	PRT	10.0	10.0	10.0	12.0	16.3
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	10.0	9.7	10.0	15.7	16.7
	Reflex	2	SL	0.125	lb ai/a	PRT					
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	10.0	10.0	10.0	15.3	16.0
	Command	3	ME	0.5	lb ai/a	PRT					
7	Spartan	4	F	0.25	lb ai/a	PRT	10.0	10.0	10.0	16.0	16.7
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT					
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	10.0	10.0	10.0	17.3	16.0
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	10.0	8.3	10.0	16.3	16.0
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR					
10	Untreated - Handweeded						1.0	1.0	1.0	16.0	16.7
LSD P=.05							0.00	2.07	0.00	3.48	1.44
Standard Deviation							0.00	1.20	0.00	2.03	0.84
CV							0.0	13.74	0.0	14.17	5.15

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Weed Control in Bell Pepper and Tomato - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEPPER 25Jun19 RATING 1-10	TOMATO 25Jun19 RATING 1-10	BYGR 25Jun19 RATING 1-10	YEFT 25Jun19 RATING 1-10	COLQ 25Jun19 RATING 1-10
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	2.3	1.0	9.3	9.3	8.3
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	2.3	1.7	10.0	10.0	10.0
	Tricor	75	DF	0.28	lb ai/a	PRT					
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	8.7	2.0	10.0	10.0	10.0
4	Preview	3.28	SC	0.41	lb ai/a	PRT	5.3	3.0	9.7	9.7	10.0
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	2.7	2.0	10.0	10.0	10.0
	Reflex	2	SL	0.125	lb ai/a	PRT					
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	2.7	3.7	10.0	10.0	10.0
	Command	3	ME	0.5	lb ai/a	PRT					
7	Spartan	4	F	0.25	lb ai/a	PRT	4.3	3.7	10.0	10.0	10.0
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT					
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	3.3	2.7	10.0	10.0	10.0
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.3	1.7	9.7	10.0	7.0
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR					
10	Untreated - Handweeded						1.3	1.7	1.0	1.0	2.3
LSD P=.05							1.63	1.16	0.80	0.67	2.63
Standard Deviation							0.95	0.67	0.47	0.39	1.54
CV							26.85	29.35	5.21	4.33	17.52

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CORW 25Jun19 RATING 1-10	LATH 25Jun19 RATING 1-10	RRPW 25Jun19 RATING 1-10	COGR 25Jun19 RATING 1-10	PEPPER 09Jul19 RATING 1-10
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	2.3	7.3	9.7	4.7	1.0
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	9.3	10.0	10.0	10.0	2.3
	Tricor	75	DF	0.28	lb ai/a	PRT					
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	10.0	10.0	10.0	10.0	8.0
4	Preview	3.28	SC	0.41	lb ai/a	PRT	10.0	10.0	10.0	10.0	4.0
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	10.0	9.0	10.0	10.0	2.3
	Reflex	2	SL	0.125	lb ai/a	PRT					
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	9.3	10.0	10.0	10.0	2.0
	Command	3	ME	0.5	lb ai/a	PRT					
7	Spartan	4	F	0.25	lb ai/a	PRT	9.7	10.0	10.0	10.0	4.3
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT					
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	8.7	9.3	10.0	10.0	2.7
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	4.0	8.3	10.0	9.0	5.3
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR					
10	Untreated - Handweeded						7.0	4.7	4.7	6.7	1.3
LSD P=.05							4.06	3.46	2.57	2.94	2.17
Standard Deviation							2.37	2.02	1.50	1.71	1.26
CV							29.47	22.77	15.89	18.97	37.9

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Weed Control in Bell Pepper and Tomato - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Pest Code								YEFT	COGR	COLQ	CORW	LATH
Crop Code							TOMATO					
Rating Date							09Jul19	09Jul19	09Jul19	09Jul19	09Jul19	09Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	1.0	5.7	1.0	9.0	1.0	5.0
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	1.7	7.0	9.3	9.0	7.7	9.3
	Tricor	75	DF	0.28	lb ai/a	PRT						
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	2.3	10.0	10.0	10.0	9.3	10.0
4	Preview	3.28	SC	0.41	lb ai/a	PRT	2.7	4.7	10.0	10.0	9.3	9.0
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	2.0	9.7	10.0	9.3	9.7	6.7
	Reflex	2	SL	0.125	lb ai/a	PRT						
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	3.7	10.0	10.0	9.3	8.3	10.0
	Command	3	ME	0.5	lb ai/a	PRT						
7	Spartan	4	F	0.25	lb ai/a	PRT	4.0	10.0	10.0	10.0	9.0	9.7
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT						
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	1.7	6.7	10.0	10.0	6.7	7.0
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	3.0	10.0	10.0	8.0	7.3	9.0
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR						
10	Untreated - Handweeded						2.3	1.0	1.7	1.0	3.7	1.0
LSD P=.05							1.72	3.47	0.72	2.40	3.47	2.58
Standard Deviation							1.00	2.02	0.42	1.40	2.02	1.50
CV							41.25	27.12	5.09	16.34	28.11	19.62

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage				
Pest Code										
Crop Code							PEPPER	PEPPER	PEPPER	PEPPER
Rating Date							14Aug19	14Aug19	21Aug19	21Aug19
Rating Type							HARVEST	HARVEST	HARVEST	HARVEST
Rating Unit							NO./PLOT	KG/PLOT	NO./PLOT	KG/PLOT
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	1.3	0.28	3.0	0.53
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	7.3	2.30	12.3	2.63
	Tricor	75	DF	0.28	lb ai/a	PRT				
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	1.7	0.44	3.3	0.68
4	Preview	3.28	SC	0.41	lb ai/a	PRT	6.0	1.50	6.0	1.39
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	3.3	0.83	6.3	1.36
	Reflex	2	SL	0.125	lb ai/a	PRT				
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	10.0	2.62	10.7	2.37
	Command	3	ME	0.5	lb ai/a	PRT				
7	Spartan	4	F	0.25	lb ai/a	PRT	6.0	1.34	5.0	1.16
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT				
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	4.3	1.11	11.7	2.50
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	1.7	0.46	4.3	0.99
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR				
10	Untreated - Handweeded						5.3	1.08	3.3	0.74
LSD P=.05							7.80	1.76	6.84	1.50
Standard Deviation							4.55	1.03	3.99	0.88
CV							96.79	85.84	60.4	60.97

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Weed Control in Bell Pepper and Tomato - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEPPER 28Aug19 HARVEST NO./PLOT	PEPPER 28Aug19 HARVEST KG/PLOT	PEPPER 06Sep19 HARVEST NO./PLOT	PEPPER 06Sep19 HARVEST KG/PLOT	PEPPER 18Sep19 HARVEST NO./PLOT
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	5.3	1.01	14.0	2.30	15.0
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	23.0	4.29	18.7	3.53	14.7
	Tricor	75	DF	0.28	lb ai/a	PRT					
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	3.7	0.72	5.0	1.07	4.3
4	Preview	3.28	SC	0.41	lb ai/a	PRT	19.0	3.76	15.0	3.25	11.7
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	14.7	2.99	28.7	5.50	29.7
	Reflex	2	SL	0.125	lb ai/a	PRT					
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	28.0	5.35	29.3	6.18	24.0
	Command	3	ME	0.5	lb ai/a	PRT					
7	Spartan	4	F	0.25	lb ai/a	PRT	23.3	4.86	28.0	5.56	17.7
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT					
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	25.0	5.30	26.7	5.40	24.7
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	11.7	2.26	25.3	5.12	10.7
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR					
10	Untreated - Handweeded						10.3	2.09	15.3	3.09	12.3
LSD P=.05							16.51	3.29	13.68	3.17	9.51
Standard Deviation							9.63	1.92	7.97	1.85	5.55
CV							58.69	58.71	38.71	45.01	33.67

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEPPER 18Sep19 HARVEST KG/PLOT	PEPPER 04Oct19 HARVEST NO./PLOT	PEPPER 04Oct19 HARVEST KG/PLOT	PEPPER TOTAL NO./PLOT	PEPPER TOTAL KG/PLOT
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	2.87	16.0	3.27	54.7	10.26
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	2.98	26.0	5.55	102.0	21.28
	Tricor	75	DF	0.28	lb ai/a	PRT					
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	0.96	4.7	0.95	22.7	4.82
4	Preview	3.28	SC	0.41	lb ai/a	PRT	2.62	25.7	5.69	83.3	18.20
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	6.15	32.0	6.71	114.7	23.54
	Reflex	2	SL	0.125	lb ai/a	PRT					
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	5.04	20.7	4.83	122.7	26.40
	Command	3	ME	0.5	lb ai/a	PRT					
7	Spartan	4	F	0.25	lb ai/a	PRT	4.29	28.0	6.58	108.0	23.79
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT					
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	5.31	26.7	5.77	119.0	25.39
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	2.35	36.0	8.04	89.7	19.21
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR					
10	Untreated - Handweeded						2.66	17.3	3.61	64.0	13.27
LSD P=.05							1.98	14.87	3.00	39.17	9.52
Standard Deviation							1.15	8.67	1.75	22.83	5.55
CV							32.74	37.20	34.27	25.93	29.80

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Weed Control in Bell Pepper and Tomato - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	TOMATO 22Aug19 HARVEST NO./PLOT	TOMATO 22Aug19 HARVEST KG/PLOT	TOMATO 30Aug19 HARVEST KG/PLOT	TOMATO 05Sep19 HARVEST KG/PLOT	TOMATO 13Sep19 HARVEST KG/PLOT
	Pest Code										
	Crop Code										
	Rating Date										
	Rating Type										
	Rating Unit										
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	46.0	11.89	31.17	11.13	4.92
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	50.3	13.59	43.63	14.14	10.30
	Tricor	75	DF	0.28	lb ai/a	PRT					
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	33.3	8.80	29.13	22.28	20.57
4	Preview	3.28	SC	0.41	lb ai/a	PRT	29.0	7.63	18.84	14.82	17.61
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	61.3	16.03	31.06	13.83	12.01
	Reflex	2	SL	0.125	lb ai/a	PRT					
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	26.3	6.46	16.58	14.98	21.24
	Command	3	ME	0.5	lb ai/a	PRT					
7	Spartan	4	F	0.25	lb ai/a	PRT	22.3	5.34	10.95	9.88	25.08
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT					
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	37.3	8.68	20.85	9.97	13.18
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	51.0	13.70	12.51	9.70	16.44
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR					
10	Untreated - Handweeded						47.3	10.77	14.92	6.72	3.01
LSD P=.05							17.99	5.07	19.65	10.75	9.15
Standard Deviation							10.49	2.96	11.45	6.27	5.33
CV							25.94	28.74	49.88	49.17	36.94

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	TOMATO 20Sep19 HARVEST KG/PLOT	TOMATO 27Sep19 HARVEST KG/PLOT	TOMATO 04Oct19 HARVEST KG/PLOT	TOMATO TOTAL KG/PLOT
	Pest Code									
	Crop Code									
	Rating Date									
	Rating Type									
	Rating Unit									
1	Prowl H20	3.8	CS	1.4	lb ai/a	PRT	4.34	2.95	8.49	66.41
2	Satellite Flex	3.5	EC	0.98	lb ai/a	PRT	13.48	5.59	9.15	100.72
	Tricor	75	DF	0.28	lb ai/a	PRT				
3	Moccasin MTZ	4.466	EC	1.67	lb ai/a	PRT	32.86	12.54	10.48	126.19
4	Preview	3.28	SC	0.41	lb ai/a	PRT	24.28	9.28	11.46	92.46
5	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	13.86	10.12	11.21	96.90
	Reflex	2	SL	0.125	lb ai/a	PRT				
6	Dual Magnum	7.62	EC	0.95	lb ai/a	PRT	32.77	14.65	10.73	106.67
	Command	3	ME	0.5	lb ai/a	PRT				
7	Spartan	4	F	0.25	lb ai/a	PRT	32.01	22.77	16.03	106.03
	Prowl H20	3.8	CS	1.4	lb ai/a	PRT				
8	Authority MTZ	45	DF	0.338	lb ai/a	PRT	27.15	9.99	10.51	89.83
9	Dual Magnum	7.62	EC	1.3	lb ai/a	PRT	28.94	11.45	9.66	92.72
	Rely 280	2.34	L	0.58	lb ai/a	PO1 DIR				
10	Untreated - Handweeded						6.97	2.04	7.45	44.43
LSD P=.05							18.80	8.38	6.55	48.52
Standard Deviation							10.96	4.88	3.82	28.28
CV							50.57	48.16	36.31	30.66

Weed Control in Pumpkin & Squash – HTRC - 2019

Project Code: 108-19-1 **Location: East Lansing, MI**
Block: 117-118

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Pumpkin, Squash **Variety: Howden, Waltham Butternut, Golden Hubbard**
Planting Method: Seeded **Planting Date: 6/7/19** **Harvest Date:**
Spacing: 6 in **Row Spacing: 5 ft, 1 row each crop/plot**
Tillage Type: **Study Design: RCB** **Replications: 3**
Plot Size: 16 ft wide x 50 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.2%** **pH: 6.3**
Sand: 69% **Silt: 20%** **Clay: 11%** **CEC: 4.1**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/7/19	10:40 am	79/61	F	Dry	2-4 NE	53	2% Cloudy	N
PO1	7/25/19	1:56 pm	87/81	F	Dry	4-7 SE	33	25% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/25/19	YEFT = yellow foxtail			
6/25/19	CORW = common ragweed			
6/25/19	WIRA = wild radish			
7/24/19	BYGR = barnyard grass			
7/24/19	COLQ = common lambsquarters			
7/24/19	RRPW = redroot pigweed			
7/25/19	BTNT	10-12″	Runners	Variable
7/25/19	PUMP	12-15″	Runners	Variable
7/25/19	HOWDEN	8-12″	Runners	Few- Variable

Notes and Comments
1. Spray applied with tractor sprayer 8002, 20 gpa, 30 psi, 3.2 mph, CO2 sprayer. 16 foot band.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Plots on 30 foot centers.
4. The field had serious stand reduction from animal damage. Yield data not evaluated.

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Weed Control in Pumpkin & Squash - HTRC - 2019

Trial ID: 108-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 108-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BTNT	HOWD	GOHUB	YEFT	CORW	WIRA	BTNT
Pest Code													
Crop Code							BTNT	HOWD	GOHUB	YEFT	CORW	WIRA	BTNT
Rating Date							25Jun19	25Jun19	20Jun19	25Jun19	25Jun19	25Jun19	24Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							0-10	0-10	0-10	0-10	0-10	0-10	1-10
1	Curbit	3	EC	1.13	lb ai/a	PRE	0.0	0.0	0.0	10.0	9.3	7.7	2.3
	Command	3	ME	0.375	lb ai/a	PRE							
2	Strategy	2.1	SE	6	pt/a	PRE	0.0	0.0	0.0	10.0	8.7	8.3	2.7
3	Curbit	3	EC	1.13	lb ai/a	PRE	0.0	0.0	0.0	10.0	9.3	9.0	2.0
	Command	3	ME	0.375	lb ai/a	PRE							
	Reflex	2	SL	0.125	lb ai/a	PRE							
4	Dual Magnum	7.62	EC	0.126	lb ai/a	PRE	0.0	0.0	3.3	10.0	9.3	9.0	1.3
	Command	3	ME	0.375	lb ai/a	PRE							
	Reflex	2	SL	0.125	lb ai/a	PRE							
5	Curbit	3	EC	1.13	lb ai/a	PRE	0.0	0.0	0.0	10.0	4.7	7.3	2.0
	Dual Magnum	7.62	EC	1.26	lb ai/a	PRE							
6	Curbit	3	EC	1.13	lb ai/a	PRE	0.0	0.0	0.0	10.0	9.3	9.7	2.0
	Dual Magnum	7.62	EC	1.26	lb ai/a	PRE							
	Reflex	2	SL	0.125	lb ai/a	PRE							
7	Curbit	3	EC	1.13	lb ai/a	PRE	0.0	0.0	0.0	10.0	10.0	9.3	2.7
	Command	3	ME	0.375	lb ai/a	PRE							
	Sandea	75	WG	0.023	lb ai/a	PRE							
8	Curbit	3	EC	1.13	lb ai/a	PRE	0.0	0.0	0.0	10.0	9.7	7.0	1.7
	Command	3	ME	0.375	lb ai/a	PRE							
	Sandea	75	WG	0.023	lb ai/a	PO1							
	Select Max	.97	EC	0.12	lb ai/a	PO1							
9	Curbit	3	EC	1.13	lb ai/a	PRE	0.0	0.0	0.0	10.0	9.7	9.0	5.3
	Command	3	ME	0.375	lb ai/a	PRE							
	BIR	1.67	SL	0.045	lb ai/a	PRE							
10	Untreated					PRE	0.0	0.0	0.0	1.7	2.3	4.3	1.7
LSD P=.05							0.00	0.00	3.13	0.63	1.81	3.61	3.29
Standard Deviation							0.00	0.00	1.83	0.37	1.05	2.11	1.92
CV							0.0	0.0	547.72	3.98	12.78	26.12	81.15

Michigan State University

Weed Control in Pumpkin & Squash - HTRC - 2019

Trial ID: 108-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 108-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	HOWD	GOHUB	BYGR	COLQ	CORW	RRPW
	Pest Code								BYGR	COLQ	CORW	RRPW
	Crop Code						HOWD	GOHUB				
	Rating Date						24Jul19	24Jul19	24Jul19	24Jul19	24Jul19	24Jul19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Curbit	3	EC	1.13	lb ai/a	PRE	2.3	4.7	4.0	4.7	6.3	6.0
	Command	3	ME	0.375	lb ai/a	PRE						
2	Strategy	2.1	SE	6	pt/a	PRE	2.0	1.3	6.0	5.3	7.7	7.3
3	Curbit	3	EC	1.13	lb ai/a	PRE	2.0	2.7	6.0	6.0	9.0	9.3
	Command	3	ME	0.375	lb ai/a	PRE						
	Reflex	2	SL	0.125	lb ai/a	PRE						
4	Dual Magnum	7.62	EC	0.126	lb ai/a	PRE	1.3	4.0	1.7	4.3	9.3	8.3
	Command	3	ME	0.375	lb ai/a	PRE						
	Reflex	2	SL	0.125	lb ai/a	PRE						
5	Curbit	3	EC	1.13	lb ai/a	PRE	1.7	1.0	8.3	4.3	4.3	8.3
	Dual Magnum	7.62	EC	1.26	lb ai/a	PRE						
6	Curbit	3	EC	1.13	lb ai/a	PRE	1.7	4.7	7.0	4.7	9.3	8.3
	Dual Magnum	7.62	EC	1.26	lb ai/a	PRE						
	Reflex	2	SL	0.125	lb ai/a	PRE						
7	Curbit	3	EC	1.13	lb ai/a	PRE	3.0	3.3	6.3	7.0	9.3	9.7
	Command	3	ME	0.375	lb ai/a	PRE						
	Sandea	75	WG	0.023	lb ai/a	PRE						
8	Curbit	3	EC	1.13	lb ai/a	PRE	1.7	1.7	5.0	3.7	9.0	4.7
	Command	3	ME	0.375	lb ai/a	PRE						
	Sandea	75	WG	0.023	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
9	Curbit	3	EC	1.13	lb ai/a	PRE	3.7	5.3	6.0	7.0	7.0	7.0
	Command	3	ME	0.375	lb ai/a	PRE						
	BIR	1.67	SL	0.045	lb ai/a	PRE						
10	Untreated					PRE	2.0	4.0	3.3	4.3	6.3	7.0
LSD P=.05							2.76	5.79	5.17	7.16	4.93	5.29
Standard Deviation							1.61	3.38	3.01	4.17	2.87	3.08
CV							75.53	103.41	56.14	81.26	36.99	40.54

Project Code: 109-19-1 Location: East Lansing, MI
Block: 59

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Red Beet, Sugar Beet, Swiss Chard Variety: Ruby Queen, HIL9879NT, Silverado
Planting Method: Seeded Planting Date: 5/16/19 Harvest Date:
Spacing: Row Spacing:
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam OM: 2.2% pH: 6.7
Sand: 54% Silt: 28% Clay: 18% CEC: 9.9

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PPI	5/14/19	2:20 pm	66/52	F	Dry	5-7 SW	30	15% Cloudy	N
PRE	5/17/19	1:10 pm	66/61	F	Dry	1-3 SW	55	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/18/19	COLQ = common lambsquarters			
6/18/19	CORW = common ragweed			
6/18/19	EBNS = eastern black nightshade			
6/26/19	YEFT = yellow foxtail			
6/26/19	LATH = ladysthumb			
6/26/19	RRPW = redroot pigweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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. 5 IR4 beds sprayed with Dual Magnum 1.3 Pre.
4. Spray all plots POST with:
   Nortron 0.33 -> 7.807 ml
   Spin-Aid 0.488 -> 35.52
   Upbeet 0.0156 -> 0.3538 g
   Select Max 0.12 -> 11.71
   Stinger 0.094 lb -> 2.9
5. Plots 30 ft; bed spacing 8 ft.
6. Total area needed: 80 ft wide x 100 ft long.
7. 5/17/19 all guards sprayed with treatment 1.

