HORTICULTURAL REPORT

2022 WEED CONTROL RESEARCH ON FRUIT & VEGETABLE CROPS

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WEED CONTROL IN HORTICULTURAL CROPS – 2022
FOREWORD

This report summarizes the results of weed control experiments on horticultural crops in Michigan in 2022. It is intended to inform industry and university research and extension colleagues of our current results.

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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-leafed weeds and grasses were sometimes used in orchard studies or for late-season assessments.

Weed control and crop injury are rated on a 0 to 100 scale; 0 = no visible injury or reduction in growth; 100 = complete kill of plants. The ratings can be roughly translated as follows:

100% kill, all the plants are dead or none are visible.
90-100% kill or reduction in growth and stand.
80-90% kill or reduction in growth and stand.
70-80% kill or reduction in growth and stand.
This is still a commercially acceptable control.
60-70% kill or reduction in growth and stand.
50% kill or reduction in growth and stand.
30-40% kill or reduction in growth and stand.
20-30% reduction in growth and stand.
10-20% reduction in growth and stand.
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 2022.5(2), 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.

Personnel Participated in Research Trials:

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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 vulgaris* 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.*
COBT	Common Beggar-Ticks	*Bidens Frondosa* L.
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.
FADA	false dandelion	*Pyrrhopappus carolinianus* (Walt.) DC.
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
FLWE	flixweed	*Descurainia sophia*

WEED LIST

Abbr.	Common Name	Botanical Name
GALI	galinsoga, hairy	*Galinsoga ciliata (Raf.) Blake*
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.
HABI	hawkbit spp.	*Leontodon spp.*
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.
PUAM	purple amaranth	*Amaranthus blitum*
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.

WEED LIST

Abbr.	Common Name	Botanical Name
RRPW	redroot pigweed	*Amaranthus retroflexus* L.
RSFI	redstem filaree	*Erodium cicutarium* (L.) L'Hér. ex Ait.
RUTH	Russian thistle	*Salsola iberica* L.
SFGE	smallflower geranium	*Geranium pusillum* 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.
WHGR	Whitlow Grass	*Draba verna 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	UPL
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
clomazone	Up-Stage	3 CS	UPL
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	UPL
diclobenil	Casoron L	1.4 CS	UPL
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	UPL
flufenacet 54.5% + metribuzin 13.6 %	Axiom	68 DF	Bayer CropScience
flumetsulam	Python	80 WDG	Corteva

CHEMICAL LIST

COMMON NAME	TRADE NAME	FORMULATION	MANUFACTURER
flumioxazin	Chateau SW	51 WG	Valent
flumioxazin	Sureguard	51 WDG	Valent
flumioxazin	Valor EZ	4 SC	Valent
flumioxazin 1.43 lb ai + pyroxasulfone 1.7 lb ai	Fierce EZ	3.04 SC	Valent
fluthiacet	Cadet	0.91 EC	FMC
fluthiacet + mesotrione	Solstice	4L	FMC
fluroxypyr	Starane Ultra	2.8 L	Corteva
florpyrauxifen-benzyl	Loyant	0.21 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	UPL
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
halauxifen	Elevore	0.572 WG	Corteva
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	4.16 SC	Corteva
linuron	Lorox	50 DF	TKI NovaSource
mesotrione	Callisto	4 SC	Syngenta
metribuzin	Tricor	75 DF	UPL
metribuzin 2.23 lb ai + sulfentrazone 1.12 lb ai	KFD-464-01	3.35 SC	UPL
metribuzin 30% + sulfentrazone 15%	KFD-291-02	45 DF	UPL
napropamide	Devrinol DF-XT	50 DF	UPL
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	UPL
oxyfluorfen	Goal 2XL	2 EC	Nufarm
oxyfluorfen	GoalTender	4 SC	Nufarm
paraquat	Gramoxone SL	2 L	Syngenta
pelargonic acid	Scythe	4.2 EC	Gowan

CHEMICAL LIST

COMMON NAME	TRADE NAME	FORMULATION	MANUFACTURER
pendimethalin	Prowl	3.3 EC	BASF
pendimethalin	Prowl H2O	3.8 ACS	BASF
pendimethalin	Satellite Hydrocap	3.8 SC	UPL
penoxsulam 0.083 lb ai + oxyfluorfen 3.93 lb ai	Pindar GT	4.013	Corteva
phenmedipham	Spin-Aid	1.3 L	Bayer CropScience
phenmedipham 0.6 lb ai + desmedipham 0.6 lb ai	Betamix	1.3 L	Bayer CropScience
prometryn	Caparol	4 L	Syngenta
pronamide	Kerb	3.3 SC	Corteva
pyraflufen-ethyl	Venue	0.17 SC	Nichino
pyridate	Lentagran	45 WP	NA
Pyridate	Tough	5 EC	Belchim
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	Shutdown	4.16 SC	UPL
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
tiafenacil	DCC-3825	70 WDG	ISK
tiafenacil	Reviton	2.83 SC	HELM Agro
tembotrione	Laudis	3.5 SC	Bayer CropScience
terbacil	Sinbar	80 WDG	TKI NovaSource
tolpyralate	Shieldex 400 SC, SL-573	3.33 L	Summit Agro USA
topramezone	Impact	2.8 L	Amvac
triclopyr	Garlon	3 SC	Corteva
trifloxysulfuron	Envoke	75 WG	Syngenta
trifludimoxazin (15%) + saflufenacil (25%)	BAS 851-01 (BASF-1)	3.13 SC	BASF
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	
Bronc	AMS	38% ammonium sulfate liquid	Wilbur-Ellis
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 / ac =	Acre
a.i. / ai =	Active Ingredient
Amt =	Amount
ACS =	Aqueous Capsule Suspension
AMS =	Ammonium Sulfate
AS =	Aqueous Solution
ASPA =	Asparagus
BCUP =	Buttercup Squash
BIR =	Bicyclopyrone
BL =	Broad Leaf/Leaves
BLBE =	Blueberry
BNUT =	Butternut Squash
CAULI =	Cauliflower
CEC =	Cation Exchange Capacity
CRC =	Clarksville Research Center
CS =	Capsule Suspension
CUKE =	Cucumber
CV =	Coefficient of Variability
DAP =	Days After Planting
DF =	Dry Flowable
DIA =	Diameter
DIR =	Directed
DORM	Dormant
DPRE =	Delayed Preemergence
DS =	Designator
EC =	Emulsifiable Concentrate
EPRE =	Early Preemergence
EPOST =	Early Postemergence
F =	Flowable or Fahrenheight
FALL =	Fall Application
FM/FORM =	Formulation
FT =	Distance in feet
g / gr =	Gram
GAL =	Gallon
GPA =	Gallon per acre
GROW STG =	Growth Stage at time of Application
HRVT =	Harvest
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 or Nitrogen
NA =	Not Applicable/ Not Available
NO. =	Number
OM =	Organic Matter
OZ =	Ounce
P =	Probability
POH =	Post Harvest
PO1 =	Postemergence 1
PO2 =	Postemergence 2
PO3 =	Postemergence 3
PO4 =	Postemergence 4
POST =	Postemergence
POT/POTP =	Post Transplant
PPI =	Preplant Incorporated
PRE =	Preemergence
PREC. =	Precipitation (inches)
PRT/PRTP =	Pretransplant
PSI =	Pounds per square inch
PT PR =	Pint Product
PUMP =	Pumpkin
QT =	Quart
QT PR =	Quart Product
REBE =	Red Beet
RCB / RCBD =	Randomized Complete Block Design
RH =	Relative Humidity
REP(S) =	Replication
SC =	Suspension Concentrate
SE =	Suspo-emulsion
SNBE =	Snapbean
SP =	Soluble Powder
SPP =	Species
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
WC =	Weed Control
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
2022

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	35.3	26.7	0	1	61.6	46	0.18	1	77.2	60.1	0
2	43.8	21.2	0.03	2	51.6	44.4	0	2	74.9	53.7	0.03
3	45	31.9	0.05	3	51	43.5	0.94	3	77.8	45.3	0
4	43.2	32	0.27	4	57.9	41.3	0.01	4	72.6	41	0
5	58.6	37	0	5	58.8	35.5	0	5	68.5	53.8	0.02
6	51.4	43.5	0.47	6	62.3	46.7	0.12	6	75.1	58.5	0.04
7	47.3	37.4	0.07	7	65.2	41	0	7	72.2	53.3	1.37
8	46	34.1	0.24	8	66.3	32.7	0	8	67.3	46.7	0.18
9	38.6	29.1	0	9	74.6	46.6	0	9	73.5	49	0.01
10	57	24.2	0	10	81.2	56.1	0	10	74.2	46.4	0
11	66.8	33.3	0	11	81.6	63.1	0	11	75.2	49.1	0
12	67.1	31.2	0	12	85.9	53.4	0	12	80.2	59.1	0
13	67.1	53.6	0.23	13	85.9	50.5	0	13	76.1	62.7	0.32
14	62.4	36.1	0.07	14	85.9	58.6	0.21	14	92.1	68.5	0
15	50.7	39.1	0.01	15	82	51.1	0.01	15	92.6	67.2	0
16	41.8	28.5	0	16	73.3	52	0.1	16	89.2	71.5	0.04
17	45.2	27.4	0	17	66.6	44.3	0	17	72.3	51.6	0
18	35.5	30.7	0.18	18	53.5	42.2	0.23	18	78.6	47.3	0
19	42.8	31.9	0.03	19	76.8	52.7	0	19	84.8	60.5	0.09
20	52.1	24.6	0	20	84.3	60.9	0	20	94.6	68.1	0
21	63.5	42.8	0.12	21	77	57.1	0.42	21	86.2	71.9	0
22	51	33	0.34	22	62.4	46.3	0.02	22	86.3	69.7	0
23	81.8	43.4	0.96	23	61.3	40.9	0	23	80.5	53.7	0
24	80.6	64.3	0.74	24	67	39.7	0	24	88.5	52.9	0
25	65.3	42.7	0	25	69.4	48.6	0.27	25	87.1	58.3	0.05
26	43.4	34.2	0	26	74.2	60.6	0.13	26	81.5	63.6	0
27	42.1	29.4	0	27	72.4	51.5	0	27	73.5	49.6	0
28	54	26.3	0	28	74	50.4	0	28	80.9	44.7	0
29	60.1	37.2	0	29	81	53.6	0	29	81.8	59.5	0.36
30	59.2	42.9	0.04	30	86.1	63.4	0	30	87.7	61.2	0
				31	88.1	70	0				

TEMPERATURE AND PRECIPITATION DATA

MSU Horticulture Teaching and Research Center

Recorded at
MSU Horticulture Teaching and Research Center (HTRC)
East Lansing, Michigan
2022

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	82.3	61.7	0	1	82.3	61.7	0	1	84.2	54.4	0
2	82	60.1	0	2	82	60.1	0	2	84.1	61.7	0
3	86.1	59.9	0	3	86.1	59.9	0.61	3	86.5	60.1	0
4	87.5	57.8	0	4	87.5	57.8	0.01	4	68.6	59.9	0
5	75.1	57.2	0.21	5	75.1	57.2	0	5	71.1	57.8	0
6	76.4	49.3	0.09	6	76.4	49.3	0	6	76.2	57.2	0
7	83.6	47.1	0.01	7	83.6	47.1	0.32	7	76.7	49.3	0
8	81.5	48.8	0.04	8	81.5	48.8	0.06	8	82.9	47.1	0
9	79.1	59.5	0	9	79.1	59.5	0	9	82.2	48.8	0
10	82.5	65.3	0	10	82.5	65.3	0	10	86.9	59.5	0
11	82.3	49.1	0	11	82.3	49.1	0	11	71.6	65.3	0.64
12	80.3	46.1	0.01	12	80.3	46.1	0	12	67.3	49.1	0
13	77.8	50.6	0	13	77.8	50.6	0.47	13	71.8	46.1	0
14	80.1	51.1	0	14	80.1	51.1	0.03	14	77.7	50.6	0
15	78.1	54.1	0.25	15	78.1	54.1	0	15	76.1	51.1	0
16	81	55.7	0.01	16	81	55.7	0	16	80	54.1	0
17	78.9	64.7	0	17	78.9	64.7	0	17	83	55.7	0
18	87.7	55	0	18	87.7	55	0	18	82.7	64.7	0.02
19	89.6	50	0	19	89.6	50	0.06	19	80	55	0.04
20	90.2	62.2	0	20	90.2	62.2	0.01	20	72.8	50	0.87
21	88.2	45.4	0	21	88.2	45.4	0.41	21	83.3	62.2	0.1
22	89	37.1	0	22	89	37.1	0	22	62.8	45.4	0
23	88.1	48.5	0.12	23	88.1	48.5	0	23	63.7	37.1	0
24	83.4	51.8	0.73	24	83.4	51.8	0	24	62.9	48.5	0.06
25	76.3	47.9	0	25	76.3	47.9	0.04	25	63.1	51.8	0.13
26	79.5	45.1	0	26	79.5	45.1	0	26	59.2	47.9	0.1
27	81.8	44.7	0	27	81.8	44.7	0	27	59.3	45.1	0
28	78.8	39.6	0	28	78.8	39.6	0	28	55.4	44.7	0
29	78.8	33.8	0	29	78.8	33.8	0.59	29	60.9	39.6	0
30	81.7		0	30	81.7		0	30	66.5	33.8	0
31	84.2		0	31	84.2		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
2022

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	36.7	28	0.12	1	56.4	47.3	0.38	1	78.3	52.5	0
2	43.7	28.4	0.21	2	52.4	44.6	0.68	2	72.6	49.7	0
3	54.3	38.4	-	3	57.7	41.3	0	3	78.3	50.5	0
4	55.7	39.4	0.07	4	59.1	39.4	0.36	4	71.6	43.2	0
5	56.3	37.1	0	5	58.2	39.2	0.1	5	80.7	56.4	0
6	56.6	45	0.53	6	66.2	44.4	0	6	76.3	60.8	0.14
7	45	38.4	0.02	7	67	45.5	0	7	63.6	51.4	0.22
8	40.1	32.5	0.05	8	66.1	44.3	0	8	69.7	47.9	0.6
9	60.2	29.1	0	9	78	50.9	0	9	72.8	52.9	0
10	59.6	42.6	0	10	89.5	69.7	0	10	73.6	52.8	0
11	69.4	33.8	0	11	90.4	69.7	0	11	74.1	51.4	0
12	67.3	59.7	0.32	12	88.1	66.4	0	12	77	58.9	0
13	50.5	36.3	0.07	13	87.7	61.7	0	13	87.5	61.5	1.04
14	51.5	40.6	0.12	14	77.7	56.9	0	14	95.3	72.1	0
15	41.2	30.8	0	15	71.3	52.8	0.07	15	93.6	75.9	0
16	40.8	29.1	0	16	72.6	51.6	0.01	16	91.4	69.4	0.03
17	39.4	31.5	0.21	17	64.6	46.9	0	17	80.9	59.5	0
18	43	32.7	0	18	59.4	51.7	0.16	18	70.3	51.1	0
19	50.4	31.8	0.11	19	81.4	48	0	19	81.5	47.7	0
20	63.9	47.8	0.09	20	84.5	61.3	0	20	90.4	61.4	0
21	51.7	39.8	0.64	21	61.4	52.9	0.54	21	96.6	64	0
22	83.1	47.2	0	22	57.9	42.6	0	22	85.3	64.2	0
23	73.2	64.2	0.42	23	63.5	40.2	0	23	78.8	56.9	0
24	60	42.2	0	24	69.7	47.5	0	24	88.3	51.8	0
25	41.2	33.2	0	25	77.5	56.9	0.2	25	77.2	64.6	0
26	41.5	33	0	26	74.9	63.5	0	26	77.1	66.5	0
27	50.3	35.9	0	27	65.6	48.7	0.06	27	71.5	51.8	0
28	50	35.7	0	28	72.8	43.9	0	28	83.2	46.7	0
29	64	42.6	0	29	83.2	58.9	0	29	84.1	62	0
30	64.2	49.6	0.69	30	88.1	68.8	0	30	91.1	67.1	0
				31	89.4	72.9	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
2022