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Weed Control in Red Beet, Sugar Beets, and Swiss Chard - HTRC - 2019

Trial ID: 109-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 109-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CHARD	SUBE	REBE	COLQ	CORW	EBNS	CHARD
Pest Code													
Crop Code							CHARD	SUBE	REBE				CHARD
Rating Date							18Jun19	18Jun19	18Jun19	18Jun19	18Jun19	18Jun19	26Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10	1-10
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRE	2.7	1.7	4.3	9.3	7.0	10.0	3.3
2	Outlook	6	EC	0.4	lb ai/a	PRE	2.0	1.7	4.0	9.3	9.3	10.0	3.3
3	Nortron	4	SC	1.5	lb ai/a	PRE	1.3	1.3	4.0	10.0	9.0	10.0	1.7
4	Ro-Neet	6	EC	4	lb ai/a	PPI	1.0	1.0	1.7	6.3	9.0	10.0	1.0
5	Untreated						1.0	1.0	1.3	1.0	5.7	1.0	1.3
LSD P=.05							1.14	0.91	1.82	1.46	2.87	0.00	1.85
Standard Deviation							0.61	0.48	0.97	0.77	1.52	0.00	0.98
CV							37.85	36.23	31.5	10.76	19.03	0.0	46.09

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SUBE	REBE	YEFT	COLQ	CORW	EBNS	LATH
Pest Code													
Crop Code							SUBE	REBE					
Rating Date							26Jun19	26Jun19	26Jun19	26Jun19	26Jun19	26Jun19	26Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10	1-10
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRE	2.7	4.0	10.0	7.7	5.3	10.0	10.0
2	Outlook	6	EC	0.4	lb ai/a	PRE	2.7	3.7	10.0	7.3	7.0	10.0	9.0
3	Nortron	4	SC	1.5	lb ai/a	PRE	1.0	3.7	10.0	9.0	5.0	10.0	10.0
4	Ro-Neet	6	EC	4	lb ai/a	PPI	1.0	2.7	10.0	5.0	7.0	9.0	8.0
5	Untreated						1.0	2.7	7.3	4.7	8.3	8.7	7.7
LSD P=.05							0.73	2.80	1.75	3.41	5.77	1.48	3.75
Standard Deviation							0.39	1.49	0.93	1.81	3.07	0.79	1.99
CV							23.24	44.67	9.83	26.91	46.93	8.24	22.29

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Weed Control in Red Beet, Sugar Beets, and Swiss Chard - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RRPW	CHARD	SUBE	REBE	CHARD
Pest Code											
Crop Code											
Rating Date							26Jun19	09Jul19	09Jul19	09Jul19	22Jul19
Rating Type							RATING	RATING	RATING	RATING	HARVEST
Rating Unit							1-10	1-10	1-10	1-10	KG/PLOT
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRE	9.7	2.3	1.7	3.3	6.98
2	Outlook	6	EC	0.4	lb ai/a	PRE	10.0	2.0	1.7	3.0	9.01
3	Nortron	4	SC	1.5	lb ai/a	PRE	10.0	1.7	1.3	2.7	10.48
4	Ro-Neet	6	EC	4	lb ai/a	PPI	7.7	1.0	1.0	1.7	12.66
5	Untreated						6.7	1.3	1.3	2.3	10.39
LSD P=.05							3.72	1.72	1.17	2.78	5.39
Standard Deviation							1.97	0.91	0.62	1.48	2.86
CV							22.44	54.77	44.22	56.83	28.92

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REBE	REBE	REBE	SUBE	SUBE
Pest Code											
Crop Code											
Rating Date							06Aug19	06Aug19	06Aug19	27Sep19	27Sep19
Rating Type							HRVT - tops	HRVT - root	HRVT - root	HARVEST	HARVEST
Rating Unit							KG/PLOT	NO./PLOT	KG/PLOT	KG/PLOT	NO/PLOT
1	Dual Magnum	7.62	EC	1.3	lb ai/a	PRE	4.28	68.3	9.16	59.76	190.76
2	Outlook	6	EC	0.4	lb ai/a	PRE	4.13	73.7	10.26	63.96	193.29
3	Nortron	4	SC	1.5	lb ai/a	PRE	3.92	77.7	9.17	63.20	225.87
4	Ro-Neet	6	EC	4	lb ai/a	PPI	3.87	82.0	9.67	65.01	233.68
5	Untreated						3.42	70.7	7.36	64.04	218.71
LSD P=.05							1.56	24.94	3.90	9.33	30.27
Standard Deviation							0.83	13.25	2.07	5.0	16.08
CV							21.14	17.79	22.70	7.84	7.57

Weed Control in Sweet Corn – HTRC - 2019

Project Code: 106-19-1 **Location: East Lansing, MI**
Block: 137

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: **Variety:**
Planting Method: Seeded **Planting Date:** **Harvest Date:**
Spacing: **Row Spacing:**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.4%** **pH: 7.0**
Sand: 62% **Silt: 21%** **Clay: 16%** **CEC: 6.9**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	6/8/18		/	F				% Cloudy	
PO1	7/10/18		/	F				% Cloudy	

Crop and Weed Information at Application

	Height or Diameter	Growth Stage	Density

Notes and Comments

1. Spray applied with 4 nozzle boom. FF11002, 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. Herbicides were applied to sweet corn in 2018. Vegetable crops were planted in 2019 to observe any carryover injury.
4. 2018 two hybrids in each plot Aspire LL and SV9010SA RR.
5. 2019 spacing 14″ between rows 3-4″ in row.
6. Stalks mowed and soil disked in whole field in fall 2018.
7. In 2019, work the soil and plant cucumber, red beet, mustard, squash, and peas across plots to test for carryover and rotation problems.
8. 5/17/19 planted two rows in each rep. From W: 2 pea, 2 mustard, 2 zucchini, 2 red beet, 2 cucumber
9. 5/17/19 Dual Magnum 1.3 lb sprayed on the whole plot.
10. Peas very poor stand so they were not harvested.

Michigan State University

Weed Control in Sweet Corn - HTRC - 2019

Trial ID: 106-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 106-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CUCU	MUSTARD	PEA	REBE	SQUASH SUMMER	SUBE
	Crop Code											
	Crop Name											
	Rating Date						11Jul19	11Jul19	11Jul19	11Jul19	11Jul19	11Jul19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Acuron	3.547	CS	2.58	lb ai/a	PRE	3.0	2.3	9.0	6.0	3.7	3.3
2	Zidua	85	WDG	0.21	lb ai/a	PRE	4.8	6.4	8.0	6.2	4.8	2.6
3	Lumax	3.948	L	1.23	lb ai/a	PRE	3.7	3.0	8.0	4.7	2.0	5.3
4	AAtrex	4	L	2	lb ai/a	PRE	4.3	5.7	8.3	5.7	4.7	3.3
5	Surpass	6.4	EC	2	lb ai/a	PRE	6.7	4.3	8.7	5.0	4.3	4.0
6	Outlook	6	EC	0.98	lb ai/a	PRE	4.7	3.7	10.0	4.7	5.0	2.0
7	Callisto	4	SC	0.24	lb ai/a	PRE	8.0	3.0	7.0	5.0	3.0	6.0
8	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	8.3	7.7	8.0	7.3	6.3	6.3
	Sandea	75	WG	0.047	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	6.7	5.0	5.3	6.7	3.7	4.0
10	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	9.3	2.3	5.7	7.0	4.0	5.7
	Shieldex 400 SC	3.33	SC	0.026	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
11	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	8.0	5.1	7.2	7.4	7.4	7.7
	Shieldex 400 SC	3.33	SC	0.035	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
12	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	3.3	6.0	5.7	5.0	3.7	5.0
	Impact	2.8	SC	0.022	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
13	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	6.0	6.3	9.3	5.7	4.0	4.3
	Laudis	3.5	SC	0.082	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
14	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	6.7	5.3	9.7	7.0	4.3	3.7
	Liberty 280	2.34	L	0.37	lb ai/a	PO1						
15	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	3.7	2.3	6.7	5.3	3.3	3.0
	Roundup PowerMax	5.5	L	0.95	lb ai/a	PO1						
16	Untreated						4.7	3.0	5.3	8.4	6.3	7.7
LSD P=.05							3.35	3.05	4.24	4.17	3.20	3.80
Standard Deviation							2.00	1.82	2.53	2.49	1.91	2.27
CV							34.8	40.73	33.26	41.03	43.33	49.06

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Weed Control in Sweet Corn - HTRC - 2019

Trial ID: 106-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 106-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CUCU	ZUCC	CUCU	CUCU	CUCU
	Crop Code						CUCU	ZUCC	CUCU	CUCU	CUCU
	Crop Name										
	Rating Date						22Jul19	22Jul19	26Jul19	26Jul19	02Aug19
	Rating Type						PLANT COUNT	PLANT COUNT	HARVEST	HARVEST	HARVEST
	Rating Unit						NO./PLOT	NO./PLOT	NO./PLOT	KG/PLOT	NO./PLOT
1	Acuron	3.547	CS	2.58	lb ai/a	PRE	8.3	6.7	6.0	1.07	5.0
2	Zidua	85	WDG	0.21	lb ai/a	PRE	10.0	8.3	8.3	1.11	6.7
3	Lumax	3.948	L	1.23	lb ai/a	PRE	9.0	7.0	8.7	1.37	3.7
4	AAtrex	4	L	2	lb ai/a	PRE	12.3	7.7	11.0	2.06	8.7
5	Surpass	6.4	EC	2	lb ai/a	PRE	7.7	6.7	6.0	0.95	3.3
6	Outlook	6	EC	0.98	lb ai/a	PRE	8.7	8.0	7.3	0.81	3.0
7	Callisto	4	SC	0.24	lb ai/a	PRE	7.3	9.0	6.7	0.80	2.0
8	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	7.7	8.0	5.3	0.55	2.7
	Sandea	75	WG	0.047	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
9	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	7.7	8.3	3.7	0.28	1.0
10	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	5.3	8.3	2.7	0.38	0.7
	Shieldex 400 SC	3.33	SC	0.026	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
11	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	9.3	5.3	3.3	0.44	2.0
	Shieldex 400 SC	3.33	SC	0.035	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
12	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	7.7	7.0	6.0	0.85	2.7
	Impact	2.8	SC	0.022	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
13	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	7.3	7.7	4.3	0.44	1.0
	Laudis	3.5	SC	0.082	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
14	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	6.0	6.0	2.3	0.24	2.7
	Liberty 280	2.34	L	0.37	lb ai/a	PO1					
15	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	6.0	8.3	4.7	0.71	5.0
	Roundup PowerMax	5.5	L	0.95	lb ai/a	PO1					
16	Untreated						5.7	6.3	6.3	0.87	1.3
LSD P=.05							3.82	3.09	6.88	1.11	3.96
Standard Deviation							2.29	1.85	4.13	0.67	2.37
CV							29.08	25.0	71.24	82.71	73.94

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Weed Control in Sweet Corn - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CUCU 02Aug19 HARVEST KG/PLOT	CUCU 09Aug19 HARVEST NO./PLOT	CUCU 09Aug19 HARVEST KG/PLOT	CUCU 16Aug19 HARVEST NO./PLOT	CUCU 16Aug19 HARVEST KG/PLOT
1	Acuron	3.547	CS	2.58	lb ai/a	PRE	0.33	5.0	0.39	2.0	0.59
2	Zidua	85	WDG	0.21	lb ai/a	PRE	0.36	4.0	0.39	3.0	0.45
3	Lumax	3.948	L	1.23	lb ai/a	PRE	0.25	4.3	0.33	1.3	0.26
4	AAtrex	4	L	2	lb ai/a	PRE	0.67	4.7	0.42	5.3	0.98
5	Surpass	6.4	EC	2	lb ai/a	PRE	0.20	2.0	0.13	3.0	0.47
6	Outlook	6	EC	0.98	lb ai/a	PRE	0.22	4.7	0.40	1.3	0.22
7	Callisto	4	SC	0.24	lb ai/a	PRE	0.13	4.0	0.27	2.0	0.25
8	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.25	1.7	0.14	1.7	0.26
	Sandea	75	WG	0.047	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
9	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.07	2.0	0.14	1.0	0.12
10	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.03	2.3	0.15	1.3	0.24
	Shieldex 400 SC	3.33	SC	0.026	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
11	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.26	3.0	0.20	0.7	0.08
	Shieldex 400 SC	3.33	SC	0.035	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
12	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.18	3.0	0.28	3.0	0.63
	Impact	2.8	SC	0.022	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
13	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.06	3.3	0.27	1.3	0.25
	Laudis	3.5	SC	0.082	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
14	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.19	1.3	0.10	0.7	0.09
	Liberty 280	2.34	L	0.37	lb ai/a	PO1					
15	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.43	3.7	0.27	2.3	0.39
	Roundup PowerMax	5.5	L	0.95	lb ai/a	PO1					
16	Untreated						0.10	1.7	0.17	1.0	0.32
LSD P=.05							0.33	3.44	0.32	2.13	0.51
Standard Deviation							0.20	2.07	0.19	1.28	0.30
CV							85.08	65.22	77.51	66.05	87.13

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	CUCU NO./PLOT 23Aug19 HARVEST	CUCU KG/PLOT 23Aug19 HARVEST	CUCU NO./PLOT 04Sep19 HARVEST	CUCU KG/PLOT 04Sep19 HARVEST	CUCU TOTAL KG HARVEST	MUSTARD KG/PLOT 22Jul19 HARVEST
1	Acuron	3.547	CS	2.58	lb ai/a	PRE	4.3	0.49	6.0	0.53	3.39	1.19
2	Zidua	85	WDG	0.21	lb ai/a	PRE	4.0	0.39	6.0	0.46	3.16	1.20
3	Lumax	3.948	L	1.23	lb ai/a	PRE	3.3	0.35	5.7	0.50	3.05	1.04
4	AAtrex	4	L	2	lb ai/a	PRE	5.0	0.46	8.3	0.87	5.45	1.10
5	Surpass	6.4	EC	2	lb ai/a	PRE	3.7	0.27	4.7	0.29	2.31	1.40
6	Outlook	6	EC	0.98	lb ai/a	PRE	1.0	0.11	4.3	0.23	1.98	1.90
7	Callisto	4	SC	0.24	lb ai/a	PRE	1.3	0.07	3.0	0.26	1.77	1.27
8	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	3.0	0.16	4.0	0.30	1.65	0.54
	Sandea	75	WG	0.047	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.3	0.03	4.3	0.37	1.01	0.85
10	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.7	0.09	2.7	0.17	1.06	1.25
	Shieldex 400 SC	3.33	SC	0.026	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
11	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	1.0	0.12	5.3	0.22	1.31	1.33
	Shieldex 400 SC	3.33	SC	0.035	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
12	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	3.0	0.31	3.0	0.19	2.44	1.09
	Impact	2.8	SC	0.022	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
13	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	1.0	0.07	3.0	0.27	1.35	0.74
	Laudis	3.5	SC	0.082	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
14	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	1.0	0.07	1.3	0.15	0.85	0.96
	Liberty 280	2.34	L	0.37	lb ai/a	PO1						
15	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	2.0	0.21	3.3	0.40	2.40	1.51
	Roundup PowerMax	5.5	L	0.95	lb ai/a	PO1						
16	Untreated						3.0	0.22	1.7	0.06	1.73	0.88
LSD P=.05							2.65	0.27	3.70	0.42	2.21	0.79
Standard Deviation							1.59	0.16	2.22	0.25	1.32	0.47
CV							67.54	75.23	53.33	76.09	60.66	41.35

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REBE 04Sep19 HARVEST NO./PLOT	REBE 04Sep19 HARVEST KG/PLOT	SUBE 18Sep19 HARVEST NO./PLOT	SUBE 18Sep19 HARVEST KG/PLOT	ZUCC 26Jul19 HARVEST NO./PLOT
1	Acuron	3.547	CS	2.58	lb ai/a	PRE	7.7	1.27	19.7	5.61	4.0
2	Zidua	85	WDG	0.21	lb ai/a	PRE	8.3	0.74	22.3	5.91	1.3
3	Lumax	3.948	L	1.23	lb ai/a	PRE	5.0	0.34	14.7	4.07	2.3
4	AAtrex	4	L	2	lb ai/a	PRE	7.7	0.82	24.0	7.12	3.0
5	Surpass	6.4	EC	2	lb ai/a	PRE	9.3	0.55	21.7	5.25	2.3
6	Outlook	6	EC	0.98	lb ai/a	PRE	11.7	1.27	28.3	7.28	2.3
7	Callisto	4	SC	0.24	lb ai/a	PRE	7.0	0.66	17.0	5.66	4.0
8	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	4.3	0.51	14.3	4.44	2.3
	Sandea	75	WG	0.047	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
9	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	6.0	0.54	15.7	2.74	1.7
10	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	3.0	0.28	19.0	4.76	2.7
	Shieldex 400 SC	3.33	SC	0.026	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
11	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	7.7	1.62	13.3	3.31	1.7
	Shieldex 400 SC	3.33	SC	0.035	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
12	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	7.7	0.71	17.7	3.95	1.7
	Impact	2.8	SC	0.022	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
13	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	6.3	0.67	26.7	6.16	3.0
	Laudis	3.5	SC	0.082	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	N Pak (AMS)	100	L	2.5	% v/v	PO1					
14	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	4.3	0.32	24.3	6.76	2.3
	Liberty 280	2.34	L	0.37	lb ai/a	PO1					
15	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	5.3	0.51	25.3	6.99	4.3
	Roundup PowerMax	5.5	L	0.95	lb ai/a	PO1					
16	Untreated						4.0	0.18	17.3	4.83	3.7
LSD P=.05							5.82	1.12	14.97	5.41	3.60
Standard Deviation							3.49	0.67	8.98	3.24	2.16
CV							53.02	97.88	44.7	61.18	81.0

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage						
Crop Code							ZUCC	ZUCC	ZUCC	ZUCC	ZUCC	ZUCC
Crop Name												
Rating Date							26Jul19	02Aug19	02Aug19	09Aug19	09Aug19	16Aug19
Rating Type							HARVEST	HARVEST	HARVEST	HARVEST	HARVEST	HARVEST
Rating Unit							KG/PLOT	NO./PLOT	KG/PLOT	NO./PLOT	KG/PLOT	NO./PLOT
1	Acuron	3.547	CS	2.58	lb ai/a	PRE	3.37	2.7	1.12	3.0	0.77	3.0
2	Zidua	85	WDG	0.21	lb ai/a	PRE	0.34	3.7	0.85	2.3	0.68	2.7
3	Lumax	3.948	L	1.23	lb ai/a	PRE	0.50	3.0	1.65	2.3	0.61	3.0
4	AAtrex	4	L	2	lb ai/a	PRE	0.71	3.3	1.24	2.0	0.76	3.0
5	Surpass	6.4	EC	2	lb ai/a	PRE	0.45	2.7	1.18	1.7	0.27	3.0
6	Outlook	6	EC	0.98	lb ai/a	PRE	0.62	3.7	1.30	3.7	1.11	2.7
7	Callisto	4	SC	0.24	lb ai/a	PRE	0.87	3.7	1.31	2.3	0.84	5.3
8	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.30	2.3	0.82	1.0	0.33	3.3
	Sandea	75	WG	0.047	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.45	2.0	0.59	2.7	0.71	1.7
10	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.36	2.0	0.62	2.3	1.10	1.7
	Shieldex 400 SC	3.33	SC	0.026	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
11	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.34	1.7	0.56	3.3	1.32	1.7
	Shieldex 400 SC	3.33	SC	0.035	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
12	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.61	2.0	1.03	3.7	1.28	2.0
	Impact	2.8	SC	0.022	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
13	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.87	2.7	1.00	3.0	1.07	2.7
	Laudis	3.5	SC	0.082	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
14	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.84	2.3	0.86	2.7	1.64	1.7
	Liberty 280	2.34	L	0.37	lb ai/a	PO1						
15	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.92	3.3	1.31	2.3	1.39	3.0
	Roundup PowerMax	5.5	L	0.95	lb ai/a	PO1						
16	Untreated						1.13	2.7	1.41	3.0	1.14	3.7
LSD P=.05							2.20	2.29	1.09	2.49	1.11	2.77
Standard Deviation							1.32	1.38	0.66	1.49	0.66	1.66
CV							166.61	50.43	62.34	57.76	70.68	60.32

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ZUCC 16Aug19 HARVEST KG/PLOT	ZUCC 23Aug19 HARVEST NO./PLOT	ZUCC 23Aug19 HARVEST KG/PLOT	ZUCC 04Sep19 HARVEST NO./PLOT	ZUCC 04Sep19 HARVEST KG/PLOT	ZUCC HARVEST TOTAL KG
1	Acuron	3.547	CS	2.58	lb ai/a	PRE	3.10	2.7	0.97	5.3	2.43	11.76
2	Zidua	85	WDG	0.21	lb ai/a	PRE	2.02	2.0	0.47	4.3	1.73	6.09
3	Lumax	3.948	L	1.23	lb ai/a	PRE	3.05	1.0	0.41	7.3	2.39	8.59
4	AAtrex	4	L	2	lb ai/a	PRE	1.92	1.7	0.49	3.3	0.78	5.91
5	Surpass	6.4	EC	2	lb ai/a	PRE	3.11	1.0	0.28	3.0	0.96	6.25
6	Outlook	6	EC	0.98	lb ai/a	PRE	1.99	1.7	0.48	3.0	1.17	6.67
7	Callisto	4	SC	0.24	lb ai/a	PRE	5.12	1.3	0.38	5.3	2.01	10.52
8	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	2.23	2.0	0.73	2.7	1.09	5.49
	Sandea	75	WG	0.047	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	0.72	2.0	0.42	1.0	0.32	3.19
10	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	1.47	2.3	1.03	1.7	0.79	5.37
	Shieldex 400 SC	3.33	SC	0.026	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
11	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	1.43	2.7	0.91	2.7	2.06	6.63
	Shieldex 400 SC	3.33	SC	0.035	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
12	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	1.33	3.3	1.55	3.3	1.31	7.10
	Impact	2.8	SC	0.022	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
13	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	2.63	1.3	0.58	2.7	1.26	7.40
	Laudis	3.5	SC	0.082	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
	N Pak (AMS)	100	L	2.5	% v/v	PO1						
14	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	1.63	2.3	0.97	3.7	1.82	7.76
	Liberty 280	2.34	L	0.37	lb ai/a	PO1						
15	Dual Magnum	7.62	EC	0.95	lb ai/a	PRE	2.86	1.7	0.91	2.7	1.22	8.62
	Roundup PowerMax	5.5	L	0.95	lb ai/a	PO1						
16	Untreated						2.68	2.7	1.06	3.3	1.28	8.69
LSD P=.05							3.28	1.99	0.84	2.85	1.66	6.53
Standard Deviation							1.97	1.19	0.51	1.71	1.00	3.92
CV							84.45	60.26	69.65	49.42	70.71	54.03

Weed Control in Apple – CRC - 2019

Project Code: 128-19-1 **Location: Clarksville, MI**
Tier 2

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Apple **Variety: Red Delicious, Gala, Fuji**
Planting Method: Transplant **Planting Date: 2003-2007**
Spacing: 4-6 ft **Row Spacing: 15 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 11 ft wide x 50 ft long

Soil Type: Lapeer Sandy Loam **OM: 2.3%** **pH: 6.1**
Sand: 39% **Silt: 40%** **Clay: 21%** **CEC: 5.3**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/8/19	1:00 pm	60/54	F	Damp	6-10 SW	53	50% Cloudy	N
PO1	5/28/19	1:15 pm	67/65	F	Damp	1-3 NE	70	100% Cloudy	Y

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/8/19	APPLE	10-12′	Pre Bud	Good
4/8/19	QUGR = quackgrass	3-4″	Veg	Moderate
4/8/19	COCW = common chickweed	1-2″	Flower	Many
4/8/19	REFE = red fescue	2-3″	Veg	Many
5/24/19	HOWE = horseweed			
5/28/19	APPLE	10′	Post Bloom	Good
5/28/19	BLDO = broadleaf dock	6-16″	Veg	Moderate
5/28/19	COCW = common chickweed	4-6″	Flower + Seed	Many
5/28/19	DAND = dandelion	6-12″	Post Flower	Many
5/28/19	DOBG = downy bromegrass	18-24″	Seed	Many
5/28/19	PUDN = purple deadnettle	6-10″	Flower	Moderate
5/28/19	RECL = red clover	6-10″	Veg	Moderate
5/28/19	REFE = red fescue	6-10″	Flower	Moderate
5/28/19	WHCL = white clover	4-6″	Veg	Many
6/21/19	COGR = common groundsel			
7/22/19	BHPL = buckhorn plantain			
7/22/19	BYGR = barnyard grass			
7/22/19	COLQ = common lambsquarters			
7/22/19	PRKW = prostrate knotweed			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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. Nonionic surfactant used: Preference (Winfield Solutions)
4. 4/8/19 Plots 108, 109, 209, 309 no trees.

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Weed Control in Apple - CRC - 2019

Trial ID: 128-19-1 Location: Clarksville, MI Trial Year: 2019
Protocol ID: 128-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE 24May19 RATING 1-10	COCW 24May19 RATING 1-10	DAND 24May19 RATING 1-10	DOBG 24May19 RATING 1-10	HOWE 24May19 RATING 1-10	RECL 24May19 RATING 1-10
1	Untreated						1.0	1.0	2.3	1.0	3.3	1.0
2	Princep	90	WDG	4	lb ai/a	PRE	1.0	8.3	7.0	9.3	7.7	9.7
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
3	Princep	90	WDG	4	lb ai/a	PRE	0.7	8.3	4.3	8.0	8.7	8.7
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
4	Princep	90	WDG	4	lb ai/a	PRE	1.0	8.7	6.3	8.3	9.3	8.0
	Alion 200	1.67	SC	0.065	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
5	Princep	90	WDG	4	lb ai/a	PRE	1.0	9.7	3.7	8.3	7.0	9.7
	Matrix	25	DF	0.063	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
6	Shutdown	4.16	L	0.26	lb ai/a	PO1	1.0	1.0	3.3	1.7	4.7	1.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
7	Shutdown	4.16	L	0.26	lb ai/a	PO1	1.0	1.0	5.0	4.0	4.0	3.3
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Karmex	80	DF	2	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
8	Shutdown	4.16	L	0.26	lb ai/a	PO1	0.7	1.0	2.3	4.0	4.0	1.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Sinbar	80	WDG	1.2	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
9	Shutdown	4.16	L	0.26	lb ai/a	PO1	0.7	1.0	3.7	4.3	5.0	1.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Alion 200	1.67	SC	0.065	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
10	Prowl H20	3.8	CS	3.8	lb ai/a	PRE	1.0	8.7	3.0	7.0	5.7	1.7
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
11	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	1.0	6.3	5.3	7.7	10.0	7.3
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
12	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	1.0	8.3	6.0	6.7	10.0	8.3
	Karmex	80	DF	2	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						

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Weed Control in Apple - CRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE 24May19 RATING 1-10	COCW 24May19 RATING 1-10	DAND 24May19 RATING 1-10	DOBG 24May19 RATING 1-10	HOWE 24May19 RATING 1-10	RECL 24May19 RATING 1-10
13	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	1.0	9.0	9.0	8.7	9.3	9.0
	Solida	25	WDG	0.031	lb ai/a	PRE						
	Aim	2	EC	0.031	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
14	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	1.0	6.0	3.3	6.0	7.0	7.0
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE						
	Aim	2	EC	0.031	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
	Solida	25	WDG	0.031	lb ai/a	PO1						
	Aim	2	EC	0.031	lb ai/a	PO1						
	Poast	1.53	EC	0.28	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
15	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	1.0	10.0	7.7	8.7	10.0	9.3
	Karmex	80	DF	2	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
LSD P=.05							0.43	2.18	3.95	5.38	5.69	3.69
Standard Deviation							0.26	1.30	2.37	3.22	3.40	2.21
CV							27.66	22.1	49.05	51.53	48.3	38.52

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Weed Control in Apple - CRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REFE	WHCL	APPLE	COGR	DAND
	Pest Code						REFE	WHCL		COGR	DAND
	Crop Code								APPLE		
	Rating Date						24May19	24May19	21Jun19	21Jun19	21Jun19
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
1	Untreated						3.3	1.0	1.0	7.7	1.7
2	Princep	90	WDG	4	lb ai/a	PRE	9.0	9.0	1.0	10.0	7.3
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
3	Princep	90	WDG	4	lb ai/a	PRE	9.0	9.0	1.0	10.0	8.3
	Gramoxone SL	3	SL	1	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Princep	90	WDG	4	lb ai/a	PRE	9.0	8.7	1.0	10.0	9.3
	Alion 200	1.67	SC	0.065	lb ai/a	PO1					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
5	Princep	90	WDG	4	lb ai/a	PRE	6.3	7.3	1.0	10.0	10.0
	Matrix	25	DF	0.063	lb ai/a	PO1					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
6	Shutdown	4.16	L	0.26	lb ai/a	PO1	5.7	1.0	1.0	10.0	7.0
	Interline	2.34	L	0.88	lb ai/a	PO1					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1					
7	Shutdown	4.16	L	0.26	lb ai/a	PO1	8.3	5.7	1.0	10.0	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1					
	Karmex	80	DF	2	lb ai/a	PO1					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1					
8	Shutdown	4.16	L	0.26	lb ai/a	PO1	6.3	3.3	1.0	10.0	9.3
	Interline	2.34	L	0.88	lb ai/a	PO1					
	Sinbar	80	WDG	1.2	lb ai/a	PO1					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1					
9	Shutdown	4.16	L	0.26	lb ai/a	PO1	7.7	1.3	1.0	10.0	9.3
	Interline	2.34	L	0.88	lb ai/a	PO1					
	Alion 200	1.67	SC	0.065	lb ai/a	PO1					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1					
10	Prowl H20	3.8	CS	3.8	lb ai/a	PRE	9.3	1.0	1.0	6.7	1.0
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
11	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	9.0	7.0	1.0	10.0	1.0
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
12	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	9.7	7.3	1.0	10.0	1.7
	Karmex	80	DF	2	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REFE	WHCL	APPLE	COGR	DAND
Pest Code							REFE	WHCL		COGR	DAND
Crop Code									APPLE		
Rating Date							24May19	24May19	21Jun19	21Jun19	21Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
13	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	9.7	8.3	1.0	10.0	6.3
	Solida	25	WDG	0.031	lb ai/a	PRE					
	Aim	2	EC	0.031	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
14	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	7.0	4.3	1.0	10.0	9.7
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE					
	Aim	2	EC	0.031	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
	Solida	25	WDG	0.031	lb ai/a	PO1					
	Aim	2	EC	0.031	lb ai/a	PO1					
	Poast	1.53	EC	0.28	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
15	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	10.0	8.3	1.0	10.0	2.7
	Karmex	80	DF	2	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
LSD P=.05							3.78	3.67	0.00	2.66	2.47
Standard Deviation							2.26	2.19	0.00	1.59	1.48
CV							28.41	39.79	0.0	16.51	23.44

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Weed Control in Apple - CRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REFE	WHCL		BYGR	REFE	BHPL
	Pest Code						REFE	WHCL		BYGR	REFE	BHPL
	Crop Code								APPLE			
	Rating Date						21Jun19	21Jun19	22Jul19	22Jul19	22Jul19	22Jul19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated						1.7	1.0	1.0	1.0	4.0	4.0
2	Princep	90	WDG	4	lb ai/a	PRE	10.0	10.0	1.0	1.0	10.0	6.0
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
3	Princep	90	WDG	4	lb ai/a	PRE	10.0	10.0	1.0	1.7	10.0	9.3
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
4	Princep	90	WDG	4	lb ai/a	PRE	10.0	10.0	1.0	9.7	10.0	10.0
	Alion 200	1.67	SC	0.065	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
5	Princep	90	WDG	4	lb ai/a	PRE	10.0	10.0	1.0	9.7	10.0	9.0
	Matrix	25	DF	0.063	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
6	Shutdown	4.16	L	0.26	lb ai/a	PO1	6.0	8.7	1.0	8.3	2.3	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
7	Shutdown	4.16	L	0.26	lb ai/a	PO1	9.0	10.0	1.0	6.3	7.3	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Karmex	80	DF	2	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
8	Shutdown	4.16	L	0.26	lb ai/a	PO1	9.3	10.0	1.0	7.7	10.0	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Sinbar	80	WDG	1.2	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
9	Shutdown	4.16	L	0.26	lb ai/a	PO1	9.7	10.0	1.0	8.3	9.0	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Alion 200	1.67	SC	0.065	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
10	Prowl H20	3.8	CS	3.8	lb ai/a	PRE	3.7	1.0	1.3	8.0	4.7	7.7
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
11	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	6.7	2.0	1.0	10.0	8.3	7.0
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
12	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	9.0	7.0	1.0	9.0	9.7	8.7
	Karmex	80	DF	2	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	REFE	WHCL	APPLE	BYGR	REFE	BHPL
Pest Code							REFE	WHCL		BYGR	REFE	BHPL
Crop Code									APPLE			
Rating Date							21Jun19	21Jun19	22Jul19	22Jul19	22Jul19	22Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
13	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	8.0	6.0	1.0	7.0	9.3	9.0
	Solida	25	WDG	0.031	lb ai/a	PRE						
	Aim	2	EC	0.031	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
14	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	10.0	9.3	1.0	8.3	10.0	9.0
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE						
	Aim	2	EC	0.031	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
	Solida	25	WDG	0.031	lb ai/a	PO1						
	Aim	2	EC	0.031	lb ai/a	PO1						
	Poast	1.53	EC	0.28	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
15	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	8.7	9.3	1.0	8.3	10.0	8.7
	Karmex	80	DF	2	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
LSD P=.05							2.64	1.97	0.27	3.03	2.80	4.69
Standard Deviation							1.58	1.18	0.16	1.81	1.67	2.81
CV							19.49	15.49	15.69	26.02	20.13	32.79

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Weed Control in Apple - CRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COLQ	DAND	HOWE	PRKW
Pest Code							COLQ	DAND	HOWE	PRKW
Crop Code										
Rating Date							22Jul19	22Jul19	22Jul19	22Jul19
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	Untreated						7.0	1.0	7.0	4.0
2	Princep	90	WDG	4	lb ai/a	PRE	7.0	1.3	9.0	9.3
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
3	Princep	90	WDG	4	lb ai/a	PRE	8.3	1.0	7.3	10.0
	Gramoxone SL	3	SL	1	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
4	Princep	90	WDG	4	lb ai/a	PRE	9.3	7.3	10.0	10.0
	Alion 200	1.67	SC	0.065	lb ai/a	PO1				
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
5	Princep	90	WDG	4	lb ai/a	PRE	10.0	9.7	6.0	10.0
	Matrix	25	DF	0.063	lb ai/a	PO1				
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1				
	NIS	100	SL	0.25	% v/v	PO1				
6	Shutdown	4.16	L	0.26	lb ai/a	PO1	9.3	1.0	9.7	8.7
	Interline	2.34	L	0.88	lb ai/a	PO1				
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1				
7	Shutdown	4.16	L	0.26	lb ai/a	PO1	10.0	5.7	10.0	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1				
	Karmex	80	DF	2	lb ai/a	PO1				
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1				
8	Shutdown	4.16	L	0.26	lb ai/a	PO1	10.0	5.3	10.0	9.3
	Interline	2.34	L	0.88	lb ai/a	PO1				
	Sinbar	80	WDG	1.2	lb ai/a	PO1				
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1				
9	Shutdown	4.16	L	0.26	lb ai/a	PO1	10.0	6.3	9.3	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1				
	Alion 200	1.67	SC	0.065	lb ai/a	PO1				
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1				
10	Prowl H20	3.8	CS	3.8	lb ai/a	PRE	10.0	1.0	6.7	10.0
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE				
	NIS	100	SL	0.25	% v/v	PRE				
11	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	10.0	1.0	8.0	10.0
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE				
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE				
	NIS	100	SL	0.25	% v/v	PRE				
12	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	10.0	1.0	10.0	10.0
	Karmex	80	DF	2	lb ai/a	PRE				
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE				
	NIS	100	SL	0.25	% v/v	PRE				

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COLQ	DAND	HOWE	PRKW
	Pest Code						COLQ	DAND	HOWE	PRKW
	Crop Code									
	Rating Date						22Jul19	22Jul19	22Jul19	22Jul19
	Rating Type						RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10
13	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	10.0	5.3	6.7	10.0
	Solida	25	WDG	0.031	lb ai/a	PRE				
	Aim	2	EC	0.031	lb ai/a	PRE				
	NIS	100	SL	0.25	% v/v	PRE				
14	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	10.0	5.3	7.0	10.0
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE				
	Aim	2	EC	0.031	lb ai/a	PRE				
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE				
	NIS	100	SL	0.25	% v/v	PRE				
	Solida	25	WDG	0.031	lb ai/a	PO1				
	Aim	2	EC	0.031	lb ai/a	PO1				
	Poast	1.53	EC	0.28	lb ai/a	PO1				
	COC	100	SL	1	% v/v	PO1				
15	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	10.0	2.0	10.0	10.0
	Karmex	80	DF	2	lb ai/a	PRE				
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE				
	NIS	100	SL	0.25	% v/v	PRE				
LSD P=.05							3.04	3.29	4.11	2.59
Standard Deviation							1.82	1.96	2.46	1.55
CV							19.31	54.24	29.13	16.45

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Weed Control in Apple - CRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCL	APPLE	BYGR	COLQ	DAND	HOWE
Pest Code							WHCL		BYGR	COLQ	DAND	HOWE
Crop Code								APPLE				
Rating Date							22Jul19	14Aug19	14Aug19	14Aug19	14Aug19	14Aug19
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	1.7	2.7	7.0	1.7	6.7
2	Princep	90	WDG	4	lb ai/a	PRE	10.0	1.0	2.7	6.7	1.3	6.3
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
3	Princep	90	WDG	4	lb ai/a	PRE	9.3	1.0	2.3	5.7	1.3	7.3
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
4	Princep	90	WDG	4	lb ai/a	PRE	10.0	1.0	9.3	9.0	7.7	10.0
	Alion 200	1.67	SC	0.065	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
5	Princep	90	WDG	4	lb ai/a	PRE	10.0	1.0	6.7	7.7	9.0	6.7
	Matrix	25	DF	0.063	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
6	Shutdown	4.16	L	0.26	lb ai/a	PO1	8.7	1.7	9.0	10.0	1.0	8.3
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
7	Shutdown	4.16	L	0.26	lb ai/a	PO1	10.0	1.3	5.3	10.0	5.3	10.0
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Karmex	80	DF	2	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
8	Shutdown	4.16	L	0.26	lb ai/a	PO1	10.0	2.0	6.7	10.0	5.0	9.7
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Sinbar	80	WDG	1.2	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
9	Shutdown	4.16	L	0.26	lb ai/a	PO1	9.3	1.5	8.7	10.0	7.3	8.7
	Interline	2.34	L	0.88	lb ai/a	PO1						
	Alion 200	1.67	SC	0.065	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
10	Prowl H20	3.8	CS	3.8	lb ai/a	PRE	1.0	1.7	5.7	10.0	1.0	6.7
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
11	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	3.0	1.0	9.7	10.0	1.0	7.7
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
12	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	8.3	1.0	8.7	10.0	1.3	8.3
	Karmex	80	DF	2	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						