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	78.5	59.9	0	1	85.1	62.6	0	1	85.8	62.3	0
2	80.7	55.1	0	2	89.7	70.2	1.16	2	84.7	66.1	0
3	85.5	57.9	0	3	81.3	70	0.23	3	84.2	62.4	0
4	89.6	63	0	4	81.3	69.5	0.21	4	70.8	63.6	0.01
5	88.7	67.2	2.03	5	88.7	70	0	5	77.3	59.9	0
6	83.9	69.6	0.62	6	89.4	70.3	0.01	6	79	63.5	0
7	84.8	65.8	0	7	83.6	73.1	0.61	7	77.6	56.5	0
8	83	67.9	0	8	80.7	68.4	0.02	8	81	52.2	0
9	81.3	59.1	0	9	77.5	55.9	0	9	84.1	55.1	0
10	80.3	55.1	0	10	76.8	62.3	0	10	82.2	60.4	0
11	85.2	62.6	0.12	11	77.7	62.7	0	11	71.7	61.3	0.54
12	78	62.2	0	12	73.8	56.6	0.06	12	62.4	54	0
13	75.7	60.4	0	13	68.3	60.6	0.28	13	69.4	48.7	0.08
14	80.8	56.1	0	14	76	60.3	0	14	75.6	51.7	0
15	80.8	66.8	0.02	15	77.4	57.4	0	15	80.4	51.4	0.01
16	78.7	67.5	1.85	16	79	57.6	0	16	81.1	58.5	0
17	81.4	66.6	0	17	79	54.4	0	17	84.9	64	0
18	86.1	63.4	0	18	83.6	62	0	18	84.7	65.8	0
19	85.2	73.5	0.04	19	78.5	65	0.16	19	74.2	57.4	0.25
20	86	72.9	0.01	20	77	64.1	0.38	20	70.1	69.9	0
21	84.6	66.6	0.01	21	76.3	60.9	0	21	79.6	64.3	0
22	86.2	65.8	0	22	78.2	53.9	0	22	64.7	48.7	0
23	80.4	67.6	0.58	23	81.5	57.9	0	23	63.9	42.4	0
24	83.4	68	0.35	24	82.8	57.2	0	24	67.5	52.2	0
25	78.2	55.7	0	25	75.1	62.2	0	25	62.8	55.1	0.47
26	79.4	63.5	0.01	26	75.3	58.8	0	26	60.3	50.9	0.38
27	76.6	64	0.02	27	82.4	55.1	0	27	56.5	48.8	0.62
28	75.6	58.7	0	28	89.6	63.9	0	28	58.6	45.7	0
29	80.1	56.8	0	29	87.9	67.9	0.2	29	62.6	40.3	0
30	83.2	60.9	0	30	76	61.1	0	30	65.2	40.6	0
31	81.7	68.1	0	31	80.6	55.3	0				

TEMPERATURE AND PRECIPITATION DATA

Decatur

Recorded at
Bartley Farms
Dowagiac, Michigan
2022

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	38.3	26.5	0.11	1	57.3	47.6	0.21	1	78.4	52	0
2	45	25.2	0.18	2	53.9	46.4	0	2	74.6	48.7	0
3	50.7	34.1	0	3	53	46.4	0.99	3	78.4	46.3	0
4	56.6	36.5	0.2	4	63.3	42.8	0	4	75.2	40.5	0
5	58.1	36.4	0	5	58.7	39.6	0.1	5	86.1	56.5	0
6	56	45.7	0.52	6	54.7	48.3	0.45	6	77.7	55.3	0.26
7	47	38.1	0.05	7	69.8	43.9	0	7	69.7	51.9	0.36
8	41.7	33.3	0.03	8	67.4	41.7	0	8	72.3	47.4	0.52
9	41.8	30.3	0.1	9	78.5	49.9	0	9	74.9	52.4	0
10	60.7	26.7	0	10	87.1	65.9	0	10	79.8	48.2	0
11	63.6	38.8	0	11	90.3	68.1	0	11	75.3	49.3	0
12	69.9	31.7	0	12	89.3	59.1	0	12	84.8	59.3	0
13	66.9	48.1	0.86	13	88.8	53.9	0	13	89.3	61.6	0.48
14	51.3	35.9	0.18	14	82.2	54.5	0	14	97	70.7	0.01
15	51	41.1	0.04	15	78.6	49.9	0.12	15	94.3	76.9	0
16	43.3	28.7	0	16	74.3	50.7	0.01	16	92.1	71.1	0
17	48.8	25.4	0	17	69	48.1	0	17	80.8	59.6	0
18	39.1	31.3	0.15	18	60	53.4	0.1	18	77.4	48.5	0
19	45	29.7	0.13	19	81.7	48.9	0	19	83.3	46.2	0
20	53.5	28.1	0.03	20	85.2	61.2	0	20	91.6	56.7	0
21	65.3	45.4	0.21	21	64	53.8	0.21	21	96.6	59.9	0
22	52	38.9	0.52	22	59.8	41.2	0	22	84.9	63.8	0
23	83.8	47.1	0.01	23	68.4	37.4	0	23	84	53.8	0
24	76.1	63.3	0.3	24	71.1	44.8	0	24	92	50	0
25	63.5	41.7	0	25	72.7	61.9	0.04	25	79	57.8	0.01
26	42	31.1	0	26	74.7	60	0	26	79.3	63.8	0
27	41.8	28.7	0	27	67.5	49.5	0.13	27	74.1	49.2	0
28	50.3	35.5	0	28	77.2	45.6	0	28	84.1	44.7	0
29	64.3	41.8	0	29	84.9	54.3	0	29	86.4	61.7	0
30	64.9	47.9	0.54	30	89.3	63.1	0	30	90.7	62.2	0
				31	89.7	73.6	0				

TEMPERATURE AND PRECIPITATION DATA

Decatur

Recorded at
Bartley Farms
Dowagiac, Michigan
2022

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	82.2	60.5	0.02	1	82.6	65.7	0	1	87.1	60	0
2	85.1	52.1	0	2	86.8	59.5	0	2	84.9	62	0
3	90.5	55	0	3	90	68.7	0.25	3	87.4	61.5	0
4	89.7	56.9	0	4	86.3	68.8	0.07	4	70.8	63.2	0.02
5	90.8	68	2.64	5	88.7	67.2	0	5	78	60.2	0
6	86.5	69.1	0.4	6	90.9	67.3	0	6	83.5	62.1	0
7	85.1	65.1	0	7	83.7	71.4	1.25	7	82.3	54.5	0
8	83.3	65.3	0	8	83.5	67.7	0.34	8	84.7	50.5	0
9	82.4	59.3	0	9	81.1	58.8	0	9	84	48.9	0
10	85.1	51.4	0	10	82.4	55	0	10	85.7	55.8	0
11	85.1	60.2	0	11	80.4	60.5	0	11	72	60	0.3
12	80.5	61.2	0	12	80.6	50.9	0	12	60.4	51.4	0
13	79.4	59.1	0	13	76.3	53	0.01	13	69.4	46.7	0.04
14	85.4	56.3	0	14	67.9	60.1	0.22	14	79.8	47.1	0
15	74.8	56.3	0.36	15	81.5	58.5	0	15	82.4	51.3	0
16	81.7	66.8	0.02	16	83.5	54.4	0	16	81.8	51.8	0
17	80.8	68	1.94	17	86.1	54.9	0	17	84.6	56.7	0
18	87	63.7	0.01	18	80.9	52.5	0	18	85.7	65	0
19	86.9	73.2	0	19	84.9	56.9	0	19	79.4	55	0.19
20	87.3	68.3	0	20	81.2	58.5	0.3	20	69.7	69.7	0
21	85.6	66.3	0.93	21	82.4	62.7	0.92	21	80.8	61.9	0.01
22	89.9	67.5	0	22	82.8	56.6	0	22	63.5	46.5	0
23	86.3	65.6	0.67	23	83.1	52.1	0	23	66	35.5	0
24	82.3	67.1	0.33	24	86.3	55.1	0	24	70.5	51.6	0
25	76.6	56.8	0	25	76.8	58.2	0	25	64.2	52.7	0.41
26	80.3	54.5	0	26	79.9	58.2	0	26	60.9	49.5	0.15
27	82.1	61.5	0	27	82	52.5	0	27	57.5	46	0.41
28	78.8	61.3	0	28	86.9	59.7	0.04	28	63	43.9	0
29	77.3	55	0	29	87.6	66.8	0.19	29	67.1	35.8	0
30	83.7	53.1	0	30	77	59.3	0.02	30	69.7	35.9	0
31	84.1	58.4	0	31	80.4	54.2	0				

TEMPERATURE AND PRECIPITATION DATA

Fennville & Hamilton

Recorded at
MSU Trevor Nichols Research Center
Fennville, Michigan
2022

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	36.6	25	0.07	1	56.7	46.1	0.19	1	75.1	52.3	0.03
2	42	25.7	0.15	2	50.9	43.1	0	2	67.7	50	0
3	45	33.6	0	3	51	42.6	0.85	3	72	47.4	0
4	51.4	36.8	0.31	4	56	39.4	0	4	68.7	40.9	0
5	58	34.7	0	5	59.5	37.2	0	5	72.5	53.4	0.06
6	53.7	43.7	0.63	6	59.6	48.7	0.36	6	72.9	60	0.02
7	44	37.4	0.02	7	67.4	45	0	7	64	52.8	0.29
8	39.9	32.4	0.05	8	67.7	42.3	0	8	67.5	47.8	0.39
9	39.1	27.8	0.06	9	78.5	48.7	0	9	67.5	51	0.02
10	60.3	23.6	0	10	85.6	65.3	0	10	73.2	51	0
11	57.4	35.2	0.01	11	90.2	66.7	0	11	71.1	55	0
12	68.9	32.1	0	12	88.2	62.9	0	12	74.2	57.3	0
13	67.6	44.3	0.44	13	87	57.7	0	13	86.7	55.4	0.9
14	46.7	36.4	0.14	14	74.8	53.2	0	14	91.8	68.4	0.17
15	44.2	40	0	15	68.4	49.3	0.05	15	90.4	79.4	0
16	40.2	27.3	0	16	69.6	50.4	0.01	16	86.1	66.1	0.25
17	45.8	26.5	0	17	62.6	43.5	0	17	74.4	61.7	0
18	38.7	31	0.21	18	56.4	46.6	0.28	18	73.2	50	0
19	41.5	29.5	0	19	76.2	48.1	0	19	75.4	47.4	0
20	49.8	28.6	0.08	20	84.2	56.3	0	20	84	61.6	0
21	60.5	38.1	0.23	21	60.5	51.5	0.13	21	90.8	69.4	0
22	49.4	35.8	0.85	22	56.5	42.8	0	22	83.2	61.2	0
23	82	48.6	0	23	65.1	36.7	0	23	80	55.4	0
24	73.4	52.8	0.06	24	67.8	47.1	0	24	84.2	53.9	0
25	54.7	41.2	0	25	71.3	53.8	0.58	25	79	59.4	0.12
26	41.2	34	0	26	75.5	58.8	0.16	26	72.7	64.8	0
27	39.1	31.7	0	27	63.5	52.3	0.08	27	67.6	50.6	0
28	50.7	34.8	0	28	68.9	44.4	0	28	79.7	47.1	0
29	63.4	44.5	0	29	82.7	54.5	0	29	77.5	60.8	0
30	60.9	48.9	0.49	30	86.6	63.2	0	30	86.1	61.9	0
				31	84.2	68.9	0				

TEMPERATURE AND PRECIPITATION DATA

Fennville & Hamilton

Recorded at
MSU Trevor Nichols Research Center
Fennville, Michigan
2022

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	78.7	62.2	0	1	80.1	66.3	0	1	85.7	61.6	0
2	78.5	53.6	0	2	83.3	61.7	0	2	83.1	64.8	0
3	80.8	55.4	0	3	86.6	70.5	0.14	3	80.4	61.8	0
4	87.1	59	0.07	4	80.3	66.6	0	4	70.1	60.5	0
5	81.3	68.3	0.53	5	88.9	63.2	0	5	72	58.7	0
6	83.7	67.6	0.08	6	87.8	69.4	0	6	79.6	62.1	0
7	83.3	62.2	0	7	81.3	73.6	0.07	7	79.5	54.6	0
8	84.3	64.6	0.13	8	78	67.1	0.01	8	77.3	51.9	0
9	82.1	56.8	0	9	79.1	56.1	0	9	82.8	55.2	0
10	77	48.4	0	10	77.2	53.1	0	10	81	58.5	0
11	78.7	61.7	0.05	11	82	62.9	0	11	71.1	58.8	0.57
12	76.9	60	0.01	12	76.5	48.8	0	12	63.8	53.9	0
13	77.5	58.5	0	13	63.2	51.7	0.17	13	73	49.9	0
14	80.2	57.2	0	14	68.2	57	0.18	14	73.2	51.9	0
15	72.5	52.8	0.16	15	81.2	59.6	0	15	76.8	51.1	0
16	84.5	64.5	0	16	83.9	54.6	0.01	16	78.2	57	0
17	79	67.1	0	17	83.6	55.1	0	17	81.8	61.4	0
18	80.7	61.6	0	18	76.7	55.4	0	18	80.6	65.5	0.19
19	84.3	68.6	0	19	83.6	59.2	0	19	75.8	55.7	0
20	81.9	69.3	0.11	20	78.5	64.5	0.09	20	68.4	67.9	0
21	84.4	66	0.06	21	77.4	63.5	0.01	21	76.3	64.1	0
22	84	64.4	0	22	80.9	56.3	0	22	64.5	43.9	0
23	83.7	67.2	0.56	23	78.3	51.3	0	23	65.3	37.4	0
24	77.6	67	0.8	24	83	57.7	0	24	62.2	50.1	0.05
25	73.2	56.6	0	25	74.2	61.8	0	25	63.7	54.9	0.18
26	79.9	54.5	0	26	77.8	58	0	26	59.2	50	0.15
27	78.9	59.7	0	27	83.1	53.2	0	27	55.9	46.1	0.42
28	74.6	59.2	0.03	28	89.4	62.6	0.79	28	59.7	44.3	0
29	74.5	55.6	0	29	85.4	67.8	0.49	29	63.4	39.9	0
30	78.6	55.6	0	30	74.6	67.5	0	30	67.2	37.1	0
31	81.5	58.6	0	31	77	65	0				

TEMPERATURE AND PRECIPITATION DATA

Hart

Recorded at
MSU Earl & Linda Perterson West Michigan Research Station
Hart, Michigan
2022