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Weed Control in Apple - CRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCL	APPLE	BYGR	COLQ	DAND	HOWE
Pest Code							WHCL		BYGR	COLQ	DAND	HOWE
Crop Code								APPLE				
Rating Date							22Jul19	14Aug19	14Aug19	14Aug19	14Aug19	14Aug19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
13	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	5.7	1.0	6.7	10.0	4.0	7.3
	Solida	25	WDG	0.031	lb ai/a	PRE						
	Aim	2	EC	0.031	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
14	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	5.3	1.0	7.7	10.0	3.0	6.3
	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE						
	Aim	2	EC	0.031	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
	Solida	25	WDG	0.031	lb ai/a	PO1						
	Aim	2	EC	0.031	lb ai/a	PO1						
	Poast	1.53	EC	0.28	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
15	Prowl H20	3.8	CS	2.85	lb ai/a	PRE	9.3	1.0	8.7	9.3	3.0	9.0
	Karmex	80	DF	2	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
LSD P=.05							2.61	1.13	4.41	4.11	3.00	4.12
Standard Deviation							1.56	0.67	2.64	2.46	1.80	2.47
CV							21.1	53.17	39.4	27.26	50.82	31.08

Weed control in Apple - HTRC- 2019

Project Code: 128-19-2 Location: East Lansing, MI
Block: 154-160

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Apple Variety: Spartan, Auvil Early Fiji, Pacific Gala, Honeycrisp, LuckyJon
Planting Method: Transplant Planting Date: 2006 Harvest Date:
Spacing: 12 ft; 3 trees/plot Row Spacing: 18 ft
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 11 ft wide x 60 ft long

Soil Type: Marlette Fine Sandy Loam OM: 2.2% pH: 7.0
Sand: 46% Silt: 29% Clay: 25% CEC: 9.9

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/4/19	9:50 am	36/39	F	Wet	3-5 SE	64	95% Cloudy	N
PO1	7/3/19	1:15 pm	85/78	F	Moist	2-4 NW	60	90% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/4/19	APPLE	10-12′	Dormant	Few missing, cut trunks
4/4/19	No weeds present			
5/29/19	ANBG = annual bluegrass			
5/29/19	YERO = yellow rocket			
6/12/19	PRKW = prostrate knotweed			
6/12/19	QUGR = quackgrass			
7/3/19	APPLE	10-15′	1-2″ Fruit	Good - Variable
7/3/19	BHPL = buckhorn plantain	6-18″	Flower	Moderate
7/3/19	COGR = common groundsel	6-12″	Flower	Few
7/3/19	CORW = common ragweed	6-18″	Veg	Moderate
7/3/19	CUDO = curly dock	6-18″	Flower	Moderate
7/3/19	DAND = dandelion	6-18″	Flower	Many
7/3/19	HOWE = horseweed	12-36″	Veg	Many
7/3/19	LATH = ladysthumb	6-24″	Flower	Moderate
7/3/19	RECL = red clover	6-24″	Flower	Moderate
7/3/19	SHPU = sheperdspurse	12-18″	Seed	Moderate
7/3/19	WICA = wild carrot	6-24″	Flower	Many
7/3/19	YENS = yellow nutsedge	6-10″	Veg	Many
7/11/19	YEFT = yellow foxtail			
8/6/19	PEST = perennial sowthistle			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. 1 pass on each side of row.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.

Michigan State University

Weed Control in Apple - HTRC - 2019

Trial ID: 128-19-2 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 128-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE	ANBG	CORW	DAND	HOWE	LATH
	Pest Code											
	Crop Code						APPLE					
	Rating Date						29May19	29May19	29May19	29May19	29May19	29May19
	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	4.0	3.7	7.0	3.3	6.3
2	Treevix	70	WG	0.044	lb ai/a	PRE	1.0	7.3	10.0	9.0	10.0	10.0
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	MSO	100	SL	1	% v/v	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
3	Alion 200	1.67	SC	0.026	lb ai/a	PRE	1.0	10.0	10.0	9.3	10.0	10.0
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
4	Zidua	85	WDG	0.133	lb ai/a	PRE	1.3	10.0	10.0	10.0	9.7	10.0
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
5	Alion 200	1.67	SC	0.026	lb ai/a	PRE	1.0	9.3	10.0	10.0	7.7	9.3
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
6	Alion 200	1.67	SC	0.026	lb ai/a	PRE	1.0	10.0	10.0	9.7	8.7	10.0
	Prowl H20	3.8	CS	2.15	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
7	Alion 200	1.67	SC	0.017	lb ai/a	PRE	1.0	10.0	10.0	10.0	6.0	10.0
	Prowl H20	3.8	CS	3.8	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
8	Alion 200	1.67	SC	0.026	lb ai/a	PRE	1.0	10.0	10.0	10.0	9.0	10.0
	Matrix	25	DF	0.031	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
9	Zidua	85	WDG	0.267	lb ai/a	PRE	2.3	10.0	10.0	9.3	6.3	10.0
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3	lb ai/a	PO1						
10	Karmex	80	DF	3	lb ai/a	PRE	1.0	9.3	10.0	9.7	7.7	10.0
	Homeplate	100	L	4	% v/v	PO1						
11	Karmex	80	DF	3	lb ai/a	PRE	1.7	10.0	10.0	10.0	8.0	10.0
	Homeplate	100	L	8	% v/v	PO1						
12	Karmex	80	DF	3	lb ai/a	PRE	1.0	10.0	10.0	10.0	8.7	10.0
	Homeplate	100	L	1	% v/v	PO1						
	Rely 280	2.34	L	0.58	lb ai/a	PO1						
13	Karmex	80	DF	3	lb ai/a	PRE	1.3	10.0	10.0	10.0	10.0	10.0
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	Treevix	70	WG	0.044	lb ai/a	PO1						
	MSO	100	SL	1	% v/v	PO1						
14	Karmex	80	DF	3	lb ai/a	PRE	1.0	10.0	10.0	10.0	9.7	10.0
	Starane Ultra	2.8	L	0.49	lb ai/a	PO1						
LSD P=.05							0.52	3.06	1.37	2.46	4.28	2.19
Standard Deviation							0.31	1.82	0.82	1.47	2.55	1.31
CV							25.92	19.6	8.55	15.31	31.13	13.49

Michigan State University

Weed Control in Apple - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA	YERO	APPLE	QUGR	CORW	CUDO
Pest Code												
Crop Code									APPLE			
Rating Date							29May19	29May19	12Jun19	12Jun19	12Jun19	12Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated						4.0	3.3	1.0	4.0	1.7	5.7
2	Treevix	70	WG	0.044	lb ai/a	PRE	8.3	10.0	1.0	9.0	10.0	7.0
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	MSO	100	SL	1	% v/v	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
3	Alion 200	1.67	SC	0.026	lb ai/a	PRE	9.3	7.0	1.0	10.0	9.7	6.0
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
4	Zidua	85	WDG	0.133	lb ai/a	PRE	9.7	10.0	1.0	10.0	10.0	7.0
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
5	Alion 200	1.67	SC	0.026	lb ai/a	PRE	8.3	9.3	1.0	9.7	10.0	7.7
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
6	Alion 200	1.67	SC	0.026	lb ai/a	PRE	8.7	9.3	1.0	9.7	10.0	7.3
	Prowl H20	3.8	CS	2.15	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
7	Alion 200	1.67	SC	0.017	lb ai/a	PRE	8.0	9.3	1.3	9.0	7.7	10.0
	Prowl H20	3.8	CS	3.8	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
8	Alion 200	1.67	SC	0.026	lb ai/a	PRE	9.3	10.0	1.0	10.0	10.0	8.7
	Matrix	25	DF	0.031	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
9	Zidua	85	WDG	0.267	lb ai/a	PRE	9.0	9.3	1.0	10.0	10.0	7.7
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3	lb ai/a	PO1						
10	Karmex	80	DF	3	lb ai/a	PRE	6.3	10.0	1.0	9.7	10.0	10.0
	Homeplate	100	L	4	% v/v	PO1						
11	Karmex	80	DF	3	lb ai/a	PRE	8.0	10.0	1.3	10.0	10.0	10.0
	Homeplate	100	L	8	% v/v	PO1						
12	Karmex	80	DF	3	lb ai/a	PRE	8.0	10.0	1.0	10.0	10.0	9.3
	Homeplate	100	L	1	% v/v	PO1						
	Rely 280	2.34	L	0.58	lb ai/a	PO1						
13	Karmex	80	DF	3	lb ai/a	PRE	8.7	10.0	1.0	10.0	10.0	9.7
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	Treevix	70	WG	0.044	lb ai/a	PO1						
	MSO	100	SL	1	% v/v	PO1						
14	Karmex	80	DF	3	lb ai/a	PRE	7.3	10.0	1.0	10.0	10.0	10.0
	Starane Ultra	2.8	L	0.49	lb ai/a	PO1						
LSD P=.05							3.65	3.21	0.40	2.53	1.89	4.40
Standard Deviation							2.18	1.91	0.24	1.51	1.13	2.62
CV							26.95	20.96	22.47	16.1	12.23	31.66

Michigan State University

Weed Control in Apple - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	DAND	HOWE	PRKW	WICA	YERO	APPLE
Pest Code												
Crop Code												
Rating Date							12Jun19	12Jun19	12Jun19	12Jun19	12Jun19	11Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated						3.3	1.0	3.7	1.0	1.0	1.0
2	Treevix	70	WG	0.044	lb ai/a	PRE	7.7	10.0	9.3	5.7	10.0	1.0
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	MSO	100	SL	1	% v/v	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
3	Alion 200	1.67	SC	0.026	lb ai/a	PRE	7.7	10.0	7.0	7.0	7.0	1.0
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
4	Zidua	85	WDG	0.133	lb ai/a	PRE	10.0	9.3	9.7	9.0	9.7	1.7
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
5	Alion 200	1.67	SC	0.026	lb ai/a	PRE	10.0	6.0	8.0	3.3	8.7	1.1
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
6	Alion 200	1.67	SC	0.026	lb ai/a	PRE	10.0	8.0	10.0	4.7	7.0	1.0
	Prowl H20	3.8	CS	2.15	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
7	Alion 200	1.67	SC	0.017	lb ai/a	PRE	10.0	4.7	7.7	3.7	9.3	1.0
	Prowl H20	3.8	CS	3.8	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
8	Alion 200	1.67	SC	0.026	lb ai/a	PRE	9.3	8.3	9.0	9.3	10.0	1.7
	Matrix	25	DF	0.031	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
9	Zidua	85	WDG	0.267	lb ai/a	PRE	8.7	5.0	6.3	7.3	9.3	1.1
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3	lb ai/a	PO1						
10	Karmex	80	DF	3	lb ai/a	PRE	9.3	5.7	10.0	4.0	10.0	1.0
	Homeplate	100	L	4	% v/v	PO1						
11	Karmex	80	DF	3	lb ai/a	PRE	10.0	6.7	9.3	4.7	10.0	1.0
	Homeplate	100	L	8	% v/v	PO1						
12	Karmex	80	DF	3	lb ai/a	PRE	10.0	8.0	10.0	6.0	10.0	1.0
	Homeplate	100	L	1	% v/v	PO1						
	Rely 280	2.34	L	0.58	lb ai/a	PO1						
13	Karmex	80	DF	3	lb ai/a	PRE	10.0	10.0	10.0	7.3	10.0	1.3
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	Treevix	70	WG	0.044	lb ai/a	PO1						
	MSO	100	SL	1	% v/v	PO1						
14	Karmex	80	DF	3	lb ai/a	PRE	10.0	9.0	10.0	5.3	10.0	1.0
	Starane Ultra	2.8	L	0.49	lb ai/a	PO1						
LSD P=.05							2.89	5.07	3.79	4.03	3.63	0.74
Standard Deviation							1.72	3.02	2.26	2.40	2.16	0.44
CV							19.12	41.55	26.34	42.88	24.82	38.49

Weed control in Apple - HTRC- 2019

Michigan State University

Weed Control in Apple - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	YEFT	CORW	CUDO	HOWE	WICA	APPLE
Pest Code												
Crop Code												
Rating Date							11Jul19	11Jul19	11Jul19	11Jul19	11Jul19	06Aug19
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	1.0	3.7	1.0	1.0	1.0
2	Treevix	70	WG	0.044	lb ai/a	PRE	4.0	10.0	7.0	9.3	3.3	2.0
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	MSO	100	SL	1	% v/v	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
3	Alion 200	1.67	SC	0.026	lb ai/a	PRE	10.0	7.7	4.0	9.3	2.0	1.0
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
4	Zidua	85	WDG	0.133	lb ai/a	PRE	10.0	9.0	5.7	8.3	6.7	1.3
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
5	Alion 200	1.67	SC	0.026	lb ai/a	PRE	9.3	10.0	7.3	5.3	1.7	1.1
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
6	Alion 200	1.67	SC	0.026	lb ai/a	PRE	10.0	7.7	6.7	6.0	1.7	2.3
	Prowl H20	3.8	CS	2.15	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
7	Alion 200	1.67	SC	0.017	lb ai/a	PRE	10.0	7.0	9.0	6.0	1.0	1.0
	Prowl H20	3.8	CS	3.8	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
8	Alion 200	1.67	SC	0.026	lb ai/a	PRE	8.7	10.0	7.0	8.3	7.7	2.0
	Matrix	25	DF	0.031	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
9	Zidua	85	WDG	0.267	lb ai/a	PRE	10.0	10.0	9.0	8.7	9.0	1.1
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3	lb ai/a	PO1						
10	Karmex	80	DF	3	lb ai/a	PRE	7.7	9.7	9.7	5.3	5.3	1.3
	Homeplate	100	L	4	% v/v	PO1						
11	Karmex	80	DF	3	lb ai/a	PRE	7.7	10.0	9.7	5.3	3.3	1.0
	Homeplate	100	L	8	% v/v	PO1						
12	Karmex	80	DF	3	lb ai/a	PRE	10.0	10.0	10.0	9.3	7.3	1.3
	Homeplate	100	L	1	% v/v	PO1						
	Rely 280	2.34	L	0.58	lb ai/a	PO1						
13	Karmex	80	DF	3	lb ai/a	PRE	10.0	10.0	10.0	10.0	6.3	2.0
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	Treevix	70	WG	0.044	lb ai/a	PO1						
	MSO	100	SL	1	% v/v	PO1						
14	Karmex	80	DF	3	lb ai/a	PRE	9.0	10.0	10.0	9.0	5.3	1.0
	Starane Ultra	2.8	L	0.49	lb ai/a	PO1						
LSD P=.05							2.43	3.69	4.36	4.83	3.03	1.10
Standard Deviation							1.45	2.20	2.60	2.88	1.81	0.65
CV							17.29	25.22	33.49	39.79	41.03	46.67

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Weed Control in Apple - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	YEFT	CORW	HOWE	PEST	PRKW	WICA
	Pest Code											
	Crop Code											
	Rating Date						06Aug19	06Aug19	06Aug19	06Aug19	06Aug19	06Aug19
	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	1.0	1.0	7.8	10.0	1.7
2	Treevix	70	WG	0.044	lb ai/a	PRE	3.0	9.3	10.0	9.0	8.3	3.0
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	MSO	100	SL	1	% v/v	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
3	Alion 200	1.67	SC	0.026	lb ai/a	PRE	8.3	7.7	10.0	5.3	4.7	1.0
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
4	Zidua	85	WDG	0.133	lb ai/a	PRE	8.7	9.3	8.3	8.3	8.0	5.7
	Alion 200	1.67	SC	0.026	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
5	Alion 200	1.67	SC	0.026	lb ai/a	PRE	9.0	10.0	5.7	10.0	7.7	2.0
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
6	Alion 200	1.67	SC	0.026	lb ai/a	PRE	10.0	10.0	6.3	9.3	10.0	1.0
	Prowl H20	3.8	CS	2.15	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
7	Alion 200	1.67	SC	0.017	lb ai/a	PRE	9.0	8.7	6.0	10.0	7.0	1.0
	Prowl H20	3.8	CS	3.8	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
8	Alion 200	1.67	SC	0.026	lb ai/a	PRE	6.0	10.0	7.7	10.0	3.0	5.3
	Matrix	25	DF	0.031	lb ai/a	PRE						
	Rely 280	2.34	L	0.88	lb ai/a	PRE						
	Ammonium Sulfate	100	SG	3	lb ai/a	PRE						
9	Zidua	85	WDG	0.267	lb ai/a	PRE	7.0	10.0	8.0	10.0	10.0	10.0
	Roundup PowerMax	5.5	L	1.4	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3	lb ai/a	PO1						
10	Karmex	80	DF	3	lb ai/a	PRE	3.3	10.0	5.3	10.0	9.0	4.0
	Homeplate	100	L	4	% v/v	PO1						
11	Karmex	80	DF	3	lb ai/a	PRE	6.7	10.0	6.7	10.0	9.3	3.0
	Homeplate	100	L	8	% v/v	PO1						
12	Karmex	80	DF	3	lb ai/a	PRE	8.3	10.0	9.3	10.0	9.3	6.7
	Homeplate	100	L	1	% v/v	PO1						
	Rely 280	2.34	L	0.58	lb ai/a	PO1						
13	Karmex	80	DF	3	lb ai/a	PRE	10.0	9.3	10.0	10.0	10.0	6.0
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	Treevix	70	WG	0.044	lb ai/a	PO1						
	MSO	100	SL	1	% v/v	PO1						
14	Karmex	80	DF	3	lb ai/a	PRE	8.0	10.0	10.0	10.0	10.0	4.0
	Starane Ultra	2.8	L	0.49	lb ai/a	PO1						
LSD P=.05							4.13	2.35	4.86	2.18	4.45	3.71
Standard Deviation							2.46	1.40	2.90	1.29	2.65	2.21
CV							35.07	15.64	38.86	13.95	31.9	56.96

Postemergence Weed Control in Apple – HTRC - 2019

Project Code: 128-19-3 Location: East Lansing, MI
Block: 77

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Apple Variety: Golden Delicious, Jonagold
Planting Method: Planting Date: Harvest Date:
Spacing: Row Spacing:
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 11 ft wide x 50 ft long

Soil Type: Capac Loam OM: 2.8% pH: 7.4
Sand: 52% Silt: 23% Clay: 25% CEC: 15.1

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PO1	6/17/19	3:15 pm	69/67	F	Moist	2-4 E	71	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
6/17/19	APPLE	10-12’	<1” Early Fruit	
7/3/19	DOBG = downy bromegrass			
7/3/19	BHPL = buckhorn plantain			
7/3/19	BLME = black medic			
7/3/19	COLQ = common lambsquarters			
7/3/19	HOWE = horseweed			
7/3/19	PEST = perennial sowthistle			
7/3/19	WHCL = white clover			
7/3/19	WICA = wild carrot			
7/19/19	YEFT = yellow foxtail			
7/19/19	BLME = black medic			
7/19/19	COGR = common groundsel			
7/19/19	COLQ = common lambsquarters			
7/19/19	PEST = perennial sowthistle			
7/19/19	RECL = red clover			
7/19/19	WHCL = white clover			
7/19/19	WICA = wild carrot			
8/26/19	BLME = black medic			
8/26/19	COGR = common groundsel			
8/26/19	WHCL = white clover			
8/26/19	WICA = wild carrot			

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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. PO1 = post fruit set; ± May 1-15.
4. Added Select to trt 01 and 02, 24 ml/gal, 0.12 lbai/A.

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Postemergence Weed Control in Apple - HTRC - 2019

Trial ID: 128-19-3 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 128-19-3 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE	BHPL	BLME	COLQ	DOBG	HOWE
Pest Code								BHPL	BLME	COLQ	DOBG	HOWE
Crop Code							APPLE					
Rating Date							03Jul19	03Jul19	03Jul19	03Jul19	03Jul19	03Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Embed	3.8	L	0.95	lb ai/a	PO1	1.0	8.7	10.0	10.0	7.0	4.6
2	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	1.0	7.0	10.0	9.7	7.0	5.3
3	Embed	3.8	L	0.95	lb ai/a	PO1	1.0	6.7	6.7	9.7	10.0	10.0
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
4	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	1.0	9.0	7.0	10.0	10.0	7.7
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
5	Embed	3.8	L	0.95	lb ai/a	PO1	1.0	10.0	8.7	10.0	10.0	9.3
	Durango	5.4	L	1	lb ai/a	PO1						
6	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	1.0	10.0	9.3	10.0	10.0	7.0
	Durango	5.4	L	1	lb ai/a	PO1						
7	Untreated						1.0	1.0	1.0	1.1	1.0	1.0
LSD P=.05							0.00	3.54	3.17	0.56	5.13	2.34
Standard Deviation							0.00	1.99	1.76	0.31	2.78	1.30
CV							0.0	26.62	23.43	3.55	35.35	20.28

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEST	WHCL	WICA	APPLE	YEFT	BLME
Pest Code							PEST	WHCL	WICA		YEFT	BLME
Crop Code										APPLE		
Rating Date							03Jul19	03Jul19	03Jul19	19Jul19	19Jul19	19Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Embed	3.8	L	0.95	lb ai/a	PO1	8.0	5.0	4.3	1.0	10.0	7.7
2	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	6.3	4.3	3.7	1.7	9.3	8.3
3	Embed	3.8	L	0.95	lb ai/a	PO1	10.0	3.0	8.3	1.0	7.0	8.0
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
4	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	8.0	3.7	8.0	2.3	4.0	4.7
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
5	Embed	3.8	L	0.95	lb ai/a	PO1	8.0	8.0	8.3	2.0	9.3	6.0
	Durango	5.4	L	1	lb ai/a	PO1						
6	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	7.3	8.0	7.3	2.3	8.3	7.7
	Durango	5.4	L	1	lb ai/a	PO1						
7	Untreated						1.0	1.0	1.0	2.0	3.0	1.0
LSD P=.05							4.01	2.01	2.75	1.39	3.17	3.70
Standard Deviation							2.25	1.13	1.55	0.78	1.78	2.08
CV							32.42	23.98	26.43	44.37	24.42	33.63

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Postemergence Weed Control in Apple - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COGR	COLQ	PEST	RECL	WHCL	WICA
	Pest Code						COGR	COLQ	PEST	RECL	WHCL	WICA
	Crop Code											
	Rating Date						19Jul19	19Jul19	19Jul19	19Jul19	19Jul19	19Jul19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Embed	3.8	L	0.95	lb ai/a	PO1	10.0	10.0	9.7	7.7	3.3	1.7
2	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	9.0	10.0	10.0	10.0	5.0	3.7
3	Embed	3.8	L	0.95	lb ai/a	PO1	3.7	10.0	6.7	8.7	3.7	8.3
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
4	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	2.3	8.7	9.7	6.7	6.7	7.3
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
5	Embed	3.8	L	0.95	lb ai/a	PO1	5.7	10.0	8.3	10.0	8.3	7.7
	Durango	5.4	L	1	lb ai/a	PO1						
6	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	5.7	10.0	8.7	10.0	9.0	7.0
	Durango	5.4	L	1	lb ai/a	PO1						
7	Untreated						10.0	4.7	3.3	1.0	1.0	1.0
LSD P=.05							3.56	3.76	4.22	2.81	2.32	3.28
Standard Deviation							2.00	2.11	2.37	1.58	1.30	1.84
CV							30.22	23.34	29.5	20.5	24.66	35.14

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	APPLE	BLME	COGR	WHCL	WICA
	Pest Code							BLME	COGR	WHCL	WICA
	Crop Code						APPLE				
	Rating Date						26Aug19	26Aug19	26Aug19	26Aug19	26Aug19
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
1	Embed	3.8	L	0.95	lb ai/a	PO1	1.3	10.0	10.0	4.0	1.0
2	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	1.3	9.3	8.7	6.7	3.3
3	Embed	3.8	L	0.95	lb ai/a	PO1	1.3	4.7	2.7	3.7	8.0
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
4	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	2.0	5.0	3.3	8.7	6.7
	Gramoxone 2SL	2	SL	0.75	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
5	Embed	3.8	L	0.95	lb ai/a	PO1	1.3	7.0	5.7	8.7	3.7
	Durango	5.4	L	1	lb ai/a	PO1					
6	2,4-D (Weedar 64)	3.8	L	0.95	lb ai/a	PO1	2.0	7.3	4.7	8.3	3.3
	Durango	5.4	L	1	lb ai/a	PO1					
7	Untreated						1.0	1.0	9.3	1.0	1.0
LSD P=.05							0.82	3.85	2.87	4.22	4.65
Standard Deviation							0.46	2.16	1.62	2.37	2.62
CV							31.36	34.17	25.51	40.53	67.81

Weed Control in Blueberry – SWMREC - 2019

Project Code: 127-19-1 **Location: Benton Harbor, MI**

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Blueberry **Variety: Bluecrop**
Planting Method: Transplant **Planting Date: 1990** **Harvest Date:**
Spacing: 4 ft in row **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Spinks Loam Fine Sand **OM: 2.4%** **pH: 4.0**
Sand: 78% **Silt: 13%** **Clay: 9%** **CEC: 12.3**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/24/19	10:00 am	50/47	F	Damp	3-4 SE	44	0% Cloudy	Y
PO1	6/11/19	11:00 am	75/60	F	Damp	3-4 SW	36	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/24/19	BLBE = blueberry	4-5 ft	Green tip	Good
4/24/19	QUGR = quackgrass	4-10″	Foliar	Moderate
4/24/19	BHPL = buckhorn plantain	3-4″	Veg	Many
4/24/19	CUDO = curly dock	3-4″	Veg	Moderate
4/24/19	DAND = dandelion	3-4″	Flower	Moderate
4/24/19	HAVE = hairy vetch	3-4″	Veg	Moderate
4/24/19	PUDN = purple deadnettle	3-5″	Flower	Moderate
4/24/19	REFE = red fescue	3-5″	Foliar	Many
4/24/19	WHCL = white clover	1-2″	Veg	Many
6/11/19	BLBE = blueberry	4-5 ft	Green fruit	Good
6/11/19	QUGR = quackgrass	6-10″	Veg	Moderate
6/11/19	WHCL = white clover	4-6″	Flower	Moderate
6/11/19	PAAS = panicled aster	6-12″	Veg	Many
6/11/19	YEHW = yellow hawkweed	6-12″	Flower	Moderate
7/16/19	WIDRASP = wild raspberry			

Notes and Comments
1. Spray applied with 2 nozzle boom; 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. 6/11/19 plot 307 has PO1V. Sprayed with T. 9 R U.

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Weed Control in Blueberry - SWMREC - 2019

Trial ID: 127-19-1 Location: Benton Harbor, MI Trial Year: 2019
Protocol ID: 127-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BLBE 11Jun19 RATING 1-10	QUGR 11Jun19 RATING 1-10	PAAS 11Jun19 RATING 1-10	WHCL 11Jun19 RATING 1-10	YEHW 11Jun19 RATING 1-10	BLBE 16Jul19 RATING 1-10
1	Untreated						1.0	1.7	1.0	1.0	4.0	1.7
2	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	1.0	7.3	5.0	8.7	8.7	1.7
	Surflan	4	L	4	lb ai/a	PRE						
	Callisto	4	SC	0.187	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
3	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	1.3	7.0	4.0	8.0	8.7	1.7
	Surflan	4	L	4	lb ai/a	PRE						
	Karmex	80	DF	1.28	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
4	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	1.0	9.0	7.3	4.0	4.0	1.7
	Surflan	4	L	2	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
5	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	2.3	8.3	4.3	9.0	7.0	2.3
	Karmex	80	DF	1.28	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
6	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	2.3	9.3	8.0	8.3	9.7	2.0
	Solida	25	WDG	0.031	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE						
	NIS	100	SL	0.25	% v/v	PRE						
	Stinger	3	L	0.125	lb ai/a	PO1						
	Poast	1.53	EC	0.28	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
7	Chateau SW	51	WDG	0.255	lb ai/a	PRE	1.3	9.0	4.3	7.3	9.0	1.3
	Surflan	4	L	4	lb ai/a	PRE						
	Callisto	4	SC	0.156	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE,PO1						
	NIS	100	SL	0.25	% v/v	PRE,PO1						
8	Alion 200	1.67	SC	0.065	lb ai/a	PRE	1.0	6.3	9.3	10.0	10.0	1.0
	Rely 280	2.34	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
9	Chateau SW	51	WDG	0.383	lb ai/a	PRE	1.0	10.0	7.0	8.3	9.3	1.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
10	Sinbar	80	WDG	1.2	lb ai/a	PRE	1.0	7.7	9.3	10.0	9.7	1.3
	Quinstar	3.8	L	0.375	lb ai/a	PRE,PO1						
	COC	100	SL	1	% v/v	PRE,PO1						
11	Trellis SC	4.17	SC	1	lb ai/a	PRE	1.0	8.3	5.7	9.3	10.0	1.7
	Surflan	4	L	4	lb ai/a	PRE						
	Rely 280	2.34	L	1	lb ai/a	PRE,PO1						
LSD P=.05							0.95	3.28	4.29	3.47	4.27	1.47
Standard Deviation							0.56	1.93	2.52	2.04	2.51	0.86
CV							42.88	25.24	42.43	26.7	30.66	54.79

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Weed Control in Blueberry - SWMREC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRASS	PAAS	HAVE	WIDRASP	YEHW
Pest Code							GRASS	PAAS	HAVE	WIDRASP	YEHW
Crop Code											
Rating Date							16Jul19	16Jul19	16Jul19	16Jul19	16Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Untreated						3.3	3.3	7.0	1.0	4.0
2	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	4.7	6.3	9.0	2.0	4.0
	Surflan	4	L	4	lb ai/a	PRE					
	Callisto	4	SC	0.187	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
3	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	5.3	4.7	7.7	1.0	3.3
	Surflan	4	L	4	lb ai/a	PRE					
	Karmex	80	DF	1.28	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
4	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	5.7	7.0	8.0	10.0	1.0
	Surflan	4	L	2	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
5	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	5.0	7.0	8.3	2.5	4.7
	Karmex	80	DF	1.28	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
6	Zeus Prime XC	3.5	EC	0.328	lb ai/a	PRE	3.0	9.3	9.3	2.0	6.7
	Solida	25	WDG	0.031	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE					
	NIS	100	SL	0.25	% v/v	PRE					
	Stinger	3	L	0.125	lb ai/a	PO1					
	Poast	1.53	EC	0.28	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
7	Chateau SW	51	WDG	0.255	lb ai/a	PRE	6.7	7.3	10.0	7.0	9.3
	Surflan	4	L	4	lb ai/a	PRE					
	Callisto	4	SC	0.156	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.6	lb ai/a	PRE,PO1					
	NIS	100	SL	0.25	% v/v	PRE,PO1					
8	Alion 200	1.67	SC	0.065	lb ai/a	PRE	4.7	8.7	10.0	3.0	9.3
	Rely 280	2.34	L	1	lb ai/a	PRE					
	Quinstar	3.8	L	0.375	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
9	Chateau SW	51	WDG	0.383	lb ai/a	PRE	8.3	8.7	10.0	7.0	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
10	Sinbar	80	WDG	1.2	lb ai/a	PRE	6.7	9.0	10.0	2.0	6.7
	Quinstar	3.8	L	0.375	lb ai/a	PRE,PO1					
	COC	100	SL	1	% v/v	PRE,PO1					
11	Trellis SC	4.17	SC	1	lb ai/a	PRE	5.0	10.0	10.0	5.0	9.3
	Surflan	4	L	4	lb ai/a	PRE					
	Rely 280	2.34	L	1	lb ai/a	PRE,PO1					
LSD P=.05							5.96	4.01	3.19	5.94	5.74
Standard Deviation							3.50	2.36	1.87	2.62	3.37
CV							65.96	31.86	20.71	67.81	55.01

Weed Control in Concord Grape – HTRC - 2019

Project Code: 132-19-1 **Location: East Lansing, MI**
Block: 37

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Grape **Variety: Concord**
Planting Method: Seedling **Planting Date: 1967** **Harvest Date:**
Spacing: 7 ft; 4 vines/plot **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Capac Loam **OM: 3.7%** **pH: 7.4**
Sand: 52% **Silt: 28%** **Clay: 21%** **CEC: 13.5**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/22/19	9:00 am	61/49	F	Moist	5-7 SE	53	80% Cloudy	N
PO1	7/1/19	9:15 am	76/70	F	Dry	4-6 SW	65	5% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/22/19	GRAPE		Early bud set/ some dormant	
4/22/19	QUGR = quackgrass	2-3″	Veg	
4/22/19	WICA = wild carrot	3-4″ dia.	Veg	Many
5/29/19	REFE = red fescue			
5/29/19	CAGE = Carolina			
5/29/19	COMA = common mallow			
7/1/19	GRAPE	5-6′	Fruit set	Good
7/1/19	GRASS	8-10″	Veg	Moderate
7/1/19	FIBW = field bindweed	6-8″	Flower	Many
7/1/19	CATH = Canada thistle	2-4′	Flower	Many
7/1/19	DAND = dandelion	10″ dia.	Flower	Moderate
7/1/19	SFGE = small flower geranium	4-6″	Veg	Some
7/1/19	GORO = goldenrod	1-1.5′	Veg	Moderate
7/1/19	HOWE = horseweed	8-15″	Veg	Many
7/1/19	PEST = perennial sowthistle	3-4′	Flower	Moderate

Notes and Comments
1. Spray applied with 2 nozzle boom. FF11002, 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.

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trial ID: 132-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 132-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	GRASS	CAGE	CATH	COMA
	Pest Code										
	Crop Code						GRAPE				
	Rating Date						29May19	29May19	29May19	29May19	29May19
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	1.0	10.0	10.0	4.3	7.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1					
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	1.0	9.0	10.0	6.0	8.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	1.0	10.0	10.0	6.3	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
4	Mission	25	WG	0.045	lb ai/a	PRE	1.0	7.0	10.0	6.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	1.0	10.0	10.0	7.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
6	Untreated						1.0	1.0	7.0	7.0	4.0
7	Karmex	80	DF	4	lb ai/a	PRE	1.0	10.0	4.0	7.0	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
8	Karmex	80	DF	4	lb ai/a	PRE	1.0	10.0	4.0	4.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Gramoxone SL	3	SL	1	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
9	Karmex	80	DF	4	lb ai/a	PRE	1.3	10.0	2.7	7.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Trellis SC	4.16	SC	1	lb ai/a	PO1					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
10	Karmex	80	DF	4	lb ai/a	PRE	1.0	10.0	9.3	7.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Mission	25	WG	0.045	lb ai/a	PO1					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
11	Karmex	80	DF	4	lb ai/a	PRE	1.0	8.7	7.0	7.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Stinger	3	L	0.188	lb ai/a	PO1					
12	Karmex	80	DF	4	lb ai/a	PRE	1.0	9.0	5.3	9.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Quinstar	3.8	L	0.375	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
LSD P=.05							0.28	2.95	5.41	5.16	3.99
Standard Deviation							0.17	1.74	3.19	3.05	2.35
CV							16.22	20.0	42.89	46.72	26.57

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trial ID: 132-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 132-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	DAND	FIBW	PEST	WICA	GRAPE
	Pest Code						DAND	FIBW	PEST	WICA	
	Crop Code										GRAPE
	Rating Date						29May19	29May19	29May19	29May19	17Jun19
	Rating Type						RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	10.0	1.3	7.0	9.0	3.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1					
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	10.0	7.3	7.0	4.7	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	9.7	3.0	10.0	9.0	3.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
4	Mission	25	WG	0.045	lb ai/a	PRE	9.7	4.7	6.3	10.0	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	9.0	9.3	10.0	6.0	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
6	Untreated						1.7	1.0	7.0	1.0	2.7
7	Karmex	80	DF	4	lb ai/a	PRE	9.3	3.7	5.3	1.7	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
8	Karmex	80	DF	4	lb ai/a	PRE	9.3	1.3	1.0	5.7	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Gramoxone SL	3	SL	1	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
9	Karmex	80	DF	4	lb ai/a	PRE	10.0	3.7	3.3	4.3	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Trellis SC	4.16	SC	1	lb ai/a	PO1					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
10	Karmex	80	DF	4	lb ai/a	PRE	10.0	1.0	8.0	6.7	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Mission	25	WG	0.045	lb ai/a	PO1					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
11	Karmex	80	DF	4	lb ai/a	PRE	10.0	1.0	7.0	5.3	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Stinger	3	L	0.188	lb ai/a	PO1					
12	Karmex	80	DF	4	lb ai/a	PRE	9.0	1.0	4.7	3.0	3.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Quinstar	3.8	L	0.375	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
	LSD P=.05						1.41	4.29	6.40	4.22	1.30
	Standard Deviation						0.83	2.53	3.78	2.49	0.77
	CV						9.29	79.24	59.13	45.05	26.55

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	QUGR	CATH	COMA	DAND	FIBW	GORO
	Pest Code						QUGR	CATH	COMA	DAND	FIBW	GORO
	Crop Code											
	Rating Date						17Jun19	17Jun19	17Jun19	17Jun19	17Jun19	17Jun19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	10.0	4.7	6.0	9.7	2.3	6.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1						
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	8.0	7.0	7.0	6.0	3.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	7.3	4.7	7.0	6.0	3.7	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
4	Mission	25	WG	0.045	lb ai/a	PRE	10.0	5.3	10.0	10.0	4.7	8.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	9.0	7.0	10.0	5.3	10.0	8.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
6	Untreated						3.3	7.0	6.0	3.0	1.0	1.0
7	Karmex	80	DF	4	lb ai/a	PRE	7.7	7.0	7.3	6.3	3.3	4.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
8	Karmex	80	DF	4	lb ai/a	PRE	8.7	5.0	7.3	6.7	1.7	7.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Karmex	80	DF	4	lb ai/a	PRE	8.7	7.7	7.7	7.7	1.7	8.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Trellis SC	4.16	SC	1	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
10	Karmex	80	DF	4	lb ai/a	PRE	9.0	7.0	6.7	9.3	1.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Mission	25	WG	0.045	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
11	Karmex	80	DF	4	lb ai/a	PRE	9.7	7.0	7.7	9.0	1.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.188	lb ai/a	PO1						
12	Karmex	80	DF	4	lb ai/a	PRE	7.7	8.7	10.0	7.0	1.0	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
LSD P=.05							4.43	4.54	5.31	3.91	3.87	4.85
Standard Deviation							2.62	2.68	3.14	2.31	2.29	2.86
CV							31.72	41.25	40.6	32.22	76.9	37.74

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEST	SFGE	WICA	GRAPE	QUGR	CATH
	Pest Code						PEST	SFGE	WICA		QUGR	CATH
	Crop Code									GRAPE		
	Rating Date						17Jun19	17Jun19	17Jun19	28Jun19	28Jun19	28Jun19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	7.0	10.0	5.7	2.3	9.0	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1						
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	6.3	9.3	3.7	1.3	7.7	6.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	7.3	7.0	8.0	2.7	7.7	4.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
4	Mission	25	WG	0.045	lb ai/a	PRE	6.7	10.0	10.0	1.3	9.7	5.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	10.0	10.0	5.3	2.0	8.7	7.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
6	Untreated						6.3	7.0	1.0	2.0	4.7	7.0
7	Karmex	80	DF	4	lb ai/a	PRE	5.0	6.3	1.0	1.7	8.7	7.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
8	Karmex	80	DF	4	lb ai/a	PRE	1.0	4.0	3.0	2.7	10.0	5.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Karmex	80	DF	4	lb ai/a	PRE	3.7	8.0	1.7	2.7	10.0	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Trellis SC	4.16	SC	1	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
10	Karmex	80	DF	4	lb ai/a	PRE	10.0	9.0	7.0	2.3	9.0	7.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Mission	25	WG	0.045	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
11	Karmex	80	DF	4	lb ai/a	PRE	7.0	7.0	3.0	1.3	9.0	7.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.188	lb ai/a	PO1						
12	Karmex	80	DF	4	lb ai/a	PRE	4.7	7.0	1.7	1.7	9.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
LSD P=.05							6.03	6.42	3.81	1.17	3.31	4.77
Standard Deviation							3.56	3.79	2.25	0.69	1.95	2.81
CV							57.01	48.04	52.89	34.54	22.74	44.15