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	35.2	26.5	0.03	1	54.3	45.5	0.08	1	71.7	49.5	0
2	37.8	26.7	0.08	2	50.3	44.8	0	2	69.1	47	0
3	44.1	32.4	0.01	3	48.3	42.2	0.41	3	69.5	47.8	0
4	38.7	34.2	0.32	4	55.5	34.9	0	4	70.7	44.4	0
5	47.8	34.7	0	5	60.7	36.9	0	5	61.7	50.6	0.18
6	52.8	41.6	0.57	6	65.5	43	0	6	64.6	51.9	0.27
7	43	37.1	0	7	67.6	38	0	7	62.3	49.5	0
8	40.7	29.9	0.01	8	67	37.9	0	8	59.9	47.6	0.36
9	38.2	27.5	0.04	9	79.7	50.3	0	9	69.9	45.6	0
10	57.7	25.4	0	10	82.9	63.5	0	10	73	49.3	0
11	55	37.3	0	11	77.5	67.2	1.07	11	65.7	56.4	0
12	65.6	33.6	0.08	12	85.8	63.9	0	12	67.7	50.7	0
13	66.4	45.5	0.37	13	85.1	59.5	0	13	78.6	51	0.34
14	45.6	34.5	0.25	14	76.7	56.9	0	14	88.9	62.7	0
15	41	30	0	15	71.5	50.9	0	15	82.5	65.3	0.58
16	33.5	30.4	0	16	69.7	45.4	0	16	82.7	65.1	0.55
17	41.8	28.2	0	17	59.9	37.3	0	17	75.7	55.3	0
18	36.7	27.9	0.09	18	59.6	41.7	0	18	70.3	48.5	0
19	41.8	28.7	0.02	19	69.1	48.6	0	19	74.8	45.1	0
20	51.6	26.5	0.2	20	75.3	56.1	0.06	20	81.9	64.2	0
21	60.4	43.1	0.5	21	61.2	49.8	0	21	88.5	68.4	0
22	53.8	33.6	0.18	22	54.4	41.5	0	22	79.8	60.1	0
23	76.2	46.2	0	23	61	34.5	0	23	77.6	48.4	0
24	72.5	51.1	0.32	24	64.8	41	0	24	84.6	54.9	0
25	51.1	40.5	0	25	66	45.8	0.63	25	82	64.4	0.01
26	40.6	31.9	0.03	26	73	58.1	0.25	26	74.5	60.6	0
27	43	27.4	0	27	64.4	49	0	27	68.8	49.5	0
28	56.5	24.9	0.02	28	68.8	41.2	0	28	80.1	46.4	0.1
29	62.6	42.8	0	29	81.7	54.3	0	29	76.1	59.4	0.14
30	57	46	0.25	30	84.2	70.2	0	30	85.3	61.7	0
				31	79.5	70.9	0				

TEMPERATURE AND PRECIPITATION DATA

Hart

Recorded at
MSU Earl & Linda Peterson West Michigan Research Station
Hart, Michigan
2022

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	78.2	56.3	0.06	1	79.6	66.5	0.13	1	82	56.5	0
2	78.3	56.3	0	2	79.5	55.7	0	2	80.7	67.2	0
3	81.3	53.3	0	3	77.2	71.7	0.28	3	78.4	60.4	0.15
4	83.8	64.5	0.09	4	82.5	66.3	0	4	70.2	56.8	0
5	76.8	65.7	0	5	83.4	62.2	0	5	69.4	51.8	0
6	83.2	66.9	0	6	86.2	69.2	0	6	76.1	58.4	0
7	81.7	62.7	0	7	80.9	71.7	0.73	7	75.4	51.7	0
8	81.6	62.7	0	8	75.9	63.7	0.04	8	80.3	52.8	0
9	81.4	52.1	0	9	74.4	53.4	0	9	78.6	57.5	0
10	82.3	50.2	0.04	10	79.5	52.9	0.42	10	80.6	57.7	0
11	81.9	59.4	0.57	11	75.5	54.5	0.01	11	71.4	60.3	0.85
12	74.6	62.9	0.01	12	73	46	0	12	67.5	56.4	0
13	76.8	60.4	0.03	13	58.8	52.7	3.57	13	70.8	53.7	0.04
14	77.1	52.6	0	14	73.7	56.4	0	14	72.3	53.1	0
15	73.6	49.2	1.09	15	77.7	58.6	0	15	73.9	50.8	0
16	80.4	63.3	0	16	81	55.2	0	16	79	57.9	0
17	82.7	62.8	0	17	76.8	55.2	0	17	79.3	60.6	0
18	84.2	59.7	0	18	78.5	55.2	0	18	80	65.3	0
19	85.1	70.7	0	19	80	59.7	0.02	19	72.5	56.2	0
20	82.2	69.7	0	20	76.6	63.2	0	20	69.8	52.8	0.37
21	84.4	67	0	21	78.4	58.6	0	21	72.9	60.1	0
22	85.8	59.6	0	22	74.8	56.7	0	22	60.7	44.2	0.07
23	84.1	67.1	0.29	23	80.4	53.8	0	23	62.7	36.1	0
24	79.2	65.9	2.88	24	82.1	58.6	0	24	57.7	49.2	0.28
25	71.8	57.2	0	25	71.2	63.1	0.27	25	60.5	52.6	0.17
26	77.8	58.8	0	26	75.7	56.3	0	26	56.3	49.1	0.16
27	79.9	59.7	0	27	77.8	55.1	0	27	50.8	45.1	0.14
28	74.6	59.5	0.07	28	82.7	62.8	0.55	28	51.6	35.1	0
29	73.9	59.5	0	29	76	69.8	0.27	29	58.8	32.5	0
30	78.9	55.5	0	30	72.7	62.2	0	30	62.3	38.1	0
31	81.2	59.7	0	31	77.8	59.7	0				

TEMPERATURE AND PRECIPITATION DATA

Hudsonville

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2022

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	38.5	27.2	0	1	57.3	46.1	0.29	1	77.3	52.7	0.01
2	41.3	24.9	0.07	2	51	45.3	0	2	72.3	48.9	0
3	49.6	31.7	0.05	3	50.8	43.7	0.6	3	74.4	50.6	0
4	50.6	36.5	0.32	4	63.6	39.9	0	4	70.1	43.1	0
5	57.8	33.6	0	5	59.6	38.7	0	5	70.4	53.8	0.06
6	53.9	43.9	0.56	6	61.1	48.7	0.17	6	75.3	61.2	0.01
7	44.5	37.3	0.04	7	65.8	45.8	0	7	72.1	51.1	0.03
8	43.9	31.1	0.1	8	67.3	39.3	0	8	65.3	46.9	0.41
9	39.3	29.1	0.01	9	77.1	48.2	0	9	70.4	50.5	0.02
10	59	25	0	10	83.8	64.2	0	10	75	48	0
11	57.2	37.4	0	11	87.8	66.9	0	11	74	53.9	0
12	68.4	30.9	0	12	87.2	63.4	0	12	79.1	55.6	0
13	67.4	51.1	0.59	13	86.5	60	0	13	86.1	56.4	0.11
14	51.3	35.4	0.14	14	83.3	54.9	0	14	93.7	67.7	0
15	44.2	38.1	0	15	76.6	49	0	15	92.6	74.3	0
16	38.9	25.9	0	16	72.1	48.9	0	16	88.2	63.4	0.3
17	44.9	25.2	0	17	62.9	41.4	0	17	73.4	49.5	0
18	37.8	30.8	0.16	18	54.5	43.1	0.2	18	73.6	45.7	0
19	44	29.9	0.02	19	74.7	49.4	0	19	78.2	46.9	0
20	51.5	26.9	0.07	20	85.6	61	0	20	85.5	64.4	0
21	62.7	40.1	0.37	21	62.6	51.5	0.55	21	92.9	61.3	0
22	48.3	36.8	1.27	22	57.7	43.5	0	22	82.3	62.1	0
23	83	45.9	0	23	63.6	36.1	0	23	82.3	53.7	0
24	72.8	55	0.14	24	66.3	45.6	0	24	88.4	52.9	0
25	55	39.4	0	25	69.3	53.1	0.37	25	81.8	59.3	0.02
26	41.4	33.6	0	26	75.5	61.5	0.16	26	75.2	59.5	0
27	47.7	29.7	0	27	69	55.9	0.01	27	70.9	48.1	0
28	53.2	31	0	28	70.2	45	0	28	81.1	47.1	0
29	63.3	43.9	0	29	81.8	55.4	0	29	82.5	60.9	0.07
30	58.2	47.5	0.45	30	87.4	67.3	0	30	88.1	60.4	0
				31	86.7	70.7	0				

TEMPERATURE AND PRECIPITATION DATA

Hudsonville

Recorded at
Michigan Celery Cooperative
Hudsonville, Michigan
2022

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	83.7	57.9	0	1	80.7	66.7	0	1	84.9	58.2	0
2	82.5	54.8	0	2	84	59.3	0	2	84.1	66	0
3	84.9	56.3	0	3	85.7	71.7	0.04	3	84.7	64.3	0.2
4	88.8	60.5	0.31	4	82.2	66.8	0	4	69.5	60.8	0
5	82.3	68.9	0.58	5	89.7	70.5	0	5	70.9	59.3	0
6	78.9	68.9	0.03	6	90.1	68.1	0	6	77.8	60.7	0
7	85.3	61.5	0	7	83.8	74.1	0	7	80.2	53.3	0
8	82.3	66.4	0	8	78.2	66.2	0.05	8	81.1	52.2	0
9	82	58.5	0	9	80.3	55.7	0	9	82.7	57.1	0
10	81.7	49	0	10	81.5	52.3	0	10	83.4	59.1	0
11	79.1	64.5	0.01	11	81.4	61.2	0	11	68	57.4	0.87
12	76.8	62	0	12	77.8	48.6	0	12	65.9	55.7	0.01
13	80	61.5	0.31	13	60.5	53.4	2.25	13	73.7	52	0
14	81.2	59.1	0	14	70.7	55.6	0.1	14	78.8	51.9	0
15	72.6	54.3	0	15	81.9	58.1	0	15	77.7	56.5	0
16	83.4	64.4	0	16	83.7	52.9	0	16	80.8	59.9	0
17	80	67.6	0	17	82.7	56.1	0	17	82.8	63.3	0
18	85.5	59.8	0	18	80	54.8	0	18	82.1	64.2	0.24
19	86.9	66.6	0	19	83.5	59.2	0	19	81	57.6	0
20	85.6	68.9	0.08	20	77.6	64.7	0.49	20	65.2	64.7	0
21	85.1	66.3	0.21	21	81.6	63	0	21	78.8	60.1	0
22	85.5	62.6	0	22	80.8	56.8	0	22	64.5	43.2	0
23	87.5	65.5	1.26	23	80.9	51.7	0	23	64.5	35.3	0
24	78.7	64.9	0.96	24	84.1	57.1	0	24	62.5	51.4	0.02
25	72.9	56	0	25	74.6	63.1	0.03	25	64.7	49.6	0.49
26	79.8	54.9	0	26	80	60.2	0	26	58.1	47.4	0
27	80.5	59.3	0	27	80	54.7	0	27	57.7	42.7	0.04
28	75.9	59.9	0	28	86.8	62.7	0.97	28	55.9	45.6	0
29	75.5	55.2	0	29	82.3	67	0.34	29	63.7	41.7	0
30	80.1	56.1	0	30	74.9	59.8	0	30	67.9	38.5	0
31	82.6	58.4	0	31	78.8	57.2	0				

TEMPERATURE AND PRECIPITATION DATA

Clarksville

Recorded at
MSU Clarksville Research Center
Clarksville, MI
2022

APRIL				MAY				JUNE			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	37.4	27.8	0	1	57.9	44.2	0.17	1	78.4	55.5	0.02
2	41.4	24.4	0.03	2	49.9	45.1	0	2	72.8	53.3	0
3	47.7	32.2	0.01	3	50	43.3	0.41	3	74.5	49.9	0
4	44.8	32.4	0.21	4	59.1	40.2	0	4	68.8	43.1	0
5	55	35.4	0	5	57.7	38.7	0	5	67.5	53	0.03
6	53.4	40.5	0.31	6	59.7	47.3	0.12	6	74.4	57.4	0.01
7	46.3	37.4	0	7	63.3	40.9	0	7	71.7	52.2	0.14
8	43.2	30.8	0.05	8	65.2	37.9	0	8	66.5	46.5	0.18
9	39.1	28.6	0	9	75	47.4	0	9	71.1	50.1	0.03
10	57.2	25.9	0	10	81.9	59.4	0	10	75.8	48.5	0
11	60.6	41.6	0	11	83	65	0	11	75	52.9	0
12	66.1	33.5	0	12	85	60.2	0	12	80	56.3	0
13	65.9	55.7	0.3	13	84.8	57.6	0	13	84.2	58.1	0.31
14	59.8	35.3	0.09	14	82.5	59.7	0	14	85.8	63.6	0.04
15	45	38.5	0	15	75.5	53	0.03	15	91.4	76.3	0
16	39.3	26	0	16	71.6	51.3	0	16	87	68.6	0.16
17	43.3	27.1	0	17	65.7	40.8	0	17	79.1	58.9	0
18	36.3	31.4	0.12	18	53.5	42.2	0.13	18	75.4	48.6	0
19	42.4	29.7	0	19	73.9	51.1	0.01	19	79.1	49.3	0
20	51.9	27.6	0.01	20	83.8	62.7	0	20	84.8	63.6	0
21	61.6	46	0.16	21	66.3	54.2	0.31	21	93.1	64.2	0
22	48.3	38.7	0.65	22	61.2	44.7	0.02	22	84.8	66.3	0
23	81.4	44	0.04	23	60.9	38.1	0	23	82.8	54.5	0
24	74.6	61.3	0.21	24	65.3	43.8	0	24	88.4	54.2	0
25	61.4	39.7	0	25	66.9	48.7	0.19	25	86	64.5	0.05
26	43.2	33.6	0	26	74.7	63	0.11	26	78.1	64.2	0
27	46.4	29.3	0	27	68.4	56.1	0.06	27	71.3	48.6	0
28	53.4	28.9	0	28	72.6	46.8	0	28	81.4	46.2	0
29	60.5	41.6	0	29	80.1	56.5	0	29	82	59.2	0.33
30	56.3	44.3	0.36	30	85	67.1	0	30	87.5	61.9	0
				31	88.1	69.8	0				

TEMPERATURE AND PRECIPITATION DATA

Clarksville

Recorded at
MSU Clarksville Research Center
Clarksville, MI
2022

JULY				AUGUST				SEPTEMBER			
Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.	Date	High Temp F	Low Temp F	Total Prec. in.
1	83.5	59.4	0	1	80.8	66.4	0	1	83.4	57.8	0
2	83.3	54.5	0	2	83	58.8	0	2	83.9	66.8	0
3	86.4	57.7	0	3	88.8	69.5	0.16	3	84.9	63.5	1.22
4	87.7	61	0.1	4	83.1	69.9	0	4	67	58.1	0.04
5	84.3	68.3	0.51	5	83.7	68.4	0	5	69.3	56.6	0
6	75.7	63.6	0.26	6	89.4	69.5	0	6	74.3	57.7	0
7	84	59.5	0	7	85.3	73.9	0	7	77.6	54.2	0
8	80.2	61.2	0	8	80	65	0.06	8	80	54.4	0
9	79.6	51.8	0	9	76.9	56.2	0	9	79.5	55.6	0
10	81.8	32	0	10	81.8	55.6	0	10	82.9	60.8	0
11	78.8	32	0.03	11	79.8	58.6	0	11	68.7	58.1	0.35
12	77.2	61.9	0	12	78	49.8	0	12	64.7	50.7	0
13	79.3	59.7	0.02	13	59.2	54.5	0.73	13	70.9	47.9	0
14	80.6	58.7	0	14	70.3	55.3	0.05	14	76.2	53	0
15	75.3	57.2	0.06	15	79	58.3	0	15	75	53.7	0
16	81.7	62.4	0.05	16	81.2	53.2	0	16	78.9	59.1	0
17	78.3	64.1	0	17	81.4	55.1	0	17	81.1	61.7	0
18	86.7	61.2	0	18	80.7	56.4	0	18	79.3	64.7	0.08
19	86.8	66	0	19	82.3	58	0	19	78.3	59.4	0
20	87.2	69.4	0.01	20	80.5	63.3	0.39	20	64.3	63.4	0
21	86.8	67.1	0	21	80.4	58.4	0.1	21	79.4	59.8	0
22	87.7	63.7	0	22	77.9	61.1	0	22	60.8	43.7	0
23	88.1	66.6	0.29	23	80.4	55.3	0	23	62.6	35.7	0
24	78.7	66.1	1.06	24	82.9	58.7	0	24	60.3	49.8	0.02
25	74.3	56.2	0	25	75.6	62.1	0	25	62.1	51	0.15
26	79.1	55.1	0	26	77.7	59.7	0.01	26	56.5	48.9	0.18
27	80.9	59.1	0	27	78.1	55.5	0	27	56.4	42.9	0.02
28	78.6	60.6	0	28	84.3	57.9	0	28	54.7	45.3	0.01
29	77.9	55.6	0	29	83.7	65.8	0.18	29	62.4	44.9	0
30	81.1	55.1	0	30	75.2	60	0	30	65.5	38.2	0
31	82.7	59.3	0	31	78.8	57.3	0				

Impact of Fall Application of Indaziflam on Rye Cover Crop Establishment and Asparagus Crop Safety - Year 2 - WCMREC - 2021-2022

Project Code: 120-22-1 Location: Hart, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Asparagus Variety: Guelph Millennium
Planting Method: Transplant Planting Date: April 2019
Harvest Date: 29 harvests between 5/12/22 – 6/16/22
Plant Spacing: 9″ Row Spacing: 4.5′
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 5.5 ft wide x 30 ft long

Soil Type: Remus Fine Sandy Loam OM: 1.5% pH: 6.0
Sand: 81% Silt: 10.4% Clay: 8.6% CEC: 4.1

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
FALL	11/10/21	11:30-11:50 PM	53/42 F	Damp	E 2-4 mph	55%	80%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
11/10/21	ASPA = Asparagus	Mowed to 3-4″	Dormant	Good
11/10/21	SFGE = Small Flower Geranium	6-8″ dia	Vegetative	Few
11/10/21	DAND = Dandelion	5-6″ dia	Vegetative	Few

Additional Weeds Observed Throughout Season

WHCA = White Campion
VIPW = Virginia Pepperweed
FIPA = Field Pansy
HAVE = Hairy Vetch
COCW = Common Chickweed
POAM = Powell Amaranth
TOTAL BL = includes overall control of all broadleaf spp.

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 0-100; 0 = no injury, 100 = complete kill.
3. Rye cover crop seeded on 9/3/22 at 168 lb/ac.
4. Ferns were mowed down before FALL application.
5. Rye grass cover crop biomass samples were collected from each plot in April from two 30 cm x 30 cm quadrats per plot.
6. Cover crop was terminated with an application of glyphosate after the biomass samples were collected. The non-treated plots also received maintenance application of Karmex (3 lb ai/ac) + Prowl H2O (3 lb ai/ac) to control broadleaves.
7. A post-harvest maintenance application of Roundup (1 qt) + Dual Magnum (1.5 qt) + Spartan 4F (8 oz) was applied on 6/16/22.
8. Rye cover crop seeded again on September 2, 2022.

Michigan State University

Impact of Fall Application of Indaziflam on Rye Cover Crop Establishment and Asparagus Crop Safety - Year 2 - WCMREC - 2021-2022

Trial ID:120-22-1

Protocol ID:120-22-1 Location:Hart, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code							DAND	FIPA	HAVE	WHCA	SFGE	
Crop Name												RYE
Rating Date							28Apr2022	28Apr2022	28Apr2022	28Apr2022	28Apr2022	28Apr2022
Rating Type							RATING	RATING	RATING	RATING	RATING	FRESH BIOMASS
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	G
Assessed By							NS	NS	NS	NS	NS	CP
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-treated						23b	23c	23c	23c	23b	28.00b
2	Karmex	80DF		3	lb ai/a	FALL	83a	45bc	98a	95a	94a	2.50d
	Tricor	75DF		1	lb ai/a	FALL						
3	Alion	1.67SC		0.011	lb ai/a	FALL	63a	64abc	46bc	38bc	59ab	46.50a
4	Alion	1.67SC		0.022	lb ai/a	FALL	93a	93a	79ab	69ab	61ab	21.00bc
5	Alion	1.67SC		0.045	lb ai/a	FALL	96a	84ab	75ab	90a	66a	17.50bcd
6	Alion	1.67SC		0.067	lb ai/a	FALL	100a	95a	88a	78ab	80a	9.25cd
7	Alion	1.67SC		0.09	lb ai/a	FALL	100a	100a	93a	91a	90a	9.25cd
LSD P=.05							39.9	43.5	38.3	40.1	43.4	15.497
Standard Deviation							26.9	29.3	25.8	27.0	29.2	10.432
CV							33.84	40.79	36.12	39.13	43.33	54.49

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 13 because error mean square = 0.
^Calculated from residual.

Impact of Fall Application of Indaziflam on Rye Cover Crop Establishment and Asparagus Crop Safety - Year 2 - WCMREC - 2021-2022

Pest Code								DAND	FIPA	SFGE	COCW
Crop Name							ASPA				
Rating Date							10May2022	10May2022	10May2022	10May2022	10May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-treated						0a	0d	0c	0d	0c
2	Karmex	80DF		3lb	ai/a	FALL	0a	94c	91b	94b	100a
	Tricor	75DF		1lb	ai/a	FALL					
3	Alion	1.67SC		0.011lb	ai/a	FALL	0a	99ab	95ab	86c	98b
4	Alion	1.67SC		0.022lb	ai/a	FALL	0a	100a	99a	93b	98b
5	Alion	1.67SC		0.045lb	ai/a	FALL	0a	96bc	100a	95b	100a
6	Alion	1.67SC		0.067lb	ai/a	FALL	0a	100a	100a	99a	100a
7	Alion	1.67SC		0.09lb	ai/a	FALL	0a	98ab	100a	99a	100a
LSD P=.05							.	3.5	6.2	3.6	2.1
Standard Deviation							0.0	2.4	4.2	2.4	1.4
CV							0.0	2.81	5.01	3.02	1.66

Pest Code							SFGE			VIPW	POAM	SFGE
Crop Name								RYE	ASPA			
Rating Date							10May2022	16May2022	01Jun2022	01Jun2022	01Jun2022	01Jun2022
Rating Type							RATING	DRY BIOMASS	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	G	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	GM	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-treated						0c	6.43b	0a	0b	0c	0c
2	Karmex	80DF		3lb	ai/a	FALL	99a	0.63c	5a	100a	53b	100a
	Tricor	75DF		1lb	ai/a	FALL						
3	Alion	1.67SC		0.011lb	ai/a	FALL	86b	11.48a	6a	90a	100a	66b
4	Alion	1.67SC		0.022lb	ai/a	FALL	86b	5.10bc	6a	91a	100a	86ab
5	Alion	1.67SC		0.045lb	ai/a	FALL	93ab	4.09bc	0a	98a	100a	94a
6	Alion	1.67SC		0.067lb	ai/a	FALL	94ab	2.33bc	5a	79a	100a	98a
7	Alion	1.67SC		0.09lb	ai/a	FALL	96a	2.27bc	0a	98a	100a	95a
LSD P=.05							7.7	4.562	7.8	22.9	20.0	20.7
Standard Deviation							5.2	3.071	5.3	15.4	13.5	13.9
CV							6.58	66.5	163.68	19.45	17.1	18.08

Pest Code							FIPA	HOWE	HAVE	COMA	
Crop Name											ASPA
Rating Date							01Jun2022	01Jun2022	01Jun2022	01Jun2022	21Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-treated						0b	0c	0c	0c	8a
2	Karmex	80DF		3lb	ai/a	FALL	96a	80ab	99a	100a	11a
	Tricor	75DF		1lb	ai/a	FALL					
3	Alion	1.67SC		0.011lb	ai/a	FALL	95a	84ab	46b	75b	15a
4	Alion	1.67SC		0.022lb	ai/a	FALL	98a	74b	84a	95ab	11a
5	Alion	1.67SC		0.045lb	ai/a	FALL	96a	95a	86a	100a	9a
6	Alion	1.67SC		0.067lb	ai/a	FALL	98a	96a	93a	100a	19a
7	Alion	1.67SC		0.09lb	ai/a	FALL	100a	99a	99a	100a	18a
LSD P=.05							6.3	20.2	23.1	22.4	10.1
Standard Deviation							4.3	13.6	15.5	15.1	6.8
CV							5.12	18.05	21.46	18.5	53.11

Impact of Fall Application of Indaziflam on Rye Cover Crop Establishment and Asparagus Crop Safety - Year 2 - WCMREC - 2021-2022

Pest Code											
Crop Name							ASPA	ASPA	ASPA	ASPA	ASPA
Rating Date							30Jun2022	20Jul2022			
Rating Type							RATING	RATING	TOTAL GOOD	TOTAL GOOD	TOTAL CULL
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	NO./PLOT	KG/PLOT	NO./PLOT
Assessed By							CG	CG			
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-treated						5a	0c	183a	4.83a	15a
2	Karmex	80DF		3	lb ai/a	FALL	6a	0c	175a	4.75a	12a
	Tricor	75DF		1	lb ai/a	FALL					
3	Alion	1.67SC		0.011	lb ai/a	FALL	6a	1bc	198a	5.30a	17a
4	Alion	1.67SC		0.022	lb ai/a	FALL	5a	1bc	187a	5.11a	11a
5	Alion	1.67SC		0.045	lb ai/a	FALL	6a	1bc	202a	5.23a	15a
6	Alion	1.67SC		0.067	lb ai/a	FALL	5a	6a	234a	5.88a	18a
7	Alion	1.67SC		0.09	lb ai/a	FALL	8a	4ab	231a	6.81a	12a
LSD P=.05							4.7	2.9	54.0	1.615	7.0
Standard Deviation							3.1	2.0	36.3	1.087	4.7
CV							53.45	100.14	18.05	20.07	33.36

Pest Code							
Crop Name							ASPA
Rating Date							
Rating Type							TOTAL CULL
Rating Unit/Min/Max							KG/PLOT
Assessed By							
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	
1	Non-treated						0.38a
2	Karmex	80DF		3	lb ai/a	FALL	0.33a
	Tricor	75DF		1	lb ai/a	FALL	
3	Alion	1.67SC		0.011	lb ai/a	FALL	0.48a
4	Alion	1.67SC		0.022	lb ai/a	FALL	0.31a
5	Alion	1.67SC		0.045	lb ai/a	FALL	0.43a
6	Alion	1.67SC		0.067	lb ai/a	FALL	0.50a
7	Alion	1.67SC		0.09	lb ai/a	FALL	0.33a
LSD P=.05							0.192
Standard Deviation							0.129
CV							32.78

Performance of indaziflam on Asparagus - Year 2 - IR4 - HTRC - 2022

Project Code: 120-22-2 Location: Holt, MI
Block: 115

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Asparagus Variety: Millennium
Planting Method: Transplant Planting Date: 2009
Harvest Date: 5/9/2022 to 6/20/2022 (total 21 harvest)
Plant Spacing: 1 ft Row Spacing: 6 ft
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.3 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 Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
EPRE	4/11/22	10:45-11:25 AM	66/45 F	Moist	NW 7-9 mph	45%	50%	N
PRE	4/29/22	9-10:45 AM	49/43 F	Moist	SE 7-10 mph	35%	95%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
4/11/22	ASPA = Asparagus		Preemergence	
4/11/22	HOWE = Horseweed	2-3″ dia	Vegetative	Moderate
4/11/22	WICA = Wild Carrot	3-5 dia	Vegetative	Few
4/11/22	QUGR = Quackgrass	3-4″	Vegetative	Few (patches)
4/11/22	HABC = Hairy Bittercress	1-3″	Flower	Moderate
4/11/22	VIPW = Virginia Pepperweed	3-4″ dia	Vegetative	Moderate
4/29/22	ASPA	0-0.5″	PRE/<5% Emerging	
4/29/22	HOWE	2-3″ dia	Vegetative	Moderate
4/29/22	WICA	3-5 dia	Vegetative	Few
4/29/22	QUGR	3-4″	Vegetative	Few (patches)

Additional Weeds Observed Throughout Season

MECR = Mouseear Cress; WIRA = Wild Radish; CUDO = Curly Dock; DAND = Dandelion
COMW = Common Milkweed; PEST = Perennial Sowthistle; CATH = Canada Thistle
Grasses = Overall control of grass spp.

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 0-100; 0 = no injury, 100 = complete kill.
3. Fern was mowed after a hard frost in Fall 2021.
4. All plots received maintenance application of glyphosate (1 lb ai/ac) + Karmex (3 lb/ac) + Prowl H2O (3 lb ai/ac) on 4/29/22. Fusilade (1.5 pt/ac) + COC (1 qt/ac) was applied to patches of quackgrass on 4/29/22.
5. Immediately after the final harvest, maintenance application of Embed-Extra (1.5 qt/ac) + Stinger (10.7 fl oz/ac) + Karmex (3 l/ac) + Fusilade (1.5 pt/ac) applied to all treatments.

Results:
No negative impact reported from any of herbicide treatments on crop growth and yield.