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COMA	FIBW	GORO	HOWE	PEST	WICA
	Pest Code											
	Crop Code											
	Rating Date						28Jun19	28Jun19	28Jun19	28Jun19	28Jun19	28Jun19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	9.0	1.3	4.7		7.0	3.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1						
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	7.7	6.3	9.0		10.0	2.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	6.0	3.3	7.0		9.0	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
4	Mission	25	WG	0.045	lb ai/a	PRE	10.0	5.0	8.7	1.3	6.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	10.0	10.0	9.0		8.7	4.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
6	Untreated						4.7	1.3	3.3		6.0	1.7
7	Karmex	80	DF	4	lb ai/a	PRE	7.7	4.0	4.0		4.7	1.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
8	Karmex	80	DF	4	lb ai/a	PRE	9.0	1.0	7.0	6.0	1.0	1.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Karmex	80	DF	4	lb ai/a	PRE	10.0	3.3	9.0		2.7	1.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Trellis SC	4.16	SC	1	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
10	Karmex	80	DF	4	lb ai/a	PRE	9.7	1.7	7.0		9.0	7.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Mission	25	WG	0.045	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
11	Karmex	80	DF	4	lb ai/a	PRE	10.0	1.7	10.0		7.0	1.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.188	lb ai/a	PO1						
12	Karmex	80	DF	4	lb ai/a	PRE	10.0	1.0	8.3		6.7	1.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
LSD P=.05							3.70	4.31	6.27	.	6.13	3.97
Standard Deviation							2.19	2.55	3.71	.	3.62	2.34
CV							25.32	76.4	51.1	.	55.73	75.36

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	QUGR	CATH	COMA	FIBW	HOWE
Pest Code								QUGR	CATH	COMA	FIBW	HOWE
Crop Code							GRAPE					
Rating Date							11Jul19	11Jul19	11Jul19	11Jul19	11Jul19	11Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	2.3	9.7	6.0	9.9	7.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1						
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	1.0	7.7	7.0	10.0	7.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	2.3	8.7	5.0	10.0	4.7	5.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
4	Mission	25	WG	0.045	lb ai/a	PRE	2.3	10.0	3.0	10.0	7.3	8.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	1.7	9.0	4.5	10.0	8.7	9.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
6	Untreated						1.7	5.0	1.0	1.2	1.0	1.0
7	Karmex	80	DF	4	lb ai/a	PRE	2.0	10.0	9.5	7.0	6.3	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
8	Karmex	80	DF	4	lb ai/a	PRE	2.0	9.3	8.0	10.0	3.3	8.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Karmex	80	DF	4	lb ai/a	PRE	2.3	8.7	7.7	10.0	6.0	9.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Trellis SC	4.16	SC	1	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
10	Karmex	80	DF	4	lb ai/a	PRE	2.3	10.0	9.3	10.0	6.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Mission	25	WG	0.045	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
11	Karmex	80	DF	4	lb ai/a	PRE	1.0	9.0	4.0	5.7	1.0	8.5
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.188	lb ai/a	PO1						
12	Karmex	80	DF	4	lb ai/a	PRE	1.3	6.7	3.0	10.0	3.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
LSD P=.05							1.32	3.08	3.20	4.03	3.31	3.46
Standard Deviation							0.78	1.82	1.83	2.34	1.96	2.03
CV							41.74	21.08	32.28	27.06	38.29	24.63

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEST	WICA	GRAPE	CATH	FIBW	HOWE
	Pest Code						PEST	WICA		CATH	FIBW	HOWE
	Crop Code								GRAPE			
	Rating Date						11Jul19	11Jul19	24Jul19	24Jul19	24Jul19	24Jul19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	6.5	7.7	2.0	7.3	5.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1						
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	6.7	1.7	1.3	7.3	7.0	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	5.0	6.7	2.3	6.3	6.7	6.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
4	Mission	25	WG	0.045	lb ai/a	PRE	5.0	10.0	2.0	6.7	7.7	6.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	6.3	4.7	1.7	7.7	4.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
6	Untreated						1.0	1.0	1.3	1.0	1.0	1.7
7	Karmex	80	DF	4	lb ai/a	PRE	4.7	4.7	2.3	9.3	5.3	5.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
8	Karmex	80	DF	4	lb ai/a	PRE	3.7	6.0	2.0	8.3	1.3	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Karmex	80	DF	4	lb ai/a	PRE	6.7	4.0	2.3	9.3	4.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Trellis SC	4.16	SC	1	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
10	Karmex	80	DF	4	lb ai/a	PRE	10.0	8.7	2.0	10.0	4.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Mission	25	WG	0.045	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
11	Karmex	80	DF	4	lb ai/a	PRE	3.0	4.7	1.0	7.3	2.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.188	lb ai/a	PO1						
12	Karmex	80	DF	4	lb ai/a	PRE	2.7	1.3	1.3	7.3	6.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
LSD P=.05							4.50	3.63	1.21	3.71	3.65	4.57
Standard Deviation							2.62	2.14	0.72	2.19	2.16	2.70
CV							51.42	42.12	39.65	29.86	45.66	33.87

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEST	WICA	GRAPE	CATH	FIBW	HOWE
	Pest Code						PEST	WICA		CATH	FIBW	HOWE
	Crop Code								GRAPE			
	Rating Date						24Jul19	24Jul19	26Aug19	26Aug19	26Aug19	26Aug19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	6.3	7.0	1.7	6.3	2.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1						
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	6.7	4.0	1.0	7.0	1.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	8.7	7.3	2.7	4.7	5.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
4	Mission	25	WG	0.045	lb ai/a	PRE	4.7	10.0	2.3	4.0	5.0	4.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	9.3	4.3	2.0	7.7	1.3	9.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
6	Untreated						1.0	1.0	1.0	7.0	6.0	1.0
7	Karmex	80	DF	4	lb ai/a	PRE	7.0	4.0	1.7	10.0	5.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
8	Karmex	80	DF	4	lb ai/a	PRE	2.0	6.7	3.0	7.7	1.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
9	Karmex	80	DF	4	lb ai/a	PRE	2.7	2.7	2.3	9.3	2.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Trellis SC	4.16	SC	1	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
10	Karmex	80	DF	4	lb ai/a	PRE	8.7	8.3	2.3	7.7	1.0	8.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Mission	25	WG	0.045	lb ai/a	PO1						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
11	Karmex	80	DF	4	lb ai/a	PRE	7.0	6.3	2.0	7.0	3.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.188	lb ai/a	PO1						
12	Karmex	80	DF	4	lb ai/a	PRE	3.0	3.3	1.7	10.0	7.0	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
LSD P=.05							5.21	4.86	1.46	4.46	4.76	2.99
Standard Deviation							3.08	2.87	0.86	2.63	2.81	1.77
CV							55.14	53.03	43.84	35.74	82.89	20.78

Michigan State University

Weed Control in Concord Grape - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEST	WICA
	Pest Code						PEST	WICA
	Crop Code							
	Rating Date						26Aug19	26Aug19
	Rating Type						RATING	RATING
	Rating Unit						1-10	1-10
1	Alion 200	1.67	SC	0.065	lb ai/a	PRE	6.3	8.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE		
	Rely 280	2.34	L	1.17	lb ai/a	PRE,PO1		
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PRE,PO1		
2	Chateau SW	51	WDG	0.383	lb ai/a	PRE	10.0	3.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1		
3	Trellis SC	4.16	SC	1	lb ai/a	PRE	8.7	4.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1		
4	Mission	25	WG	0.045	lb ai/a	PRE	5.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1		
5	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	10.0	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1		
6	Untreated						6.0	3.0
7	Karmex	80	DF	4	lb ai/a	PRE	7.0	6.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE		
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1		
	NIS	100	SL	0.25	% v/v	PO1		
8	Karmex	80	DF	4	lb ai/a	PRE	3.0	8.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE		
	Gramoxone SL	3	SL	1	lb ai/a	PO1		
	NIS	100	SL	0.25	% v/v	PO1		
9	Karmex	80	DF	4	lb ai/a	PRE	4.0	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE		
	Trellis SC	4.16	SC	1	lb ai/a	PO1		
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1		
	NIS	100	SL	0.25	% v/v	PO1		
10	Karmex	80	DF	4	lb ai/a	PRE	9.3	7.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE		
	Mission	25	WG	0.045	lb ai/a	PO1		
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1		
	NIS	100	SL	0.25	% v/v	PO1		
11	Karmex	80	DF	4	lb ai/a	PRE	7.0	6.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE		
	Stinger	3	L	0.188	lb ai/a	PO1		
12	Karmex	80	DF	4	lb ai/a	PRE	5.0	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE		
	Quinstar	3.8	L	0.375	lb ai/a	PO1		
	COC	100	SL	1	% v/v	PO1		
LSD P=.05							5.63	5.73
Standard Deviation							3.32	3.38
CV							49.03	57.15

Weed Control in Grape – SWMREC - 2019

Project Code: 132-19-2 **Location: Benton Harbor, MI**
Block:

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Grape **Variety: Concord**
Planting Method: Seedlings **Planting Date: 1996** **Harvest Date:**
Spacing: 7 ft; 6 vines/plot **Row Spacing: 10 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 6 ft long x 30 ft wide

Soil Type: Spinks Loamy Fine Sand **OM: 1.5%** **pH: 5.1**
Sand: 86% **Silt: 7%** **Clay: 6%** **CEC: 6.2**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/24/19	12:30pm	63/56	F	Dry	2-3 SE	29	10% Cloudy	N
PO1	7/16/19	12:40 pm	82/77	F	Damp	2-4 SW	76	100% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/24/19	GRAPE	6′	Bud swell	Good
4/24/19	REFE = red fescue	3-4″	Veg	Few
4/24/19	SFGE = smallflower geranium	1-2″	Leaf	Many
7/16/19	GRAPE		Green fruit	Good
7/16/19	LACG = large crabgrass	3-12″	Veg	Few
7/16/19	HONE = horsenettle	3-12″	Flower	Many
7/16/19	VICR = Virginia creeper	3-6″	Veg	Many (1 plot)

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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. PO1 +- 7/8 when HONE is 6-10″.

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Weed Control in Grape - SWMREC - 2019

Trial ID: 132-19-2 Location: Benton Harbor, MI Trial Year: 2019
Protocol ID: 132-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE 11Jun19 RATING 1-10	REFE 11Jun19 RATING 1-10	SFGE 11Jun19 RATING 1-10	GRAPE 16Jul19 RATING 1-10	LACG 16Jul19 RATING 1-10	HONE 16Jul19 RATING 1-10
1	Karmex	80	DF	4	lb ai/a	PRE	1.0	9.0	4.3	1.3	9.3	2.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	2	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
2	Karmex	80	DF	4	lb ai/a	PRE	1.3	8.7	3.7	1.7	8.7	2.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
3	Karmex	80	DF	4	lb ai/a	PRE	1.0	9.0	5.7	1.7	7.7	1.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Gramoxone SL	3	SL	1	lb ai/a	PO1						
	NIS	100	SL	0.25	% v/v	PO1						
4	Casoron 170 CS	1.4	CS	4	lb ai/a	PRE	1.3	10.0	10.0	1.3	9.7	8.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
5	GoalTender	4	SC	2	lb ai/a	PRE	1.3	9.3	7.7	1.7	6.0	1.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
6	Chateau SW	51	WDG	0.383	lb ai/a	PRE	1.0	9.3	1.7	1.0	8.0	1.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1						
7	Karmex	80	DF	4	lb ai/a	PRE	1.0	10.0	3.3	1.7	10.0	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.25	lb ai/a	PO1						
8	Karmex	80	DF	4	lb ai/a	PRE	1.3	8.7	1.3	1.0	8.3	3.0
	Quinstar	3.8	L	0.375	lb ai/a	PO1						
	COC	100	SL	1	% v/v	PO1						
9	Karmex	80	DF	4	lb ai/a	PRE	1.0	10.0	4.7	1.7	8.3	3.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Roundup PowerMax	5.5	L	3	lb ai/a	PO1						
	Venue	.177	SC	0.0055	lb ai/a	PO1						
10	Karmex	80	DF	4	lb ai/a	PRE	1.0	10.0	4.3	1.3	9.3	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1	lb ai/a	PO1						
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1						
11	Karmex	80	DF	4	lb ai/a	PRE	1.0	9.7	5.7	1.7	8.7	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Starane Ultra	2.8	L	0.5	lb ai/a	PO1						
12	Untreated						1.0	1.0	1.0	1.7	1.7	1.0
LSD P=.05							0.58	1.52	3.73	1.21	3.47	2.22
Standard Deviation							0.34	0.89	2.20	0.72	2.05	1.31
CV							31.01	10.26	49.53	48.63	25.71	50.3

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Weed Control in Grape - SWMREC - 2019

Trial ID: 132-19-2 Location: Benton Harbor, MI Trial Year: 2019
Protocol ID: 132-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE 26Jul19 RATING 1-10	LACG 26Jul19 RATING 1-10	HONE 26Jul19 RATING 1-10	GRAPE 04Sep19 RATING 1-10	HONE 04Sep19 RATING 1-10
1	Karmex	80	DF	4	lb ai/a	PRE	2.3	10.0	2.7	1.7	3.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Gramoxone SL	2	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
2	Karmex	80	DF	4	lb ai/a	PRE	2.0	9.0	4.0	1.7	4.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Gramoxone SL	3	SL	0.75	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
3	Karmex	80	DF	4	lb ai/a	PRE	1.7	8.0	3.7	1.7	3.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Gramoxone SL	3	SL	1	lb ai/a	PO1					
	NIS	100	SL	0.25	% v/v	PO1					
4	Casoron 170 CS	1.4	CS	4	lb ai/a	PRE	1.7	6.7	2.7	2.0	3.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
5	GoalTender	4	SC	2	lb ai/a	PRE	1.0	4.3	3.0	2.0	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
6	Chateau SW	51	WDG	0.383	lb ai/a	PRE	1.0	4.7	1.7	1.0	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE,PO1					
7	Karmex	80	DF	4	lb ai/a	PRE	1.3	7.3	2.0	2.3	4.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Stinger	3	L	0.25	lb ai/a	PO1					
8	Karmex	80	DF	4	lb ai/a	PRE	1.0	5.3	1.7	1.3	4.7
	Quinstar	3.8	L	0.375	lb ai/a	PO1					
	COC	100	SL	1	% v/v	PO1					
9	Karmex	80	DF	4	lb ai/a	PRE	1.0	8.0	2.7	1.3	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Roundup PowerMax	5.5	L	3	lb ai/a	PO1					
	Venue	.177	SC	0.0055	lb ai/a	PO1					
10	Karmex	80	DF	4	lb ai/a	PRE	1.0	6.7	3.3	2.0	3.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Rely 280	2.34	L	1	lb ai/a	PO1					
	Ammonium Sulfate	100	SG	3.4	lb ai/a	PO1					
11	Karmex	80	DF	4	lb ai/a	PRE	2.0	3.0	5.7	2.7	7.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE					
	Starane Ultra	2.8	L	0.5	lb ai/a	PO1					
12	Untreated						1.0	1.0	1.0	1.7	1.0
LSD P=.05							0.85	4.73	2.30	1.12	2.96
Standard Deviation							0.50	2.79	1.36	0.66	1.75
CV							35.29	45.32	47.99	37.18	50.3

Performance of Clopyralid on Grape – IR4 – HTRC - 2019

Project Code: 132-19-3 **Location:** East Lansing, MI
Block:

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Grape **Variety:** Concord
Planting Method: Seedling **Planting Date:** 1967 **Harvest Date:** 9/30/19
Spacing: 7 ft; 4 vines/plot **Row Spacing:** 10 ft
Tillage Type: **Study Design:** RCB **Replications:** 3
Plot Size: 6 ft x 30 ft

Soil Type: Capac Loam **OM:** 3.7% **pH:** 7.4
Sand: 51% **Silt:** 28% **Clay:** 21% **CEC:** 13.5

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PO1	5/21/19	1:30 pm	58/55	F	Moist	5-8	57	90% Cloudy	N
PO2	6/21/19	9:00 am	68/60	F	Wet	0	70	0% Cloudy	Medium

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/21/19	GRAPE	5-6′	Budding	Good
6/4/19	DAND = dandelion			
6/4/19	PEST = perennial sowthistle			
6/4/19	WHCL = white clover			
6/4/19	WICA = wild carrot			
6/21/19	GRAPE	5-6′	Early Fruit	OK
7/9/19	CATH = Canada thistle			
7/9/19	FIBW = field bindweed			
7/9/19	HOWE = horseweed			

Notes and Comments

1. Spray applied with 2 nozzle boom. FF11002, 17.79 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. 2 year trial.
4. 2 nozzle boom with 3 ft swath on each side of row.
5. PO1 = weed <6″ (± May 21).
6. PO2 = 30 days after (June 20).
7. Row #1 (101, 201, 301) was accidentally harvested and data was lost.

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Performance of Clopyralid on Grape - IR4 - HTRC - 2019

Trial ID: 132-19--3 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 132-19-3 Investigator: Dr. Bernard Zandstra
Project ID: Study Director: Nicole Soldan

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	DAND	PEST	WHCL	WICA	GRAPE
Pest Code								DAND	PEST	WHCL	WICA	
Crop Code							GRAPE					GRAPE
Rating Date							04Jun19	04Jun19	04Jun19	04Jun19	04Jun19	21Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated Weed-Free						1.7	1.0	1.0	1.3	1.0	2.3
2	Stinger	3	L	0.25	lb ai/a	PO1,PO2	2.0	6.0	6.0	6.3	5.0	2.0
	NIS	100	SL	0.25	% v/v	PO1,PO2						
3	Stinger	3	L	0.5	lb ai/a	PO1	2.7	6.3	8.0	7.0	6.0	2.7
	NIS	100	SL	0.25	% v/v	PO1						
LSD P=.05							1.19	1.51	0.00	0.76	1.31	0.93
Standard Deviation							0.53	0.67	0.00	0.33	0.58	0.41
CV							24.97	15.0	0.0	6.82	14.43	17.5

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	DAND	FIBW	HOWE	PEST	WHCL	WICA
Pest Code							DAND	FIBW	HOWE	PEST	WHCL	WICA
Crop Code												
Rating Date							21Jun19	21Jun19	21Jun19	21Jun19	21Jun19	21Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated Weed-Free						1.0	1.0	1.0	1.0	1.0	1.3
2	Stinger	3	L	0.25	lb ai/a	PO1,PO2	7.3	2.0	10.0	7.3	8.7	6.0
	NIS	100	SL	0.25	% v/v	PO1,PO2						
3	Stinger	3	L	0.5	lb ai/a	PO1	8.3	1.3	10.0	8.7	9.3	8.7
	NIS	100	SL	0.25	% v/v	PO1						
LSD P=.05							1.19	1.00	0.00	1.85	2.07	1.73
Standard Deviation							0.53	0.38	0.00	0.82	0.91	0.67
CV							9.49	26.65	0.0	14.41	14.41	12.5

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Performance of Clopyralid on Grape - IR4 - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	GRAPE	CATH	FIBW	HOWE	PEST	WHCL
Pest Code								CATH	FIBW	HOWE	PEST	WHCL
Crop Code							GRAPE					
Rating Date							09Jul19	09Jul19	09Jul19	09Jul19	09Jul19	09Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated Weed-Free						1.0	1.0	1.0	1.0	4.0	1.0
2	Stinger	3	L	0.25	lb ai/a	PO1,PO2	2.0	10.0	1.0	10.0	8.7	10.0
	NIS	100	SL	0.25	% v/v	PO1,PO2						
3	Stinger	3	L	0.5	lb ai/a	PO1	4.0	10.0	1.0	9.3	10.0	10.0
	NIS	100	SL	0.25	% v/v	PO1						
LSD P=.05							2.27	.	0.00	1.51	8.71	0.00
Standard Deviation							1.00	.	0.00	0.67	3.84	0.00
CV							42.86	.	0.0	9.84	50.88	0.0