Michigan State University

Performance of indaziflam on Asparagus - Year 2 - IR4 - HTRC - 2022

Trial ID:120-22-2 Location:Holt, MI Trial Year:2022

Protocol ID:120-22-2 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Nicole Soldan

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	ASPA	WICA	HOWE	MECR	QUGR
Pest Code								WICA	HOWE	MECR	QUGR
Crop Name							ASPA				
Rating Date							09May2022	09May2022	09May2022	09May2022	09May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	NS	NS	NS
1	Untreated Weed-Free					PRE	13	63	63	97	67
2	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	13	93	87	100	100
	Alion 200	1.67	SC	0.065	lb ai/a	EPRE					
3	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	37	97	100	93	100
	Alion 200	1.67	SC	0.13	lb ai/a	EPRE					
4	Roundup PowerMax	5.5	L	1	lb ai/a	PRE	13	90	90	70	100
	Alion 200	1.67	SC	0.065	lb ai/a	PRE					
5	Roundup PowerMax	5.5	L	1	lb ai/a	PRE	27	60	87	97	100
	Alion 200	1.67	SC	0.13	lb ai/a	PRE					
6	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	40	87	93	100	100
	Zidua	4.17	SC	0.106	lb ai/a	EPRE					
7	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	30	93	93	93	100
	Zidua	4.17	SC	0.267	lb ai/a	EPRE					
8	Roundup PowerMax	5.5	L	1	lb ai/a	PRE	17	63	60	70	73
	Zidua	4.17	SC	0.106	lb ai/a	PRE					
9	Roundup PowerMax	5.5	L	1	lb ai/a	PRE	30	70	47	73	100
	Zidua	4.17	SC	0.267	lb ai/a	PRE					
10	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	43	93	100	100	100
	Chateau SW	51	WDG	0.128	lb ai/a	EPRE					
11	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	23	90	87	100	100
	Chateau SW	51	WDG	0.192	lb ai/a	EPRE					
12	Roundup PowerMax	5.5	L	1	lb ai/a	PRE	47	67	70	90	100
	Chateau SW	51	WDG	0.128	lb ai/a	PRE					
13	Roundup PowerMax	5.5	L	1	lb ai/a	PRE	33	60	77	83	100
	Chateau SW	51	WDG	0.192	lb ai/a	PRE					
14	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	30	80	100	97	100
	Karmex	80	DF	3	lb ai/a	EPRE					
	Prowl H20	3.8	CS	3.9	lb ai/a	EPRE					
15	Roundup PowerMax	5.5	L	1	lb ai/a	EPRE	30	97	100	100	100
	Command	3	ME	1	lb ai/a	EPRE					
	Spartan	4	F	0.375	lb ai/a	EPRE					
16	Extra Row (no treatment)						33	70	100	100	100
	Extra Row (no treatment)										
	Extra Row (no treatment)										
17	Preview	3.35	SC	0.58	lb ai/a	PRE	30	30	67	60	100
18	Preview	3.35	SC	0.76	lb ai/a	PRE	5	40	50	60	100
19	Extra Row (no treatment)						10	80	100	100	100
LSD P=.05							48.5	52.4	35.4	33.2	29.8
Standard Deviation							29.2	31.6	21.3	20.0	18.0
CV							109.98	42.16	25.83	22.56	18.54

Performance of indaziflam on Asparagus - Year 2 - IR4 - HTRC - 2022

Pest Code						WIRA	CUDO	DAND		HOWE
Crop Name									ASPA	
Rating Date						09May2022	09May2022	09May2022	01Jun2022	01Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS	NS	NS	BZ	BZ
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated Weed-Free					PRE	100	100	100	7	100
2	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	10	100
	Alion 200	1.67SC		0.065	lb ai/a	EPRE					
3	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	10	100
	Alion 200	1.67SC		0.13	lb ai/a	EPRE					
4	Roundup PowerMax	5.5L		1	lb ai/a	PRE	100	60	100	10	63
	Alion 200	1.67SC		0.065	lb ai/a	PRE					
5	Roundup PowerMax	5.5L		1	lb ai/a	PRE	100	100	100	23	90
	Alion 200	1.67SC		0.13	lb ai/a	PRE					
6	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	7	87
	Zidua	4.17SC		0.106	lb ai/a	EPRE					
7	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	3	67
	Zidua	4.17SC		0.267	lb ai/a	EPRE					
8	Roundup PowerMax	5.5L		1	lb ai/a	PRE	100	73	100	0	50
	Zidua	4.17SC		0.106	lb ai/a	PRE					
9	Roundup PowerMax	5.5L		1	lb ai/a	PRE	100	93	85	7	17
	Zidua	4.17SC		0.267	lb ai/a	PRE					
10	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	7	90
	Chateau SW	51WDG		0.128	lb ai/a	EPRE					
11	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	13	100
	Chateau SW	51WDG		0.192	lb ai/a	EPRE					
12	Roundup PowerMax	5.5L		1	lb ai/a	PRE	100	100	100	3	37
	Chateau SW	51WDG		0.128	lb ai/a	PRE					
13	Roundup PowerMax	5.5L		1	lb ai/a	PRE	100	100	100	0	50
	Chateau SW	51WDG		0.192	lb ai/a	PRE					
14	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	0	100
	Karmex	80DF		3	lb ai/a	EPRE					
	Prowl H20	3.8CS		3.9	lb ai/a	EPRE					
15	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	100	100	100	7	100
	Command	3ME		1	lb ai/a	EPRE					
	Spartan	4F		0.375	lb ai/a	EPRE					
16	Extra Row (no treatment)						100	100	100	3	80
	Extra Row (no treatment)										
	Extra Row (no treatment)										
17	Preview	3.35SC		0.58	lb ai/a	PRE	100	100	90	0	93
18	Preview	3.35SC		0.76	lb ai/a	PRE	95	100	10	0	90
19	Extra Row (no treatment)						100	100	100	10	73
LSD P=.05							2.1	29.9	9.0	15.4	45.7
Standard Deviation							1.3	17.7	4.2	9.3	27.6
CV							1.26	18.42	4.47	147.13	35.24

Performance of indaziflam on Asparagus - Year 2 - IR4 - HTRC - 2022

Pest Code						COMW	WICA	
Crop Name								ASPA
Rating Date						01Jun2022	01Jun2022	15Jun2022
Rating Type						RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						BZ	BZ	NS,BZ
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing		
1	Untreated Weed-Free					PRE	57	83	7
2	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	67	93	7
	Alion 200	1.67SC		0.065	lb ai/a	EPRE			
3	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	87	90	12
	Alion 200	1.67SC		0.13	lb ai/a	EPRE			
4	Roundup PowerMax	5.5L		1	lb ai/a	PRE	43	90	5
	Alion 200	1.67SC		0.065	lb ai/a	PRE			
5	Roundup PowerMax	5.5L		1	lb ai/a	PRE	27	60	10
	Alion 200	1.67SC		0.13	lb ai/a	PRE			
6	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	27	10	3
	Zidua	4.17SC		0.106	lb ai/a	EPRE			
7	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	67	80	0
	Zidua	4.17SC		0.267	lb ai/a	EPRE			
8	Roundup PowerMax	5.5L		1	lb ai/a	PRE	17	27	10
	Zidua	4.17SC		0.106	lb ai/a	PRE			
9	Roundup PowerMax	5.5L		1	lb ai/a	PRE	40	93	13
	Zidua	4.17SC		0.267	lb ai/a	PRE			
10	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	37	53	7
	Chateau SW	51WDG		0.128	lb ai/a	EPRE			
11	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	97	43	13
	Chateau SW	51WDG		0.192	lb ai/a	EPRE			
12	Roundup PowerMax	5.5L		1	lb ai/a	PRE	37	57	17
	Chateau SW	51WDG		0.128	lb ai/a	PRE			
13	Roundup PowerMax	5.5L		1	lb ai/a	PRE	43	37	10
	Chateau SW	51WDG		0.192	lb ai/a	PRE			
14	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	47	27	3
	Karmex	80DF		3	lb ai/a	EPRE			
	Prowl H20	3.8CS		3.9	lb ai/a	EPRE			
15	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	17	97	10
	Command	3ME		1	lb ai/a	EPRE			
	Spartan	4F		0.375	lb ai/a	EPRE			
16	Extra Row (no treatment)						33	43	10
	Extra Row (no treatment)								
	Extra Row (no treatment)								
17	Preview	3.35SC		0.58	lb ai/a	PRE	37	0	0
18	Preview	3.35SC		0.76	lb ai/a	PRE	67	50	3
19	Extra Row (no treatment)						63	63	27
LSD P=.05							61.6	53.5	15.2
Standard Deviation							37.2	32.3	9.2
CV							77.94	55.93	104.95

Performance of indaziflam on Asparagus - Year 2 - IR4 - HTRC - 2022

Pest Code						HOWE	COMW	WICA	CATH	GRASSES
Crop Name										
Rating Date						15Jun2022	15Jun2022	15Jun2022	15Jun2022	15Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS,BZ	NS,BZ	NS,BZ	NS,BZ	NS,BZ
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated Weed-Free					PRE	87	70	73	93	100
2	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	93	40	77	100	100
	Alion 200	1.67SC		0.065	lb ai/a	EPRE					
3	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	90	73	63	93	100
	Alion 200	1.67SC		0.13	lb ai/a	EPRE					
4	Roundup PowerMax	5.5L		1	lb ai/a	PRE	30	35	73	57	100
	Alion 200	1.67SC		0.065	lb ai/a	PRE					
5	Roundup PowerMax	5.5L		1	lb ai/a	PRE	57	15	40	90	100
	Alion 200	1.67SC		0.13	lb ai/a	PRE					
6	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	63	13	13	93	100
	Zidua	4.17SC		0.106	lb ai/a	EPRE					
7	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	67	40	57	100	100
	Zidua	4.17SC		0.267	lb ai/a	EPRE					
8	Roundup PowerMax	5.5L		1	lb ai/a	PRE	13	7	8	100	100
	Zidua	4.17SC		0.106	lb ai/a	PRE					
9	Roundup PowerMax	5.5L		1	lb ai/a	PRE	20	50	67	100	100
	Zidua	4.17SC		0.267	lb ai/a	PRE					
10	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	95	43	40	93	100
	Chateau SW	51WDG		0.128	lb ai/a	EPRE					
11	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	87	73	63	100	67
	Chateau SW	51WDG		0.192	lb ai/a	EPRE					
12	Roundup PowerMax	5.5L		1	lb ai/a	PRE	23	17	23	67	67
	Chateau SW	51WDG		0.128	lb ai/a	PRE					
13	Roundup PowerMax	5.5L		1	lb ai/a	PRE	40	50	37	100	100
	Chateau SW	51WDG		0.192	lb ai/a	PRE					
14	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	97	33	20	100	100
	Karmex	80DF		3	lb ai/a	EPRE					
	Prowl H20	3.8CS		3.9	lb ai/a	EPRE					
15	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	93	30	57	100	100
	Command	3ME		1	lb ai/a	EPRE					
	Spartan	4F		0.375	lb ai/a	EPRE					
16	Extra Row (no treatment)						40	20	13	100	100
	Extra Row (no treatment)										
	Extra Row (no treatment)										
17	Preview	3.35SC		0.58	lb ai/a	PRE	63	3	0	100	100
18	Preview	3.35SC		0.76	lb ai/a	PRE	60	60	40	90	100
19	Extra Row (no treatment)						43	47	57	100	90
LSD P=.05							54.0	58.4	56.2	31.1	30.3
Standard Deviation							32.6	35.3	34.0	18.8	18.3
CV							53.31	93.05	78.54	20.07	19.09

Performance of indaziflam on Asparagus - Year 2 - IR4 - HTRC - 2022

Pest Code										
Crop Name						ASPA	ASPA	ASPA	ASPA
Rating Date									
Rating Type						TOTAL GOOD	TOTAL GOOD	TOTAL CULL	TOTAL CULL
Rating Unit/Min/Max						NO./PLOT	KG/PLOT	NO./PLOT	KG/PLOT
Assessed By									
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated Weed-Free						566	13.64	94	2.32
2	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	596	12.93	99	2.27
	Alion 200	1.67SC		0.065	lb ai/a	EPRE				
3	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	514	12.24	76	2.02
	Alion 200	1.67SC		0.13	lb ai/a	EPRE				
4	Roundup PowerMax	5.5L		1	lb ai/a	PRE	515	12.64	94	2.33
	Alion 200	1.67SC		0.065	lb ai/a	PRE				
5	Roundup PowerMax	5.5L		1	lb ai/a	PRE	546	12.68	86	2.41
	Alion 200	1.67SC		0.13	lb ai/a	PRE				
6	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	518	12.91	83	2.02
	Zidua	4.17SC		0.106	lb ai/a	EPRE				
7	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	541	12.46	91	2.25
	Zidua	4.17SC		0.267	lb ai/a	EPRE				
8	Roundup PowerMax	5.5L		1	lb ai/a	PRE	573	13.50	85	2.02
	Zidua	4.17SC		0.106	lb ai/a	PRE				
9	Roundup PowerMax	5.5L		1	lb ai/a	PRE	563	13.59	106	2.63
	Zidua	4.17SC		0.267	lb ai/a	PRE				
10	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	609	13.84	81	1.87
	Chateau SW	51WDG		0.128	lb ai/a	EPRE				
11	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	591	12.90	102	2.52
	Chateau SW	51WDG		0.192	lb ai/a	EPRE				
12	Roundup PowerMax	5.5L		1	lb ai/a	PRE	474	11.88	98	2.46
	Chateau SW	51WDG		0.128	lb ai/a	PRE				
13	Roundup PowerMax	5.5L		1	lb ai/a	PRE	475	11.46	117	3.11
	Chateau SW	51WDG		0.192	lb ai/a	PRE				
14	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	547	12.07	70	1.55
	Karmex	80DF		3	lb ai/a	EPRE				
	Prowl H20	3.8CS		3.9	lb ai/a	EPRE				
15	Roundup PowerMax	5.5L		1	lb ai/a	EPRE	517	12.02	77	1.66
	Command	3ME		1	lb ai/a	EPRE				
	Spartan	4F		0.375	lb ai/a	EPRE				
17	Preview	3.35SC		0.58	lb ai/a	PRE	598	14.46	86	2.18
18	Preview	3.35SC		0.76	lb ai/a	PRE	577	13.73	87	1.88
LSD P=.05							115.4	2.306	34.0	0.891
Standard Deviation							69.7	1.392	20.5	0.538
CV							14.2	12.08	25.48	27.26

Performance of Pyroxasulfone on Asparagus - IR4 - WCMREC - 2022

Project Code: 120-22-3 Location: WCMREC Hart, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Asparagus Variety: Millenium
Planting Method: NA Planting Date: April 2019
Harvest Date: 30 harvests between 5/14/22 – 6/16/22
Plant Spacing: 9″ Row Spacing: 4.5′
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 4.5 ft wide x 25 ft long

Soil Type: Remus Fine Sandy Loam OM: 1.5% pH: 6.0
Sand: 81% Silt: 10.4% Clay: 8.6% CEC: 4.1

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
EPRE	4/12/22	12:30-1:00 pm	60/43 F	Moist	SW 2-6 mph	34%	70%	N
PRE	4/28/22	12:40-1:00 pm	49/41 F	Moist	SE 4-9 mph	28%	75%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
4/12/22	ASPA = Asparagus	PRE		
4/12/22	SFGE = Small Flower Geranium	2-4″ dia	Vegetative	Moderate
4/12/22	RYE	1-3″	Vegetative	Many
4/12/22	WHCA = White Campion	1-4″ dia	Vegetative	Moderate
4/12/22	VIPW = Virginia Pepperweed	1-2″ dia	Vegetative	Moderate
4/12/22	FIPA = Field Pansy	1-3″ dia	Vegetative	Moderate
4/28/22	ASPA	PRE		
4/28/22	RYE	3-5″	Vegetative	Many
4/28/22	FIPA	2-3″	Flower	Many
4/28/22	HAVE = Hairy Vetch	3-5″	Vegetative	Many
4/28/22	VIPW	0.5-2″	Vegetative	Moderate
4/28/22	WHCA	1-3″	Vegetative	Moderate

Additional Weeds Observed Throughout Season

POAM = Powell Amaranth

Notes and Comments

1. Spray applied with 3 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Entire study area received pre-harvest application of Round-up (1 qt) + Prowl H20 (2 qt.) + Tricor 75 DF (1 lb) on April 20, 2022.
4. Entire study area received post-harvest application of Round-up (1 qt.) + Dual Magnum (1.5 pts) + Spartan 4F (8 oz) on June 17, 2022.

Michigan State University

Performance of Pyroxasulfone on Asparagus - IR4 - WCMREC - 2022

Trial ID:120-22-3

Protocol ID:120-22-3 Location:Hart, MI Trial Year:2022

Study Director:Nicole Soldan

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code							RYE	HAVE	VIPW	WHCA	
Crop Name											ASPA
Rating Date							28Apr2022	28Apr2022	28Apr2022	28Apr2022	10May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	NS	NS	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weed Free						0b	0a	5a	0c	0a
2	Zidua	4.17SC		0.106	lb ai/a	EPRE	1ab	23a	0a	6bc	0a
3	Zidua	4.17SC		0.212	lb ai/a	EPRE	9a	15a	0a	13ab	0a
4	Zidua	4.17SC		0.424	lb ai/a	EPRE	8a	8a	23a	32a	0a
5	Zidua	4.17SC		0.106	lb ai/a	PRE	3ab	0a	0a	0c	0a
6	Zidua	4.17SC		0.212	lb ai/a	PRE	0b	0a	0a	1bc	0a
7	Zidua	4.17SC		0.424	lb ai/a	PRE	0b	0a	0a	1bc	0a
LSD P=.05							8.7	25.3	26.2	16.9	.
Standard Deviation							0.5	17.0	17.6	13.6	0.0
CV							130.37	264.58	448.69	117.52	0.0

Pest Code							VIPW	HOWE		VIPW
Crop Name									ASPA	
Rating Date							10May2022	10May2022	01Jun2022	01Jun2022
Rating Type							RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free						0c	0b	0a	90a
2	Zidua	4.17SC		0.106	lb ai/a	EPRE	0c	93a	0a	85a
3	Zidua	4.17SC		0.212	lb ai/a	EPRE	1bc	92a	0a	84a
4	Zidua	4.17SC		0.424	lb ai/a	EPRE	91a	93a	0a	90a
5	Zidua	4.17SC		0.106	lb ai/a	PRE	9b	89a	4a	93a
6	Zidua	4.17SC		0.212	lb ai/a	PRE	1bc	91a	0a	91a
7	Zidua	4.17SC		0.424	lb ai/a	PRE	4bc	92a	3a	95a
LSD P=.05							11.7	6.9	4.1	8.2
Standard Deviation							0.6	5.3	2.7	5.8
CV							97.77	8.45	305.51	8.05

Performance of Pyroxasulfone on Asparagus - IR4 - WCMREC - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	POAM	FIPA	HAVE	DAND	ASPA
Crop Name											ASPA
Rating Date							01Jun2022	01Jun2022	01Jun2022	01Jun2022	21Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
1	Untreated-Weed Free						89	96a	97a	100a	13a
2	Zidua	4.17SC		0.106	lb ai/a	EPRE	100a	99a	98a	99a	9a
3	Zidua	4.17SC		0.212	lb ai/a	EPRE	100a	98a	97a	100a	13a
4	Zidua	4.17SC		0.424	lb ai/a	EPRE	100a	98a	95a	100a	13a
5	Zidua	4.17SC		0.106	lb ai/a	PRE	100a	98a	98a	100a	15a
6	Zidua	4.17SC		0.212	lb ai/a	PRE	100a	94	98a	99a	10a
7	Zidua	4.17SC		0.424	lb ai/a	PRE	100a	95a	97a	99a	11a
LSD P=.05							.	4.1	8.1	2.4	7.4
Standard Deviation							0.0	2.7	4.6	1.6	5.0
CV							0.0	2.77	4.7	1.61	42.17

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	ASPA	ASPA	ASPA	ASPA	ASPA
Crop Name											
Rating Date							30Jun2022	20Jul2022			
Rating Type							RATING	RATING	TOTAL GOOD	TOTAL GOOD	TOTAL CULL
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	NO./PLOT	KG/PLOT	NO./PLOT
Assessed By							CG	CG			
1	Untreated-Weed Free						6a	0a	183a	4.50a	25a
2	Zidua	4.17SC		0.106	lb ai/a	EPRE	8a	1a	154a	4.29a	23a
3	Zidua	4.17SC		0.212	lb ai/a	EPRE	6a	0a	154a	4.03a	27a
4	Zidua	4.17SC		0.424	lb ai/a	EPRE	8a	3a	168a	4.50a	26a
5	Zidua	4.17SC		0.106	lb ai/a	PRE	6a	5a	161a	4.34a	21a
6	Zidua	4.17SC		0.212	lb ai/a	PRE	4a	0a	156a	4.21a	17a
7	Zidua	4.17SC		0.424	lb ai/a	PRE	6a	3a	150a	4.24a	22a
LSD P=.05							6.4	4.3	33.6	1.014	9.3
Standard Deviation							4.3	6.3	22.3	0.060	6.2
CV							68.91	98.99	14.18	8.23	27.12

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	
Crop Name							ASPA
Rating Date							
Rating Type							TOTAL CULL
Rating Unit/Min/Max							KG/PLOG
Assessed By							
1	Untreated-Weed Free						0.69a
2	Zidua	4.17SC		0.106	lb ai/a	EPRE	0.67a
3	Zidua	4.17SC		0.212	lb ai/a	EPRE	0.77a
4	Zidua	4.17SC		0.424	lb ai/a	EPRE	0.68a
5	Zidua	4.17SC		0.106	lb ai/a	PRE	0.59a
6	Zidua	4.17SC		0.212	lb ai/a	PRE	0.47a
7	Zidua	4.17SC		0.424	lb ai/a	PRE	0.59a
LSD P=.05							0.249
Standard Deviation							0.168
CV							26.31

Micro-rate Application Timings for Weed Control in Carrot - 2021

Project Code: 107-22-2 Location: Hart, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Carrot Variety: Belgrado
Planting Method: seeded Planting Date: 4/28/22
Harvest Date: 10/4/22
Plant Spacing: 1″ Row Spacing: 18″; 3 rows/plot
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 5.4 ft wide x 30 ft long

Soil Type: Benona Sand OM: 1.8% pH: 5.7
Sand: 80% Silt: 9.4% Clay: 10.6% CEC: 4.9

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	5/17/22	11:15 AM - 12:15 PM	70/68 F	Dry	NW 4-8 mph	30%	5%	N
PO2	6/1/22	10:15-11:00 AM	66/70 F	Dry	NW 3-6 mph	51%	80%	N
PO3	6/14/22	11:30 AM - 12:15 PM	75/69 F	Moist	E 3-9 mph	72%	100%	N
PO4	6/21/22	10:00-11:00 AM	81/77 F	Dry	W 4-8 mph	40%	15%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/17/22	Carrot	1″	Cotyledon	Good
5/17/22	No Weeds			
6/1/22	Carrot	1-2″	2-3 LS	Good
6/1/22	No Weeds			
6/14/22	Carrot	4″	6 LS	Good
6/14/22	RRPW = Redroot Pigweed	4-8″	Vegetative	Few
6/14/22	COPU = Common Purslane	1″	Vegetative	Few
6/21/22	Carrot	6″	7 LS	Good
6/21/22	RRPW	8-12″	Vegetative	Few
6/21/22	COPU	1″; 8″ dia	Vegetative	Few

Additional Weeds Observed Throughout Season

LACG = Large Crabgrass
Seedling = Unidentified cotyledon
Boradlf = Unidentified broadleaf spp.

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 0-100; 0 = no injury, 100 = complete kill.
3. Harvested 10-foot section from the middle row of each plot.
4. All these programs provided higher level of RRPW control. Program 7, 9, 13, 14, and 15 program caused higher level of injury. However, yield reduction was reported from program 9, 12, and 14.

Michigan State University

Micro-rate Application Timings for Weed Control in Carrot- 2021

Trial ID:107-21-2 Location:Hart, MI Trial Year:2021

Protocol ID:107-21-2 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Sushila Chaudhari

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
Pest Code								BROADLF	GRASS		RRPW	GRASS
Crop Name							CARROT			CARROT		
Rating Date							24May2022	24May2022	24May2022	07Jun2022	07Jun2022	07Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG, RM	CG, RM	CG, RM	CG	CG	CG
1	Untreated Weedy						0a	0b	0b	0a	0c	0b
2	Lorox	50DF		0.25	lb ai/a	PO1	0a	100a	98a	18a	100a	95a
	Lorox	50DF		0.25	lb ai/a	PO2						
	Lorox	50DF		0.25	lb ai/a	PO3						
	Lorox	50DF		0.25	lb ai/a	PO4						
3	Lorox	50DF		0.5	lb ai/a	PO1	0a	100a	100a	23a	100a	97a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Lorox	50DF		0.5	lb ai/a	PO4						
4	Lorox	50DF		0.75	lb ai/a	PO1	0a	100a	100a	2a	100a	98a
	Lorox	50DF		0.75	lb ai/a	PO2						
	Lorox	50DF		0.75	lb ai/a	PO3						
	Lorox	50DF		0.75	lb ai/a	PO4						
5	Lorox	50DF		0.25	lb ai/a	PO1	0a	100a	100a	2a	100a	95a
	Lorox	50DF		0.25	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Lorox	50DF		0.75	lb ai/a	PO4						
6	Caparol	4L		0.25	lb ai/a	PO1	0a	100a	100a	27a	100a	97a
	Caparol	4L		0.25	lb ai/a	PO2						
	Caparol	4L		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
7	Caparol	4L		0.5	lb ai/a	PO1	0a	100a	100a	23a	100a	100a
	Caparol	4L		0.5	lb ai/a	PO2						
	Caparol	4L		0.75	lb ai/a	PO3						
	Caparol	4L		1	lb ai/a	PO4						
8	Tricor	75DF		0.125	lb ai/a	PO1	0a	100a	98a	5a	100a	100a
	Tricor	75DF		0.125	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Tricor	75DF		0.125	lb ai/a	PO4						
9	Tricor	75DF		0.25	lb ai/a	PO1	0a	100a	100a	17a	100a	100a
	Tricor	75DF		0.25	lb ai/a	PO2						
	Tricor	75DF		0.25	lb ai/a	PO3						
	Tricor	75DF		0.25	lb ai/a	PO4						
10	Lorox	50DF		0.5	lb ai/a	PO1	0a	100a	100a	27a	97b	95a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Tricor	75DF		0.25	lb ai/a	PO4						
11	Lorox	50DF		0.5	lb ai/a	PO1	0a	100a	100a	0a	100a	98a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Caparol	4L		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
12	Lorox	50DF		0.5	lb ai/a	PO1	0a	100a	100a	3a	100a	97a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						

Micro-rate Application Timings for Weed Control in Carrot - 2021

Pest Code							BROADLF	GRASS		RRPW	GRASS
Crop Name						CARROT			CARROT		
Rating Date						24May2022	24May2022	24May2022	07Jun2022	07Jun2022	07Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG, RM	CG, RM	CG, RM	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
13	Lorox	50DF		0.5	lb ai/a	PO1	0a	100a	100a	27a	100a	100a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
14	Lorox	50DF		0.5	lb ai/a	PO1	0a	100a	100a	47a	100a	98a
	Tricor	75DF		0.125	lb ai/a	PO2						
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
15	Lorox	50DF		0.5	lb ai/a	PO1	5a	100a	100a	22a	100a	97a
	Tricor	75DF		0.125	lb ai/a	PO2						
	Prowl H20	3.8CS		0.95	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
LSD P=.05							3.7	.	1.7	43.7	2.5	6.6
Standard Deviation							2.2	0.0	1.0	26.1	1.5	4.0
CV							670.82	0.0	1.09	162.23	1.6	4.36

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 2,14,19 because error mean square = 0.
^Calculated from residual.

Micro-rate Application Timings for Weed Control in Carrot - 2021

Pest Code						SEEDLING		COPU	LACG	RRPW	
Crop Name							CARROT				CARROT
Rating Date						07Jun2022	14Jun2022	14Jun2022	14Jun2022	14Jun2022	21Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated Weedy						0b	0a	0c	0b	0c	0a
2	Lorox	50DF		0.25	lb ai/a	PO1	98a	10a	67b	95a	65b	13a
	Lorox	50DF		0.25	lb ai/a	PO2						
	Lorox	50DF		0.25	lb ai/a	PO3						
	Lorox	50DF		0.25	lb ai/a	PO4						
3	Lorox	50DF		0.5	lb ai/a	PO1	95a	15a	100a	95a	100a	15a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Lorox	50DF		0.5	lb ai/a	PO4						
4	Lorox	50DF		0.75	lb ai/a	PO1	95a	5a	100a	97a	100a	8a
	Lorox	50DF		0.75	lb ai/a	PO2						
	Lorox	50DF		0.75	lb ai/a	PO3						
	Lorox	50DF		0.75	lb ai/a	PO4						
5	Lorox	50DF		0.25	lb ai/a	PO1	97a	3a	100a	97a	100a	3a
	Lorox	50DF		0.25	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Lorox	50DF		0.75	lb ai/a	PO4						
6	Caparol	4L		0.25	lb ai/a	PO1	97a	10a	100a	97a	98a	17a
	Caparol	4L		0.25	lb ai/a	PO2						
	Caparol	4L		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
7	Caparol	4L		0.5	lb ai/a	PO1	100a	15a	100a	98a	100a	17a
	Caparol	4L		0.5	lb ai/a	PO2						
	Caparol	4L		0.75	lb ai/a	PO3						
	Caparol	4L		1	lb ai/a	PO4						
8	Tricor	75DF		0.125	lb ai/a	PO1	100a	5a	100a	100a	100a	13a
	Tricor	75DF		0.125	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Tricor	75DF		0.125	lb ai/a	PO4						
9	Tricor	75DF		0.25	lb ai/a	PO1	100a	10a	100a	100a	97a	23a
	Tricor	75DF		0.25	lb ai/a	PO2						
	Tricor	75DF		0.25	lb ai/a	PO3						
	Tricor	75DF		0.25	lb ai/a	PO4						
10	Lorox	50DF		0.5	lb ai/a	PO1	97a	13a	100a	92a	97a	18a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Tricor	75DF		0.25	lb ai/a	PO4						
11	Lorox	50DF		0.5	lb ai/a	PO1	98a	3a	100a	93a	100a	5a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Caparol	4L		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
12	Lorox	50DF		0.5	lb ai/a	PO1	98a	5a	100a	95a	100a	8a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						

Micro-rate Application Timings for Weed Control in Carrot - 2021

Pest Code						SEEDLING		COPU	LACG	RRPW	
Crop Name							CARROT				CARROT
Rating Date						07Jun2022	14Jun2022	14Jun2022	14Jun2022	14Jun2022	21Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
13	Lorox	50DF		0.5	lb ai/a	PO1	97a	17a	100a	98a	100a	23a
	Lorox	50DF		0.5	lb ai/a	PO2						
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
14	Lorox	50DF		0.5	lb ai/a	PO1	98a	35a	100a	98a	100a	38a
	Tricor	75DF		0.125	lb ai/a	PO2						
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
15	Lorox	50DF		0.5	lb ai/a	PO1	98a	15a	100a	98a	100a	25a
	Tricor	75DF		0.125	lb ai/a	PO2						
	Prowl H20	3.8CS		0.95	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
LSD P=.05							5.8	27.6	24.9	8.4	24.5	31.1
Standard Deviation							3.5	16.5	14.9	5.0	14.6	18.6
CV							3.83	153.39	16.36	5.54	16.17	122.35

Micro-rate Application Timings for Weed Control in Carrot - 2021

Pest Code						RRPW	COPU	GRASS		RRPW	LACG
Crop Name									CARROT		
Rating Date						21Jun2022	21Jun2022	21Jun2022	30Jun2022	30Jun2022	30Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated Weedy						0b	0b	0c	0a	0b	0d
2	Lorox	50DF		0.25	lb ai/a	PO1	100a	100a	95ab	3a	97a	83c
	Lorox	50DF		0.25	lb ai/a	PO2						
	Lorox	50DF		0.25	lb ai/a	PO3						
	Lorox	50DF		0.25	lb ai/a	PO4						
3	Lorox	50DF		0.5	lb ai/a	PO1	100a	100a	98ab	13a	100a	93abc
	Lorox	50DF		0.5	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Lorox	50DF		0.5	lb ai/a	PO4						
4	Lorox	50DF		0.75	lb ai/a	PO1	100a	100a	95ab	7a	100a	85bc
	Lorox	50DF		0.75	lb ai/a	PO2						
	Lorox	50DF		0.75	lb ai/a	PO3						
	Lorox	50DF		0.75	lb ai/a	PO4						
5	Lorox	50DF		0.25	lb ai/a	PO1	98a	100a	97ab	5a	97a	95abc
	Lorox	50DF		0.25	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Lorox	50DF		0.75	lb ai/a	PO4						
6	Caparol	4L		0.25	lb ai/a	PO1	100a	100a	98ab	7a	100a	93abc
	Caparol	4L		0.25	lb ai/a	PO2						
	Caparol	4L		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
7	Caparol	4L		0.5	lb ai/a	PO1	100a	100a	100a	17a	100a	97abc
	Caparol	4L		0.5	lb ai/a	PO2						
	Caparol	4L		0.75	lb ai/a	PO3						
	Caparol	4L		1	lb ai/a	PO4						
8	Tricor	75DF		0.125	lb ai/a	PO1	100a	100a	98ab	8a	100a	98ab
	Tricor	75DF		0.125	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Tricor	75DF		0.125	lb ai/a	PO4						
9	Tricor	75DF		0.25	lb ai/a	PO1	98a	100a	100a	28a	97a	100a
	Tricor	75DF		0.25	lb ai/a	PO2						
	Tricor	75DF		0.25	lb ai/a	PO3						
	Tricor	75DF		0.25	lb ai/a	PO4						
10	Lorox	50DF		0.5	lb ai/a	PO1	100a	100a	93b	8a	100a	83c
	Lorox	50DF		0.5	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Tricor	75DF		0.25	lb ai/a	PO4						
11	Lorox	50DF		0.5	lb ai/a	PO1	100a	100a	97ab	7a	100a	85bc
	Lorox	50DF		0.5	lb ai/a	PO2						
	Caparol	4L		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
12	Lorox	50DF		0.5	lb ai/a	PO1	100a	100a	95ab	7a	100a	93abc
	Lorox	50DF		0.5	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						