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA	GRAPE	DAND	HOWE	PEST	WHCL
Pest Code							WICA		DAND	HOWE	PEST	WHCL
Crop Code								GRAPE				
Rating Date							09Jul19	25Jul19	25Jul19	25Jul19	25Jul19	25Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Untreated Weed-Free						1.0	1.0	1.0	1.0	1.0	1.0
2	Stinger	3	L	0.25	lb ai/a	PO1,PO2	7.3	2.7	10.0	10.0	9.7	10.0
	NIS	100	SL	0.25	% v/v	PO1,PO2						
3	Stinger	3	L	0.5	lb ai/a	PO1	8.7	5.0	10.0	10.0	10.0	10.0
	NIS	100	SL	0.25	% v/v	PO1						
LSD P=.05							1.85	1.19	0.00	0.00	0.76	0.00
Standard Deviation							0.82	0.53	0.00	0.00	0.33	0.00
CV							14.41	18.24	0.0	0.0	4.84	0.0

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Performance of Clopyralid on Grape - IR4 - HTRC - 2019

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA 25Jul19 RATING 1-10	GRAPE 30Sep19 HARVEST NO./PLOT	GRAPE 30Sep19 HARVEST KG/PLOT
1	Untreated Weed-Free						1.0	248.0	16.12
2	Stinger	3	L	0.25	lb ai/a	PO1,PO2	5.7	214.0	13.16
	NIS	100	SL	0.25	% v/v	PO1,PO2			
3	Stinger	3	L	0.5	lb ai/a	PO1	9.3	211.3	12.71
	NIS	100	SL	0.25	% v/v	PO1			
LSD P=.05							1.85	544.44	34.67
Standard Deviation							0.82	240.20	15.29
CV							15.31	107.02	109.27

Weed Control in Raspberry – Clarksville - 2019

Project Code: 131-19-1 **Location: Clarksville, MI**
Tier 11

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Raspberry **Variety: Caroline**
Planting Method: Transplant **Planting Date: 2009** **Harvest Date:**
Spacing: Solid Row **Row Spacing: 10 ft**
Tillage Type: **Study Design: RCB** **Replications: 3**
Plot Size: 5.3 ft wide x 40 ft long

Soil Type: Lapeer Sandy Loam **OM: 2.7%** **pH: 6.5**
Sand: 39% **Silt: 40%** **Clay: 21%** **CEC: 6.9**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PRE	4/8/19	11:00 am	59/50	F	Damp	5-8 NW	69	70% Cloudy	N
PO1 DIR	6/21/19	12:15 am	77/62	F	Damp	1-2 SE	36	0% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
4/8/19	RASP		Preemergence	
4/8/19	QUGR = quackgrass	3-4″	Veg	Moderate
4/8/19	CUDO = curly dock	3-4″	Rosette	Moderate
4/8/19	DAND = dandelion	1-2″	Veg	Few - Moderate
4/8/19	HEBW = field bindweed	1-2″	Veg	Few
4/8/19	YERO = yellow rocket	2-3″	Rosette	Moderate
6/21/19	RASP	18-24″	Veg	Good
6/21/19	YEFT = yellow foxtail	1-6″	Veg	Few
6/21/19	BHPL = buckhorn plantain	6-10″	Flower	Few
6/21/19	CATH = Canada thistle			
6/21/19	DAND = dandelion	3-10″	Flower	Moderate
6/21/19	LATH = ladysthumb	36-40″	Veg	Many
6/21/19	REFE = red fescue	4-8″	Veg	Moderate

Notes and Comments
1. Spray applied PRE with 4 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. Post applied with 2 nozzle boom, 2 passes.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Apply Select Max 0.12and COC 1% after 2nd rating to all untreated postemergence plots.

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Weed Control in Raspberry - Clarksville - 2019

Trial ID: 131-19-1 Location: Clarksville, MI Trial Year: 2019
Protocol ID: 131-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RASP	QUGR	CATH	DAND	RASP	YEFT
	Pest Code											
	Crop Code						RASP				RASP	
	Rating Date						21May19	21May19	21May19	21May19	21Jun19	21Jun19
	Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
	Rating Unit						1-10	1-10	1-10	1-10	1-10	1-10
1	Karmex	80	DF	3.2	lb ai/a	PRE	1.3	8.3	6.3	5.3	1.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
2	Callisto	4	SC	0.188	lb ai/a	PRE	1.7	8.3	6.0	8.7	2.0	6.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Sandea	75	WG	0.023	lb ai/a	PO1 DIR						
	Poast	1.53	EC	0.19	lb ai/a	PO1 DIR						
	COC	100	SL	1	% v/v	PO1 DIR						
3	Sinbar	80	WDG	1.6	lb ai/a	PRE	1.3	9.7	9.0	7.0	1.3	8.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
4	Karmex	80	DF	3.2	lb ai/a	PRE	1.3	9.3	4.7	5.7	1.7	9.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1	lb ai/a	PO1 DIR						
5	Solicam	80	DF	4	lb ai/a	PRE	1.7	9.0	4.0	9.0	2.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
6	Prowl H20	3.8	CS	4	lb ai/a	PRE	2.0	7.0	4.0	7.0	1.3	9.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
7	Chateau SW	51	WDG	0.192	lb ai/a	PRE	1.7	6.7	4.7	1.0	2.3	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
8	Alion 200	1.67	SC	0.065	lb ai/a	PRE	2.3	10.0	7.0	9.3	1.7	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
9	Matrix	25	DF	0.063	lb ai/a	PRE	3.7	10.0	7.0	9.7	3.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
10	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	1.0	8.3	4.0	3.3	1.3	9.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
11	Karmex	80	DF	2	lb ai/a	PRE	1.0	9.7	3.3	8.7	1.3	6.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1 DIR						
	COC	100	SL	1	% v/v	PO1 DIR						
12	Karmex	80	DF	2	lb ai/a	PRE	2.0	9.0	4.0	9.0	1.7	7.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.125	lb ai/a	PO1 DIR						
	Poast	1.53	EC	0.19	lb ai/a	PO1 DIR						
	COC	100	SL	1	% v/v	PO1 DIR						
LSD P=.05							1.57	2.55	7.76	3.47	1.44	3.32
Standard Deviation							0.93	1.51	4.58	2.05	0.85	1.96
CV							52.87	17.17	85.94	29.37	48.73	22.13

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Weed Control in Raspberry - Clarksville - 2019

Trial ID: 131-19-1 Location: Clarksville, MI Trial Year: 2019
Protocol ID: 131-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	BHPL	CATH	DAND	REFE	RASP	RASP
Pest Code							BHPL	CATH	DAND	REFE		
Crop Code											RASP	RASP
Rating Date							21Jun19	21Jun19	21Jun19	21Jun19	12Jul19	14Aug19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Karmex	80	DF	3.2	lb ai/a	PRE	4.0	7.0	6.7	6.7	1.7	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
2	Callisto	4	SC	0.188	lb ai/a	PRE	10.0	5.3	7.0	5.7	2.0	1.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Sandea	75	WG	0.023	lb ai/a	PO1 DIR						
	Poast	1.53	EC	0.19	lb ai/a	PO1 DIR						
	COC	100	SL	1	% v/v	PO1 DIR						
3	Sinbar	80	WDG	1.6	lb ai/a	PRE	10.0	8.3	7.3	9.0	1.7	1.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
4	Karmex	80	DF	3.2	lb ai/a	PRE	6.7	7.0	5.7	7.7	1.3	1.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Rely 280	2.34	L	1	lb ai/a	PO1 DIR						
5	Solicam	80	DF	4	lb ai/a	PRE	10.0	4.0	6.3	9.0	2.0	3.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
6	Prowl H20	3.8	CS	4	lb ai/a	PRE	9.0	4.0	3.7	7.0	1.0	1.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
7	Chateau SW	51	WDG	0.192	lb ai/a	PRE	7.0	4.0	7.3	6.7	2.3	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
8	Alion 200	1.67	SC	0.065	lb ai/a	PRE	10.0	7.0	7.7	9.3	2.3	1.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
9	Matrix	25	DF	0.063	lb ai/a	PRE	6.3	5.3	9.0	10.0	3.3	2.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
10	Zeus Prime XC	3.5	EC	0.375	lb ai/a	PRE	10.0	4.3	6.7	8.3	2.0	1.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
11	Karmex	80	DF	2	lb ai/a	PRE	1.7	2.7	7.7	9.0	1.7	2.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Quinstar	3.8	L	0.375	lb ai/a	PO1 DIR						
	COC	100	SL	1	% v/v	PO1 DIR						
12	Karmex	80	DF	2	lb ai/a	PRE	10.0	1.3	7.7	9.3	1.7	2.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PRE						
	Stinger	3	L	0.125	lb ai/a	PO1 DIR						
	Poast	1.53	EC	0.19	lb ai/a	PO1 DIR						
	COC	100	SL	1	% v/v	PO1 DIR						
LSD P=.05							5.23	6.24	3.10	3.63	1.58	1.31
Standard Deviation							3.09	3.69	1.83	2.14	0.93	0.77
CV							39.13	73.32	26.61	26.32	48.7	39.7

Weed Control in New Strawberry Planting – 2018 - 2019

Project Code: 124-18-1 **Location: East Lansing, MI**
Block 122

Personnel: Bernard H. Zandstra, Nicole Soldan
Crop: Strawberry **Variety: Jewel**
Planting Method: Transplanted **Planting Date: 5/11/18**
Spacing: 18 inch **Row Spacing: 8 ft**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Marlette Fine Sandy Loam **OM: 1.1%** **pH: 7.4**
Sand: 48% **Silt: 30%** **Clay: 22%** **CEC: 6.8**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
POT	5/18	11:15 AM	69/57	F	Damp	5-10 E	43	% Cloudy	N
PO1	6/14	10:30 AM	81/64	F	Dry	2-5 SW	36	% Cloudy	N

Crop and Weed Information at Application

	Height or Diameter	Growth Stage	Density

Notes and Comments

1. Spray applied with 4 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. In spring 2018 after transplanting.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. Field planted and sprayed in 2018.
4. POT = 1-5 DATP (2018).
5. PO1 = 30-40 DATP (2018).
6. PO1DIR use 2 nozzle boom (2018).
7. Fall application of whole field on 11/8/18 of Ultra Blazer 1.5pt/a, and Satellite Hydrocap 3pt/a.
8. Crop harvested in 2019 to determine effects of 2018 post-transplant herbicides.

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Weed Control in a New Strawberry Planting - 2018-2019

Trial ID: 124-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 124-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	STBE 13May19 RATING 1-10	STBE 02Jun19 RATING 1-10	STBE 17Jun19 HARVEST KG/PLOT	STBE 21Jun19 HARVEST KG/PLOT	STBE 24Jun19 HARVEST KG/PLOT	STBE 27Jun19 HARVEST KG/PLOT
1	Sinbar	80	WDG	0.1	lb ai/a	POT	2.7	2.0	1.1830	3.7173	6.4057	6.2603
2	Devrinol DF-XT	50	DF	6	lb ai/a	POT	2.3	1.7	1.1183	3.2550	4.8860	4.2080
3	Spartan	4	F	0.25	lb ai/a	POT	2.3	2.7	1.4287	3.0217	5.9577	4.3507
4	Prowl H20	3.8	CS	1.4	lb ai/a	POT	2.7	2.3	0.8833	3.7593	5.9547	3.8277
5	Dual Magnum	7.62	EC	1.26	lb ai/a	POT	1.7	1.3	1.3540	3.4767	6.4500	3.9690
6	Devrinol DF-XT	50	DF	6	lb ai/a	POT	5.3	4.7	0.8840	2.2787	3.7567	2.8123
	Sinbar	80	WDG	0.2	lb ai/a	PO1						
	Select Max	.97	EC	0.12	lb ai/a	PO1						
7	Trellis SC	4.17	SC	1	lb ai/a	POT	5.3	4.7	1.3883	2.3460	3.3757	2.6900
8	Devrinol DF-XT	50	DF	6	lb ai/a	POT	2.0	2.0	0.8770	3.3273	6.5493	6.2897
	Quinstar	3.8	L	0.25	lb ai/a	PO1DIR						
	COC	100	SL	1	% v/v	PO1DIR						
9	Untreated						3.0	2.3	1.0930	3.5913	5.7230	4.2220
10	Devrinol DF-XT	50	DF	6	lb ai/a	POT	3.3	3.0	0.9713	2.8290	5.0597	2.6550
	Sinbar	80	WDG	0.1	lb ai/a	POT						
LSD P=.05							2.19	1.95	0.94514	1.53175	2.59338	2.73175
Standard Deviation							1.28	1.14	0.55095	0.89291	1.51177	1.59243
CV							41.58	42.57	49.28	28.25	27.93	38.57

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Weed Control in a New Strawberry Planting - 2018-2019

Trial ID: 124-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: 124-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	STBE 01Jul19 HARVEST KG/PLOT	STBE TOTAL KG/PLOT
1	Sinbar	80	WDG	0.1	lb ai/a	POT	3.7307	21.30
2	Devrinol DF-XT	50	DF	6	lb ai/a	POT	4.2980	17.77
3	Spartan	4	F	0.25	lb ai/a	POT	2.8343	17.59
4	Prowl H20	3.8	CS	1.4	lb ai/a	POT	2.7510	17.18
5	Dual Magnum	7.62	EC	1.26	lb ai/a	POT	5.1250	20.38
6	Devrinol DF-XT	50	DF	6	lb ai/a	POT	2.4707	12.20
	Sinbar	80	WDG	0.2	lb ai/a	PO1		
	Select Max	.97	EC	0.12	lb ai/a	PO1		
7	Trellis SC	4.17	SC	1	lb ai/a	POT	2.0427	11.84
8	Devrinol DF-XT	50	DF	6	lb ai/a	POT	3.8597	20.90
	Quinstar	3.8	L	0.25	lb ai/a	PO1DIR		
	COC	100	SL	1	% v/v	PO1DIR		
9	Untreated						3.3393	17.97
10	Devrinol DF-XT	50	DF	6	lb ai/a	POT	2.1690	13.68
	Sinbar	80	WDG	0.1	lb ai/a	POT		
LSD P=.05							2.00214	6.17
Standard Deviation							1.16712	3.60
CV							35.78	21.06

Evaluation of Homeplate for Weed Control on Fallow Ground - HTRC - 2019

Project Code: XMAS-19-2 **Location:** East Lansing, MI
Block 119

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: Fallow **Variety:**
Planting Method: **Planting Date:** **Harvest Date:**
Spacing: **Row Spacing:**
Tillage Type: Conventional **Study Design:** RCB **Replications:** 3
Plot Size: 5.3 ft wide x 30 ft long

Soil Type: Sandy Loam **OM:** 2.6% **pH:** 6.3
Sand: 61% **Silt:** 22% **Clay:** 17% **CEC:** 8.4

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PO1	5/21/19	11:30 am	54/50	F	wet	4-6 E	55	80% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/21/19	ORGR = orchardgrass	10-14″	Veg	Moderate
5/21/19	QUGR = quackgrass	6-12″	Veg	Moderate
5/21/19	BHPL = buckhorn plantain	3-4″, 8″	Veg	Moderate
5/21/19	COCW = common chickweed	3-4″	Flower	Many
5/21/19	COMU = common mullein	3-4″, 5-7″	Veg	Few
5/21/19	DAND = dandelion	6-18″	Flower / Seeding	many
5/21/19	RASP = raspberry	6-8″	Veg	Some
5/21/19	RECL = red clover	5-8″, 7-10″	Veg / Flower	Moderate
5/21/19	RESO = red sorrel	6-8″	Flower	Many
5/21/19	ROCI = rough cinquefoil	7-8″	Veg	Few
5/21/19	SFGE = smallflower geranium	2″, 5-9″	Veg	Moderate
5/21/19	SPKW = spotted knapweed	3-4″	Veg	Moderate
5/21/19	WHCA = white campion	3-5″	Veg / Flower	Moderate
5/21/19	WHCL = white clover	2-3″, 5-10″	Veg	Many
5/21/19	WICA = wild carrot	3-4″, 5-7″	Veg	Moderate
5/21/19	YERO = yellow rocket	6-8″	Veg	Few
6/27/19	PEST = perennial sowthistle			
7/19/19	YEFT = yellow foxtail			

Notes and Comments
1. Spray applied at 40 gallons per acre. Use 11002 nozzles. 30 psi.
2. Crop and weed injury ratings on scale of 1-10; 1 = no injury, 10 = complete kill.
3. There were no crop plants in the plots.

Michigan State University

Evaluation of Homeplate for the Control of Weeds on Fallow Ground - HTRC - 2019

Trial ID: XMAS-19-2 Location: East Lansing, MI Trial Year: 2019
Protocol ID: XMAS-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ORGR	DAND	RECL	WHCA	WHCL
Pest Code							ORGR	DAND	RECL	WHCA	WHCL
Rating Date							22May19	22May19	22May19	22May19	22May19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	1.0	4.3	6.5	4.5	6.9
2	Homeplate	100	L	6	% v/v	PO1	7.0	8.3	8.0	5.9	8.0
3	Homeplate	100	L	1	% v/v	PO1	3.5	1.3	3.3	2.4	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1					
4	Homeplate	100	L	1	% v/v	PO1	1.7	2.7	2.0	2.3	2.3
	Rely 280	2.34	L	0.6	lb ai/a	PO1					
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	1.5	2.3	1.3	1.7	1.3
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	2.0	1.0	2.0	2.0	2.0
7	Untreated						1.0	1.3	1.0	2.4	1.0
LSD P=.05							4.42	3.12	2.99	2.60	2.64
Standard Deviation							1.95	1.71	1.62	1.35	1.45
CV							77.28	56.2	46.97	44.22	40.8

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA	ORGR	COMU	DAND	RECL
Pest Code							WICA	ORGR	COMU	DAND	RECL
Rating Date							22May19	24May19	24May19	24May19	24May19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	.	2.5		3.3	6.7
2	Homeplate	100	L	6	% v/v	PO1	.	4.0	6.0	5.3	8.0
3	Homeplate	100	L	1	% v/v	PO1	1.0	2.0		1.8	4.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1					
4	Homeplate	100	L	1	% v/v	PO1	2.0	5.0		4.7	5.3
	Rely 280	2.34	L	0.6	lb ai/a	PO1					
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	1.0	1.5	1.0	3.0	3.3
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	1.0	7.0	1.0	5.3	6.7
7	Untreated						.	1.0	1.0	1.7	1.0
LSD P=.05							.	2.89	0.00	2.97	3.34
Standard Deviation							.	1.27	0.00	1.61	1.88
CV							.	38.8	0.0	45.0	37.59

Michigan State University

Evaluation of Homeplate for the Control of Weeds on Fallow Ground - HTRC - 2019

Trial ID: XMAS-19-2 Location: East Lansing, MI Trial Year: 2019
Protocol ID: XMAS-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCA	WHCL	WICA	QUGR	COMU
Pest Code											
Rating Date							24May19	24May19	24May19	29May19	29May19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	3.7	6.7	1.0	3.0	1.0
2	Homeplate	100	L	6	% v/v	PO1	6.0	8.7		3.0	
3	Homeplate	100	L	1	% v/v	PO1	3.0	4.7	2.0	2.5	
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1					
4	Homeplate	100	L	1	% v/v	PO1	4.5	5.3	6.0	6.5	
	Rely 280	2.34	L	0.6	lb ai/a	PO1					
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	3.0	1.7		2.5	1.3
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	5.0	5.7	1.0	8.0	10.0
7	Untreated						1.0	1.0	1.0	1.0	1.0
LSD P=.05							2.49	2.03	12.17	2.09	7.34
Standard Deviation							1.32	1.14	3.46	1.05	0.71
CV							35.14	23.72	157.46	27.64	21.21

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RECL	ROCI	SPKW	WHCA	WHCL
Pest Code											
Rating Date							29May19	29May19	29May19	29May19	29May19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	5.7	2.0	2.0	3.0	6.3
2	Homeplate	100	L	6	% v/v	PO1	5.7		7.0	6.5	5.7
3	Homeplate	100	L	1	% v/v	PO1	6.0	3.0	3.0	5.5	6.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1					
4	Homeplate	100	L	1	% v/v	PO1	8.3	4.0	5.7	8.0	8.7
	Rely 280	2.34	L	0.6	lb ai/a	PO1					
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	3.9	10.0	4.5	5.4	3.3
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	9.3	7.5	5.0	7.7	8.7
7	Untreated						1.3	1.0	2.0	1.0	1.0
LSD P=.05							2.32	.	5.55	2.06	1.99
Standard Deviation							1.28	.	2.45	1.11	1.12
CV							22.25	.	58.79	21.08	19.7

Michigan State University

Evaluation of Homeplate for the Control of Weeds on Fallow Ground - HTRC - 2019

Trial ID: XMAS-19-2 Location: East Lansing, MI Trial Year: 2019
Protocol ID: XMAS-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA	QUGR	BLME	COMU	SPKW
Pest Code							WICA	QUGR	BLME	COMU	SPKW
Rating Date							29May19	12Jun19	12Jun19	12Jun19	12Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	2.0	5.0	2.3	7.0	3.0
2	Homeplate	100	L	6	% v/v	PO1	6.0	5.0	2.0	10.0	10.0
3	Homeplate	100	L	1	% v/v	PO1	2.5	7.3	4.3	10.0	10.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1					
4	Homeplate	100	L	1	% v/v	PO1	7.5	5.0	9.3	10.0	5.0
	Rely 280	2.34	L	0.6	lb ai/a	PO1					
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	1.0	6.7	6.7	7.0	6.0
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	5.5	6.7	10.0	10.0	7.0
7	Untreated						1.0	4.7	1.0	4.0	1.0
LSD P=.05							3.54	6.51	2.39	5.12	.
Standard Deviation							1.11	3.66	1.35	2.88	.
CV							30.54	63.49	26.4	34.74	.

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCA	WHCL	WICA	QUGR	BLME
Pest Code							WHCA	WHCL	WICA	QUGR	BLME
Rating Date							12Jun19	12Jun19	12Jun19	18Jun19	18Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	7.0	5.0	10.0	4.7	2.3
2	Homeplate	100	L	6	% v/v	PO1	10.0	1.3	7.0	6.0	1.7
3	Homeplate	100	L	1	% v/v	PO1	9.0	7.7	8.3	9.0	3.3
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1					
4	Homeplate	100	L	1	% v/v	PO1	10.0	9.0	7.0	4.3	9.3
	Rely 280	2.34	L	0.6	lb ai/a	PO1					
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	7.7	6.3	7.7	6.3	4.3
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	8.0	9.3	7.7	6.7	10.0
7	Untreated						4.0	1.0	4.0	4.0	1.0
LSD P=.05							4.76	3.87	6.62	7.49	2.89
Standard Deviation							2.68	2.18	3.72	4.21	1.62
CV							33.66	38.41	50.42	71.87	35.51

Michigan State University

Evaluation of Homeplate for the Control of Weeds on Fallow Ground - HTRC - 2019

Trial ID: XMAS-19-2 Location: East Lansing, MI Trial Year: 2019
Protocol ID: XMAS-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	PEST	SPKW	WHCL	WICA	QUGR	PEST
Pest Code												
Rating Date							18Jun19	18Jun19	18Jun19	18Jun19	27Jun19	27Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	4.0	3.0	4.0	9.3	4.3	2.3
2	Homeplate	100	L	6	% v/v	PO1	4.7	10.0	2.7	7.0	6.3	5.7
3	Homeplate	100	L	1	% v/v	PO1	6.5	.	6.3	8.7	7.3	7.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1						
4	Homeplate	100	L	1	% v/v	PO1	7.9	7.0	8.3	7.0	4.3	4.0
	Rely 280	2.34	L	0.6	lb ai/a	PO1						
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	7.9	7.0	5.3	9.0	6.0	4.0
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	7.9	7.0	10.0	6.0	6.7	8.3
7	Untreated						5.7	1.0	2.0	5.3	4.0	2.3
LSD P=.05							6.28	.	4.41	4.96	6.26	5.59
Standard Deviation							3.14	.	2.48	2.79	3.52	3.14
CV							49.4	.	44.87	37.3	63.2	64.11

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RECL	WHCL	WICA	YEFT	QUGR	PEST
Pest Code												
Rating Date							27Jun19	27Jun19	27Jun19	19Jul19	19Jul19	19Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	4.3	2.3	7.7	10.0	6.0	2.3
2	Homeplate	100	L	6	% v/v	PO1	6.0	2.7	5.3	7.7	6.0	6.3
3	Homeplate	100	L	1	% v/v	PO1	10.0	5.3	6.7	2.0	9.3	6.0
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1						
4	Homeplate	100	L	1	% v/v	PO1	9.3	8.3	6.0	2.3	7.7	5.0
	Rely 280	2.34	L	0.6	lb ai/a	PO1						
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	9.0	5.7	4.7	4.0	7.3	5.7
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	10.0	10.0	7.7	1.0	8.7	7.7
7	Untreated						1.7	1.7	7.0	7.7	4.3	6.0
LSD P=.05							1.83	3.55	6.22	4.37	5.81	5.96
Standard Deviation							1.03	1.99	3.49	2.46	3.26	3.35
CV							14.34	38.77	54.35	49.62	46.31	60.13

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Evaluation of Homeplate for the Control of Weeds on Fallow Ground - HTRC - 2019

Trial ID: XMAS-19-2 Location: East Lansing, MI Trial Year: 2019
Protocol ID: XMAS-19-2 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RECL	RFCL	WHCL	WICA
Pest Code										
Rating Date							19Jul19	19Jul19	19Jul19	19Jul19
Rating Type							RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10
1	Homeplate	100	L	3	% v/v	PO1	6.7	4.0	6.7	10.0
2	Homeplate	100	L	6	% v/v	PO1	9.3	4.0	7.7	7.7
3	Homeplate	100	L	1	% v/v	PO1	9.3	5.0	6.7	4.7
	Roundup PowerMax	5.5	L	1	lb ai/a	PO1				
4	Homeplate	100	L	1	% v/v	PO1	8.3	8.7	7.0	6.0
	Rely 280	2.34	L	0.6	lb ai/a	PO1				
5	Roundup PowerMax	5.5	L	1	lb ai/a	PO1	8.3	4.7	6.7	7.7
6	Rely 280	2.34	L	0.6	lb ai/a	PO1	10.0	9.3	9.0	6.0
7	Untreated						7.0	1.7	9.0	7.7
LSD P=.05							3.36	4.68	5.09	5.33
Standard Deviation							1.89	2.63	2.86	3.00
CV							22.4	49.27	38.04	42.23

Weed Control in Ornamentals with Razorguard - HTRC - 2019

Project Code: XMAS-19-1 **Location: East Lansing, MI**
Block 119

Personnel: Bernard H. Zandstra, Nicole Soldan, Monique Hemker
Crop: None **Variety:**
Planting Method: **Planting Date:** **Harvest Date:**
Spacing: **Row Spacing:**
Tillage Type: Conventional **Study Design: RCB** **Replications: 3**
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Spinks Loamy Sand **OM: 2.6%** **pH: 6.3**
Sand: 61% **Silt: 22%** **Clay: 17%** **CEC: 8.4**

Herbicide Application Information

Timing	Date	Time	Air/Soil	T	Soil Surf	Wind	RH	Sky	Dew
PO1	5/21/19	10:30 am	53/50	F	wet	3-5 E	55	80% Cloudy	N

Crop and Weed Information at Application

		Height or Diameter	Growth Stage	Density
5/21/19	ORGR = orchardgrass	10-12″	Veg	Moderate
5/21/19	QUGR = quackgrass	6-12″	Veg	Moderate
5/21/19	BHPL = buckhorn plantain	3-4″, 8″	Veg	Moderate
5/21/19	COCW = common chickweed	3-4″	Flower	Many
5/21/19	COMU = common mullein	3-4″, 5-7″	Veg	Few
5/21/19	DAND = dandelion	6-18″	Flower / seeding	Many
5/21/19	PEST = perennial sowthistle			
5/21/19	RASP = raspberry	6-8″	Veg	Some
5/21/19	RECL = red clover	5-8″, 7-10″	Veg / Flower	Moderate
5/21/19	ROCI = rough cinquefoil	7-8″	Veg	Few
5/21/19	SFGE = smallflower geranium	2″, 5-9″	Veg	Moderate
5/21/19	SPKW = spotted knapweed	3-4″	Veg	Moderate
5/21/19	WHCA = white campion	3-5″	Veg / Flowers	Moderate
5/21/19	WHCL = white clover	2-3″, 5-9″	Veg	Many
5/21/19	WICA = wild carrot	3-4″, 5-7″	Veg	Moderate
5/21/19	YEFT = yellow foxtail			
5/21/19	YERO = yellow rocket	6-8″	Veg	Few

Notes and Comments
1. Spray applied with 4 nozzle boom. FF11002, 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 no crop plants in the plots.

Michigan State University

Weed Control in Ornamentals with RazorGuard - HTRC - 2019

Trial ID: XMAS-19-1 Location: East Lansing, MI Trial Year: 2019
Protocol ID: XMAS-19-1 Investigator: Dr. Bernard Zandstra

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	ORGR	QUGR	COMU	DAND	RECL	ROCI
Pest Code							ORGR	QUGR	COMU	DAND	RECL	ROCI
Rating Date							22May19	22May19	22May19	22May19	22May19	22May19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	1.5	1.0	1.0	1.3	1.7	1.7
2	RazorGuard	100	L	64	fl oz/a	PO1	1.0	1.0	1.0	1.7	2.3	1.7
3	Razor Pro	4	L	64	fl oz/a	PO1	1.0	1.0	1.0	1.3	1.7	1.0
4	Razor Pro	4	L	64	fl oz/a	PO1	2.5	2.0	2.0	3.3	5.3	1.7
	Diquat	2	L	13	fl oz/a	PO1						
	Prodiamine	4	F	21	fl oz/a	PO1						
5	Rely 280	2.34	L	1	lb ai/a	PO1	1.5	1.0	1.0	2.0	2.0	1.5
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	4.7	4.5	1.0	7.3	6.1	
7	Untreated						1.0	1.0	1.0	1.0	1.0	1.0
LSD P=.05							3.31	6.87	0.00	1.18	1.59	1.26
Standard Deviation							1.66	2.65	0.00	0.66	0.89	0.63
CV							88.31	161.05	0.0	25.62	30.87	43.91

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SFGE	WHCA	WHCL	WICA	ORGR	QUGR
Pest Code							SFGE	WHCA	WHCL	WICA	ORGR	QUGR
Rating Date							22May19	22May19	22May19	22May19	24May19	24May19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	1.0	1.0	1.7	1.0	1.5	1.5
2	RazorGuard	100	L	64	fl oz/a	PO1	1.0	2.3	1.7	1.0	2.0	3.0
3	Razor Pro	4	L	64	fl oz/a	PO1	1.0	1.9	1.0	1.0	1.0	1.0
4	Razor Pro	4	L	64	fl oz/a	PO1	1.0	2.7	3.7	3.0	1.0	3.0
	Diquat	2	L	13	fl oz/a	PO1						
	Prodiamine	4	F	21	fl oz/a	PO1						
5	Rely 280	2.34	L	1	lb ai/a	PO1	2.0	4.7	2.0	1.3		4.0
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	8.0	3.4	6.0	1.0	8.5	8.3
7	Untreated						1.0	1.0	1.0	1.0	1.0	1.0
LSD P=.05							.	3.98	1.77	3.21	2.97	2.29
Standard Deviation							.	2.15	0.97	1.41	1.14	1.14
CV							.	88.53	39.98	106.07	45.7	36.69

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	COMU	DAND	RECL	ROCI	WICA
Pest Code							COMU	DAND	RECL	ROCI	WICA
Rating Date							24May19	24May19	24May19	24May19	24May19
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	5.7	5.3	4.3	3.0	2.5
2	RazorGuard	100	L	64	fl oz/a	PO1	4.0	6.7	6.3	2.0	3.0
3	Razor Pro	4	L	64	fl oz/a	PO1	2.0	2.7	4.0	2.0	1.0
4	Razor Pro	4	L	64	fl oz/a	PO1	4.7	6.0	6.3	4.0	1.0
	Diquat	2	L	13	fl oz/a	PO1					
	Prodiamine	4	F	21	fl oz/a	PO1					
5	Rely 280	2.34	L	1	lb ai/a	PO1	2.5	6.7	6.3	2.0	2.5
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	7.0	8.7	8.0	1.0	5.0
7	Untreated						1.0	1.0	1.0	1.0	1.0
LSD P=.05							4.47	1.86	1.74	.	2.38
Standard Deviation							2.32	1.04	0.98	.	1.19
CV							60.4	19.73	18.8	.	52.07

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCA	WHCL	QUGR	COMU	RECL	ROCI
Pest Code							WHCA	WHCL	QUGR	COMU	RECL	ROCI
Rating Date							24May19	24May19	29May19	29May19	29May19	29May19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	4.3	5.3	6.3	6.0	7.7	8.5
2	RazorGuard	100	L	64	fl oz/a	PO1	4.8	6.0	8.0	8.0	7.3	6.0
3	Razor Pro	4	L	64	fl oz/a	PO1	3.5	3.7	5.3	4.0	5.0	4.5
4	Razor Pro	4	L	64	fl oz/a	PO1	3.5	6.7	6.0	3.1	6.0	4.0
	Diquat	2	L	13	fl oz/a	PO1						
	Prodiamine	4	F	21	fl oz/a	PO1						
5	Rely 280	2.34	L	1	lb ai/a	PO1	3.0	5.7	7.3	7.7	9.0	7.5
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	8.3	8.3	8.7	4.0	8.3	8.0
7	Untreated						1.0	1.0	1.0	1.0	1.0	1.0
LSD P=.05							1.69	1.97	2.55	2.31	1.54	5.70
Standard Deviation							0.88	1.11	1.43	1.29	0.87	2.05
CV							21.69	21.11	23.48	26.67	13.71	36.38

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SFGE	WICA	WHCA	WHCL	QUGR	COMU
Pest Code							SFGE	WICA	WHCA	WHCL	QUGR	COMU
Rating Date							29May19	29May19	29May19	29May19	12Jun19	12Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	6.0	8.0	6.3	8.0	9.0	7.7
2	RazorGuard	100	L	64	fl oz/a	PO1	8.0	7.7	7.0	7.7	10.0	9.0
3	Razor Pro	4	L	64	fl oz/a	PO1	4.0	4.3	4.0	5.0	10.0	9.0
4	Razor Pro	4	L	64	fl oz/a	PO1	8.0	4.3	5.0	6.3	5.7	7.0
	Diquat	2	L	13	fl oz/a	PO1						
	Prodiamine	4	F	21	fl oz/a	PO1						
5	Rely 280	2.34	L	1	lb ai/a	PO1	9.0	8.3	7.7	9.0	9.0	8.0
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	8.0	9.3	7.3	8.3	7.3	3.7
7	Untreated						1.0	1.0	1.0	1.0	1.0	1.0
LSD P=.05							16.64	3.04	1.79	1.39	1.95	4.52
Standard Deviation							1.31	1.71	1.01	0.78	1.10	2.54
CV							20.83	27.82	18.41	12.07	14.79	39.25

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	RECL	ROCI	WHCA	WHCA	QUGR	PEST
Pest Code							RECL	ROCI	WHCA	WICA	QUGR	PEST
Rating Date							12Jun19	12Jun19	12Jun19	12Jun19	18Jun19	18Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	8.7	9.3	7.7	8.3	9.3	9.0
2	RazorGuard	100	L	64	fl oz/a	PO1	9.3	10.0	7.3	9.3	10.0	
3	Razor Pro	4	L	64	fl oz/a	PO1	9.0	8.7	7.7	9.7	8.7	6.0
4	Razor Pro	4	L	64	fl oz/a	PO1	5.7	7.7	6.7	7.0	5.7	6.5
	Diquat	2	L	13	fl oz/a	PO1						
	Prodiamine	4	F	21	fl oz/a	PO1						
5	Rely 280	2.34	L	1	lb ai/a	PO1	10.0	8.3	9.3	4.7	5.3	7.7
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	8.0	10.0	9.3	9.0	5.0	5.3
7	Untreated						1.0	1.0	1.0	1.0	1.0	1.0
LSD P=.05							1.83	3.94	2.89	3.43	3.76	5.99
Standard Deviation							1.03	2.22	1.63	1.93	2.11	2.85
CV							13.97	28.21	23.22	27.56	32.85	48.25

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	SFGE	WHCA	WHCL	WICA	QUGR	PEST	RECL
Pest Code							SFGE	WHCA	WHCL	WICA	QUGR	PEST	RECL
Rating Date							18Jun19	18Jun19	18Jun19	18Jun19	27Jun19	27Jun19	27Jun19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	9.5	8.7	8.0	9.3	7.3	8.7	9.0
2	RazorGuard	100	L	64	fl oz/a	PO1	8.0	8.0	9.7	9.0	9.7	10.0	10.0
3	Razor Pro	4	L	64	fl oz/a	PO1	8.0	8.7	8.0	9.3	9.7	7.3	9.7
4	Razor Pro	4	L	64	fl oz/a	PO1	10.0	5.3	4.0	9.7	6.3	2.3	6.7
	Diquat	2	L	13	fl oz/a	PO1							
	Prodiamine	4	F	21	fl oz/a	PO1							
5	Rely 280	2.34	L	1	lb ai/a	PO1	7.5	9.7	10.0	8.0	6.3	6.3	10.0
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	10.0	8.7	4.0	9.0	5.7	2.7	6.7
7	Untreated							1.0	1.0	4.6	1.7	1.0	1.0
LSD P=.05							35.44	2.40	3.12	2.88	3.90	4.57	0.67
Standard Deviation							3.42	1.35	1.75	1.60	2.19	2.57	0.38
CV							38.67	18.92	27.47	19.07	32.9	46.92	4.99

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WHCA	WHCL	WICA	QUGR	PEST	RECL	WHCL
Pest Code							WHCA	WHCL	WICA	QUGR	PEST	RECL	WHCL
Rating Date							27Jun19	27Jun19	27Jun19	19Jul19	19Jul19	19Jul19	19Jul19
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit							1-10	1-10	1-10	1-10	1-10	1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	10.0	9.7	8.0	7.0	6.0	6.7	8.3
2	RazorGuard	100	L	64	fl oz/a	PO1	10.0	9.7	9.3	9.0	8.7	8.3	8.3
3	Razor Pro	4	L	64	fl oz/a	PO1	9.7	9.3	10.0	7.7	3.7	10.0	8.7
4	Razor Pro	4	L	64	fl oz/a	PO1	9.0	5.7	8.7	8.0	1.0	3.0	5.3
	Diquat	2	L	13	fl oz/a	PO1							
	Prodiamine	4	F	21	fl oz/a	PO1							
5	Rely 280	2.34	L	1	lb ai/a	PO1	10.0	10.0	6.0	6.3	4.3	9.7	10.0
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	7.7	5.7	9.3	4.0	3.0	4.7	7.0
7	Untreated						6.3	4.7	7.0	4.3	1.0	1.0	4.0
LSD P=.05							3.84	3.70	4.57	6.48	5.10	3.81	5.08
Standard Deviation							2.16	2.08	2.57	3.64	2.87	2.14	2.85
CV							24.11	26.63	30.85	55.05	72.58	34.63	38.66

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Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Growth Stage	WICA	WIRA
	Pest Code						WICA	WIRA
	Rating Date						19Jul19	19Jul19
	Rating Type						RATING	RATING
	Rating Unit						1-10	1-10
1	RazorGuard	100	L	42	fl oz/a	PO1	7.7	9.3
2	RazorGuard	100	L	64	fl oz/a	PO1	8.3	10.0
3	Razor Pro	4	L	64	fl oz/a	PO1	9.3	7.0
4	Razor Pro	4	L	64	fl oz/a	PO1	8.0	9.0
	Diquat	2	L	13	fl oz/a	PO1		
	Prodiamine	4	F	21	fl oz/a	PO1		
5	Rely 280	2.34	L	1	lb ai/a	PO1	5.7	10.0
6	Gramoxone 2SL	2	SL	0.6	lb ai/a	PO1	7.0	10.0
7	Untreated						9.0	10.0
LSD P=.05							4.36	3.68
Standard Deviation							2.45	2.07
CV							31.2	22.18