Micro-rate Application Timings for Weed Control in Carrot - 2021

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	RRPW	COPU	GRASS	CARROT	RRPW	LACG
Pest Code							RRPW	COPU	GRASS		RRPW	LACG
Crop Name										CARROT		
Rating Date							21Jun2022	21Jun2022	21Jun2022	30Jun2022	30Jun2022	30Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG	CG
13	Lorox	50DF		0.5	lb ai/a	PO1	100a	100a	100a	20a	100a	98ab
	Lorox	50DF		0.5	lb ai/a	PO2						
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2						
	Tricor	75DF		0.125	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
14	Lorox	50DF		0.5	lb ai/a	PO1	100a	100a	100a	45a	100a	97abc
	Tricor	75DF		0.125	lb ai/a	PO2						
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
15	Lorox	50DF		0.5	lb ai/a	PO1	100a	100a	97ab	28a	98a	93abc
	Tricor	75DF		0.125	lb ai/a	PO2						
	Prowl H20	3.8CS		0.95	lb ai/a	PO2						
	Lorox	50DF		0.5	lb ai/a	PO3						
	Caparol	4L		0.75	lb ai/a	PO4						
LSD P=.05							1.7	.	5.9	26.0	4.4	14.7
Standard Deviation							1.0	0.0	3.5	15.6	2.6	8.8
CV							1.09	0.0	3.9	114.9	2.86	10.2

Micro-rate Application Timings for Weed Control in Carrot - 2021

Pest Code						COPU		RRPW	
Crop Name							CARROT		CARROT
Rating Date						30Jun2022	13Jul2022	13Jul2022	04Oct2022
Rating Type						RATING	RATING	RATING	HARVEST
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	NO./PLOT	KG/10FT
Assessed By						CG	CG/RM/GM/NB	CG/RM/GM/NB	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated Weedy						0b	0a	0a	10.41bcd
2	Lorox	50DF		0.25	lb ai/a	PO1	100a	2a	0a	10.90bcd
	Lorox	50DF		0.25	lb ai/a	PO2				
	Lorox	50DF		0.25	lb ai/a	PO3				
	Lorox	50DF		0.25	lb ai/a	PO4				
3	Lorox	50DF		0.5	lb ai/a	PO1	100a	2a	0a	12.16abc
	Lorox	50DF		0.5	lb ai/a	PO2				
	Lorox	50DF		0.5	lb ai/a	PO3				
	Lorox	50DF		0.5	lb ai/a	PO4				
4	Lorox	50DF		0.75	lb ai/a	PO1	100a	3a	0a	11.49a-d
	Lorox	50DF		0.75	lb ai/a	PO2				
	Lorox	50DF		0.75	lb ai/a	PO3				
	Lorox	50DF		0.75	lb ai/a	PO4				
5	Lorox	50DF		0.25	lb ai/a	PO1	100a	3a	0a	11.70a-d
	Lorox	50DF		0.25	lb ai/a	PO2				
	Lorox	50DF		0.5	lb ai/a	PO3				
	Lorox	50DF		0.75	lb ai/a	PO4				
6	Caparol	4L		0.25	lb ai/a	PO1	100a	2a	1a	14.56ab
	Caparol	4L		0.25	lb ai/a	PO2				
	Caparol	4L		0.5	lb ai/a	PO3				
	Caparol	4L		0.75	lb ai/a	PO4				
7	Caparol	4L		0.5	lb ai/a	PO1	100a	5a	0a	13.48ab
	Caparol	4L		0.5	lb ai/a	PO2				
	Caparol	4L		0.75	lb ai/a	PO3				
	Caparol	4L		1	lb ai/a	PO4				
8	Tricor	75DF		0.125	lb ai/a	PO1	100a	3a	0a	12.43abc
	Tricor	75DF		0.125	lb ai/a	PO2				
	Tricor	75DF		0.125	lb ai/a	PO3				
	Tricor	75DF		0.125	lb ai/a	PO4				
9	Tricor	75DF		0.25	lb ai/a	PO1	100a	13a	0a	7.52d
	Tricor	75DF		0.25	lb ai/a	PO2				
	Tricor	75DF		0.25	lb ai/a	PO3				
	Tricor	75DF		0.25	lb ai/a	PO4				
10	Lorox	50DF		0.5	lb ai/a	PO1	100a	0a	0a	15.79a
	Lorox	50DF		0.5	lb ai/a	PO2				
	Tricor	75DF		0.125	lb ai/a	PO3				
	Tricor	75DF		0.25	lb ai/a	PO4				
11	Lorox	50DF		0.5	lb ai/a	PO1	100a	0a	0a	10.40bcd
	Lorox	50DF		0.5	lb ai/a	PO2				
	Caparol	4L		0.5	lb ai/a	PO3				
	Caparol	4L		0.75	lb ai/a	PO4				
12	Lorox	50DF		0.5	lb ai/a	PO1	100a	7a	0a	8.25cd
	Lorox	50DF		0.5	lb ai/a	PO2				
	Tricor	75DF		0.125	lb ai/a	PO3				
	Caparol	4L		0.75	lb ai/a	PO4				

Micro-rate Application Timings for Weed Control in Carrot - 2021

Pest Code							COPU		RRPW	
Crop Name								CARROT		CARROT
Rating Date							30Jun2022	13Jul2022	13Jul2022	04Oct2022
Rating Type							RATING	RATING	RATING	HARVEST
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	NO./PLOT	KG/10FT
Assessed By							CG	CG/RM/GM/NB	CG/RM/GM/NB	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
13	Lorox	50DF		0.5	lb ai/a	PO1	100a	10a	0a	12.05abc
	Lorox	50DF		0.5	lb ai/a	PO2				
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2				
	Tricor	75DF		0.125	lb ai/a	PO3				
	Caparol	4L		0.75	lb ai/a	PO4				
14	Lorox	50DF		0.5	lb ai/a	PO1	100a	23a	0a	8.34cd
	Tricor	75DF		0.125	lb ai/a	PO2				
	Dual Magnum	7.62EC		0.96	lb ai/a	PO2				
	Lorox	50DF		0.5	lb ai/a	PO3				
	Caparol	4L		0.75	lb ai/a	PO4				
15	Lorox	50DF		0.5	lb ai/a	PO1	100a	7a	0a	11.93abc
	Tricor	75DF		0.125	lb ai/a	PO2				
	Prowl H20	3.8CS		0.95	lb ai/a	PO2				
	Lorox	50DF		0.5	lb ai/a	PO3				
	Caparol	4L		0.75	lb ai/a	PO4				
LSD P=.05							.	14.1	0.6	4.319
Standard Deviation							0.0	8.4	0.3	2.582
CV							0.0	157.94	258.77	22.6

To Investigate the Effect of S-Metolachlor and Flumioxazin Application Methods on Celery Plant 'Meltdown' – 2021-2022

Field Studies:

Personnel: Dr. Sushila Chaudhari, Nicole Soldan, Monique Hemker Mose, and Christopher Galbraith
Location: Decatur, MI **Celery Variety:** Stalker, CR-1
Planting Method: Transplanted **Planting Date:** 5/14/21; 5/23/2022
Harvest Date: 8/11/21; 8/10/2022
Plant Spacing: 6" **Row Spacing:** 30" 1 row of each variety/plot
Plot Size: 2.7 ft wide x 30 ft long **Study Design:** RCB **Replications:** 3
Soil Type: Houghton Muck **OM:** 52% **pH:** 7.8
Sand: 20% **Silt:** 26% **Clay:** 2%

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PPI & PRTP	5/14/21	12:30-1:00pm	70/52 F	Dry	W 1-5mph	18%	5%	No
POTP	5/21/21	10:40-11:20am	84/66 F	Wet	SW 5-7mph	43%	60%	No
PPI & PRT	5/23/22	12:50-1:40 PM	65/59 F	Moist	NE 7 mph	39%	15%	No
POTP	6/2/22	11-11:30 PM	70/70 F	Dry	NNW 2-5 mph	30%	0%	No

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
PPI & PRTP	No Crop or weeds			
POTP	Celery	4"		Good
POTP	No weeds			

Additional Weeds Observed Throughout Season & Spray Method Descriptions

COPU = Common Purslane; RRPW = Redroot Pigweed; TOTAL WC = overall control of broadleaves, sedges, and grass spp.

Data Collection and Results:

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer. PPI = Preplant incorporation (application made immediately before planting and incorporated in upper 2-3 inches of soil by using gardening rake); PRTP = Application made on soil surface immediately before transplanting; POTP = Herbicides were applied 7 days after transplanting
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. For yield data, 10 feet of each variety was harvested from each plot.
4. There was no celery meltdown symptoms reported until mid-July during both years. Meltdown symptoms started showing after one heavy rain event in early August 2021 and reported at harvest during 2022. Weed control (Table 1 and 4) was reported higher when *S*-metolachlor and flumioxazin applied together compared to only *S*-metolachlor and only flumioxazin regardless of application method during both years. Initial crop injury (Table 2 and 5) from herbicide application was reported higher when *S*-metolachlor and flumioxazin applied together as post-transplant compared to preplant incorporation and pre-transplant surface applied. In 2021, CR-1 showed significantly higher meltdown symptoms than Stalker (Table 2). However, this difference was reported lower in 2022 (Table 5). There was a flooding event due to high rainfall in 2021 which may have contributed to the development of higher celery meltdown in CR-1 as compared to Stalker. During both years, no impact of herbicide type and application method reported for the development of celery meltdown symptoms and celery yield and number (Table 3 and 6). Overall, the results from this study showed that type of herbicides and application method had no impact on development of celery meltdown. It reported that variety has some impact on development of celery meltdown; CR-1 reported more susceptible than Stalker.

To Investigate the Effect of S-Metolachlor and Flumioxazin Application Methods on Celery Plant 'Meltdown' – 2021-2022

Table 1. Weed control in celery from S-metolachlor (Dual magnum) and flumioxazin (Chateau SW) when applied at preplant incorporation (PPI), pretransplant surface applied (PRPT), and post-transplant (POTP) in 2021 at Decatur, MI.

Trt No.	Treatment Name	Rate lb ai/a	Growth Stage	COPU 3-Jun	RRPW 3-Jun	RRPW 17-Jun	COPU 17-Jun	All weeds 4-Jul
				----------% control (0 to 100) ----------				
1	Non-treated			0.0	0.0	0.0	0.0	0.0
2	Dual Magnum	1.9	PRTP	98.3	98.3	98.3	81.7	31.7
3	Dual Magnum	1.9	PPI	96.7	100.0	86.7	51.7	36.7
4	Chateau SW	0.096	PRTP	91.7	93.3	61.7	66.7	45.0
5	Chateau SW	0.096	PPI	95.0	98.3	80.0	80.0	50.0
6	Dual Magnum	1.9	PRTP	100.0	100.0	93.3	91.7	73.3
	Chateau SW	0.096	PRTP					
7	Dual Magnum	1.9	PPI	95.0	93.3	86.7	81.7	73.3
	Chateau SW	0.096	PPI					
8	Chateau SW	0.096	POTP	96.7	96.7	85.0	85.0	55.0
9	Dual Magnum	1.9	POTP	98.3	98.3	100.0	95.0	63.3
10	Dual Magnum	1.9	POTP	100.0	100.0	100.0	96.7	76.7
	Chateau SW	0.096	POTP					
	LSD P=.05			6.02	4.40	20.10	17.69	15.10

Table 2. Celery crop injury and meltdown symptoms from Dual magnum and Chateau when applied at PPI, PRPT, and POTP in 2021 at Decatur, MI.

Trt No.	Treatment Name	Rate lb ai/a	Growth Stage	Celery 3-Jun	Celery 17-Jun	Celery 4-Jul*	At harvest CR-1	At harvest Stalker
				--------% injury (0 to 100) ---------			# of plant / plot showing meltdown	
1	Non-treated			0.0	0.0	0.0	22.7	0.0
2	Dual Magnum	1.9	PRTP	8.3	1.7	0.0	24.7	1.0
3	Dual Magnum	1.9	PPI	10.0	0.0	0.0	28.3	1.0
4	Chateau SW	0.096	PRTP	10.0	0.0	0.0	24.0	0.0
5	Chateau SW	0.096	PPI	6.7	6.7	0.0	28.0	0.0
6	Dual Magnum	1.9	PRTP	3.3	3.3	0.0	29.0	0.3
	Chateau SW	0.096	PRTP					
7	Dual Magnum	1.9	PPI	8.3	8.3	0.0	32.0	0.3
	Chateau SW	0.096	PPI					
8	Chateau SW	0.096	POTP	8.3	5.0	0.0	30.0	0.3
9	Dual Magnum	1.9	POTP	13.3	11.7	0.0	24.7	0.0
10	Dual Magnum	1.9	POTP	48.3	30.0	0.0	30.3	0.7
	Chateau SW	0.096	POTP					
	LSD P=.05			12.56	8.78	0.00	9.12	1.42

*No celery meltdown symptoms reported for 3 and 17 June and 4 July ratings.

To Investigate the Effect of S-Metolachlor and Flumioxazin Application Methods on Celery Plant 'Meltdown' – 2021-2022

Table 3. Celery crop yield response from Dual magnum and Chateau when applied at PPI, PRPT, and POTP in 2021 at Decatur, MI.

Trt No.	Treatment Name	Rate lb ai/a	Growth Stage	CR-1	Stalker	CR-1	Stalker
				------- # per 10'--------		-----kg per 10' row----	
1	Non-treated			16.3	22.3	9.61	23.19
2	Dual Magnum	1.9	PRTP	13.7	20.0	8.60	20.71
3	Dual Magnum	1.9	PPI	16.3	23.7	9.45	22.57
4	Chateau SW	0.096	PRTP	15.7	22.7	5.75	20.22
5	Chateau SW	0.096	PPI	17.3	23.3	12.00	24.57
6	Dual Magnum	1.9	PRTP	21.0	22.7	14.03	23.21
	Chateau SW	0.096	PRTP				
7	Dual Magnum	1.9	PPI	19.0	26.0	7.90	32.00
	Chateau SW	0.096	PPI				
8	Chateau SW	0.096	POTP	15.7	28.3	8.78	26.59
9	Dual Magnum	1.9	POTP	14.0	21.3	9.30	24.03
10	Dual Magnum	1.9	POTP	14.0	26.3	10.22	27.56
	Chateau SW	0.096	POTP				
	LSD P=.05			4.40	5.04	4.62	7.02

Table 4. Weed control in celery from Dual magnum and Chateau when applied at PPI, PRPT, and POTP in 2022 at Decatur, MI.

Trt No.	Treatment Name	Rate lb ai/a	Growth Stage	COPU 9-Jun	RRPW 9-Jun	RRPW 15-Jun	COPU 15-Jun
				----------% control (0 to 100) ----------			
1	Non-treated			0.0	0.0	0	0.0
2	Dual Magnum	1.9	PRTP	76.7	98.3	100.0	56.7
3	Dual Magnum	1.9	PPI	75.0	98.3	100.0	58.3
4	Chateau SW	0.096	PRTP	73.3	98.3	98.3	55.0
5	Chateau SW	0.096	PPI	73.3	93.3	100.0	53.3
6	Dual Magnum	1.9	PRTP	90.0	98.3	100.0	88.3
	Chateau SW	0.096	PRTP				
7	Dual Magnum	1.9	PPI	88.3	98.3	100.0	85.0
	Chateau SW	0.096	PPI				
8	Chateau SW	0.096	POTP	46.7	91.7	90.0	50.0
9	Dual Magnum	1.9	POTP	45.0	96.7	100.0	51.7
10	Dual Magnum	1.9	POTP	95.0	100.0	100.0	86.7
	Chateau SW	0.096	POTP				
	LSD P=.05			30.46	7.69	31.10	38.05

To Investigate the Effect of S-Metolachlor and Flumioxazin Application Methods on Celery Plant 'Meltdown' – 2021-2022

Table 5. Celery crop injury and meltdown symptoms from Dual magnum and Chateau when applied at PPI, PRPT, and POTP in 2022 at Decatur, MI.

				Celery			At harvest	
Trt	Treatment	Rate	Growth	9-Jun	15-Jun	28-Jun*	CR-1	Stalker
No.	Name	lb ai/a	Stage	--------% injury (0 to 100) ---------			# of plant / plot showing meltdown	
1	Non-treated			0.0	0.0	0.0	10.7	2.7
2	Dual Magnum	1.9	PRTP	3.3	3.3	0.0	8.7	1.0
3	Dual Magnum	1.9	PPI	3.3	0.0	0.0	11.7	7.7
4	Chateau SW	0.096	PRTP	0.0	0.0	0.0	8.7	1.7
5	Chateau SW	0.096	PPI	0.0	3.3	3.3	7.3	4.0
6	Dual Magnum	1.9	PRTP	1.7	3.3	5.0	8.3	2.7
	Chateau SW	0.096	PRTP					
7	Dual Magnum	1.9	PPI	1.7	0.0	0.0	9.3	2.7
	Chateau SW	0.096	PPI					
8	Chateau SW	0.096	POTP	15.0	3.3	3.3	7.0	5.7
9	Dual Magnum	1.9	POTP	0.0	1.7	0.0	10.3	11.0
10	Dual Magnum	1.9	POTP	41.7	21.7	10.0	9.3	4.0
	Chateau SW	0.096	POTP					
	LSD P=.05			9.23	5.69	3.42	7.73	8.38

*No celery meltdown symptoms reported for 9, 15, and 28th June ratings.

Table 6. Celery crop yield response from Dual magnum and Chateau when applied at PPI, PRPT, and POTP in 2022 at Decatur, MI.

Trt	Treatment	Rate	Growth	CR-1	Stalker	CR-1	Stalker
No.	Name	lb ai/a	Stage	------- # per 10'--------		-----kg per 10' row----	
1	Non-treated			19.7	20.0	12.3	17.6
2	Dual Magnum	1.9	PRTP	21.0	19.7	10.8	16.7
3	Dual Magnum	1.9	PPI	21.3	20.7	10.7	15.8
4	Chateau SW	0.096	PRTP	23.0	20.0	10.0	15.4
5	Chateau SW	0.096	PPI	19.0	21.0	11.3	18.1
6	Dual Magnum	1.9	PRTP	20.7	19.7	14.0	19.2
	Chateau SW	0.096	PRTP				
7	Dual Magnum	1.9	PPI	19.0	20.7	14.0	19.9
	Chateau SW	0.096	PPI				
8	Chateau SW	0.096	POTP	19.0	19.7	11.2	17.2
9	Dual Magnum	1.9	POTP	19.7	19.0	10.9	16.5
10	Dual Magnum	1.9	POTP	21.3	19.0	15.0	18.0
	Chateau SW	0.096	POTP				
	LSD P=.05			3.97	2.20	4.0	4.4

To Investigate the Effect of S-Metolachlor and Flumioxazin Application Methods on Celery Plant 'Meltdown' – 2021-2022

Greenhouse Studies:

Greenhouse study was conducted at MSU greenhouse facility during 21 April to 15 July 2021 and repeated from 28 April to 22 July 2021. Six inches round pots were used in this study. Soil was collected from grower field from Decatur, MI. This grower field has reported celery meltdown symptoms during recent years. Four celery cultivars including CR-1, Dutch, Stalker, and WA-7 were used in this study. In post-transplant treatments, celery transplants were planted on 21 and 28 April and herbicide application were made 4 days after transplanting. In case of pretransplant treatments, celery plants were transplanted immediately after applying herbicides on soil surface in pots. Both pre and post-transplant treatments were applied on same day by using automatic sprayer chamber (DeVries Sprayer) which was calibrated for 8001E at 20 gallon per ac. Flumioxazin at 0.096 lb ai/ac and S-metolachlor at 1.9 lb ai/ac were used for pre and post-transplant applications. Visual estimates of foliar injury (yellowing and necrosis) were rated on a scale of 0 (no crop injury) to 100% (crop death) at 2, 4, and 6 weeks after herbicide treatments (WAT). Plants with meltdown symptoms were counted at the time of harvest. Celery plants were harvested, evaluated for any signs of meltdown symptoms and weighted to measured fresh shoot-biomass. Data were subjected to ANOVA using SAS 9.4 (SAS 9.4, SAS Institute Inc., Cary, NC) PROC GLIMMIX and means separated using Fisher's Protected LSD test (α=0.05).

The two and three-way interactions for cultivar, herbicide, and application timing were not reported significant for injury, meltdown symptoms, and fresh shoot-biomass. Therefore, data is presented by each main factors (Table 7). The effect of cultivar was reported for only fresh shoot-biomass which shows the genetic variation between celery cultivars for shoot growth. Cultivar CR-1 produced maximum shoot-biomass followed by Dutch, Stalker, and WA-7. There was no difference reported in terms of cultivar for herbicide injury and meltdown symptoms. There was no effect of herbicides and application timing reported for development of celery meltdown symptoms. Maximum injury was reported when flumioxazin + *S*-metolachlor applied at posttransplant timing. However, these plants recovered from the initial herbicide injury and has no impact herbicide and application timing on fresh soot-biomass. Overall, these results shows that there is no impact of type of cultivar, herbicide, and application timing reported on development of celery meltdown symptoms. There might be other biotic or abiotic factors which are responsible for the development of meltdown symptoms in celery.

Table 7. Celery crop injury, meltdown symptoms, and fresh shoot-biomass from Dual Magnum and Chateau when applied at pretransplant and post-transplant in greenhouse at East Lansing, MI.

Dependent variables	% Injury			Plants showing meltdown	Fresh shoot-biomass
	2 WAT*	4 WAT	6 WAT		
Cultivar	---------- % (0 to 100) ----------			#	gm/plant
CR-1	2.2	1.0	0.9	0.1	52.6 a
Dutch	2.5	1.0	0.9	0.0	50.0 ab
Stalker	2.4	0.9	0.8	0.1	48.2 b
WA-7	3.0	1.2	0.5	0.1	47.7 b
Herbicide					
Nontreated	0.0 c	0 c	0 c	0.1	50.5
Flumioxazin	1.2 b	0.3 b	0.4 b	0.1	49.6
S-metolachlor	1 b	0.6 b	0.4 b	0	50.4
Flumioxazin + *S*-metolachlor	7.8 a	3.1 a	2.2 a	0.1	47.9
Application timing					
Pretransplant	0.9 b	0.2 b	0.3 b	0.1	50.4
Posttransplant	4.1 a	1.8 a	1.3 a	0.1	48.8

*Means within columns for dependent variables (plastic mulch, fumigation rate and depth, or herbicide program) followed by the same letter are not significantly different according to Fisher's protected LSD (α = 0.05). If no letters are included in a column, then no statistical differences were noted.

Evaluation of GoalTender Application Rate and Timing for Celery Tolerance and Weed Control - Schreur Farms - 2022

Project Code: 113-22-2 Location: Hudsonville, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Celery Variety: CR-1
Planting Method: Transplanted Planting Date: End of May
Harvest Date: 8/18/22
Plant Spacing: 6 in Row Spacing: 18 in; 2 rows/plot
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 2.7 ft wide x 30 ft long

Soil Type: Carlisle Muck OM: 73.7% pH: 5.9
Sand: 42% Silt: 54.5% Clay: 3.5% CEC: NA

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PRE	Applied by grower							
POT	6/2/22	1:30-2:30 PM	74/70 F	Moist	W 4-10 mph	31%	2%	N
PO1	7/5/22	1:15-1:30 PM	86/70 F	Slightly Moist	W 1 mph	60%	75%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/2/22	Celery	3-4″	3-4 LS	Good
6/2/22	YENS = Yellow Nutsedge	1-2″	Vegetative	Moderate
7/5/22	Celery	6-7″	Vegetative	Good
7/5/22	YENS	3-10″	Vegetative - Reproductive	Moderate-Many
7/5/22	COPU = Common Purslane	2-5″	Vegetative	Few-Many
7/5/22	PUAM = Purple Amaranth	4-10″	Vegetative	Few-Moderate
7/5/22	RRPW = Redroot Pigweed	4-12″	Vegetative	Few-Moderate
7/5/22	COGR = Common Groundsel	2-6″	Vegetative-Flowering	Moderate

Additional Weeds Observed Throughout Season

Total BL = Overall control of broadleaf spp.

Notes and Comments

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Maintenance application of Caparol (2 lb ai/ac) to whole trial around last week of June.

Evaluation of GoalTender Application Rate and Timing for Celery Tolerance and Weed Control - Schreur Farms - 2022

Michigan State University

Evaluation of GoalTender Application Rate and Timing for Celery Tolerance and Weed Control - Schreur Farms - 2022

Trial ID:113-22-2 Location:Hudsonville, MI

Protocol ID:113-22-2 Study Director:Monique Hemker Mose Trial Year:2022

Investigator (Creator):Dr. Sushila Chaudhari

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
Pest Code								YENS	TOTAL BL		YENS
Crop Name							CELERY			CELERY	
Rating Date							08Jun2022	08Jun2022	08Jun2022	16Jun2022	16Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
1	Chateau SW	51	WDG	0.096	lb ai/a	PRE	15ef	42a	100a	20ef	40a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
2	Chateau SW	51	WDG	0.096	lb ai/a	PRE	37cd	67a	100a	35cd	67a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
3	Chateau SW	51	WDG	0.096	lb ai/a	PRE	38cd	87a	100a	25de	92a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
4	Chateau SW	51	WDG	0.096	lb ai/a	PRE	3f	55a	60b	2g	50a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	Caparol	4	L	2	lb ai/a	PO1					
5	Chateau SW	51	WDG	0.096	lb ai/a	PRE	15ef	75a	85a	7g	65a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.062	lb ai/a	PO1					
6	Chateau SW	51	WDG	0.096	lb ai/a	PRE	8ef	65a	80ab	5g	42a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
7	Chateau SW	51	WDG	0.096	lb ai/a	PRE	22de	77a	80ab	12fg	70a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.25	lb ai/a	PO1					
8	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	47bc	80a	100a	35cd	82a
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
9	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	63ab	83a	98a	52a	80a
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
10	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	65a	85a	100a	52a	87a
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
11	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	62ab	72a	100a	47ab	77a
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
12	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	65a	78a	100a	53a	82a
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
13	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	50abc	87a	100a	40bc	73a
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
14	Non-Treated Weed Free						17ef	70a	78ab	5g	35a
	Caparol	4	L	1	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
LSD P=.05							17.8	31.5	24.8	10.6	43.5
Standard Deviation							10.6	18.8	14.8	6.3	25.9
CV							29.28	25.73	16.16	22.77	38.59

Evaluation of GoalTender Application Rate and Timing for Celery Tolerance and Weed Control - Schreur Farms - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	COGR	PUAM	COPU	CELERY	YENS
Pest Code							COGR	PUAM	COPU		YENS
Crop Name										CELERY	
Rating Date							16Jun2022	16Jun2022	16Jun2022	05Jul2022	05Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
1	Chateau SW	51	WDG	0.096	lb ai/a	PRE	98a	98a	98a	2c	8a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
2	Chateau SW	51	WDG	0.096	lb ai/a	PRE	98a	98a	100a	10b	17a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
3	Chateau SW	51	WDG	0.096	lb ai/a	PRE	100a	100a	100a	17a	63a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
4	Chateau SW	51	WDG	0.096	lb ai/a	PRE	57c	55b	62a	0c	13a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	Caparol	4	L	2	lb ai/a	PO1					
5	Chateau SW	51	WDG	0.096	lb ai/a	PRE	80abc	73ab	75a	0c	15a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.062	lb ai/a	PO1					
6	Chateau SW	51	WDG	0.096	lb ai/a	PRE	60c	35b	78a	0c	3a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
7	Chateau SW	51	WDG	0.096	lb ai/a	PRE	70bc	75ab	83a	0c	10a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.25	lb ai/a	PO1					
8	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	97ab	98a	98a	10b	40a
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
9	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	95ab	100a	100a	3c	18a
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
10	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	98a	65ab	100a	5bc	52a
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
11	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	97ab	100a	100a	3c	17a
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
12	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	98a	100a	100a	2c	27a
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
13	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	97ab	100a	100a	2c	35a
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
14	Non-Treated Weed Free						25d	100a	100a	0c	0a
	Caparol	4	L	1	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
LSD P=.05							27.6	40.3	28.8	6.5	39.3
Standard Deviation							16.5	24.0	17.2	3.8	23.4
CV							19.7	28.06	18.55	100.95	102.9

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Evaluation of GoalTender Application Rate and Timing for Celery Tolerance and Weed Control - Schreur Farms - 2022

Pest Code						COPU	PUAM	RRPW	COGR	
Crop Name										CELERY
Rating Date						05Jul2022	05Jul2022	05Jul2022	05Jul2022	14Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	CG	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Chateau SW	51	WDG	0.096	lb ai/a	PRE	57bc	77b	63b	87ab	0c
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
2	Chateau SW	51	WDG	0.096	lb ai/a	PRE	77ab	95a	85a	90ab	0c
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
3	Chateau SW	51	WDG	0.096	lb ai/a	PRE	92a	100a	92a	100a	0c
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
4	Chateau SW	51	WDG	0.096	lb ai/a	PRE	28cd	0c	7c	35cd	0c
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	Caparol	4	L	2	lb ai/a	PO1					
5	Chateau SW	51	WDG	0.096	lb ai/a	PRE	17d	8c	13c	38cd	13b
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.062	lb ai/a	PO1					
6	Chateau SW	51	WDG	0.096	lb ai/a	PRE	0d	0c	0c	18d	23a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
7	Chateau SW	51	WDG	0.096	lb ai/a	PRE	17d	3c	0c	32cd	28a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE					
	GoalTender	4	SC	0.25	lb ai/a	PO1					
8	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	82ab	92a	85a	83ab	0c
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
9	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	83ab	97a	90a	80ab	0c
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
10	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	82ab	93a	92a	85ab	0c
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
11	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	80ab	90a	93a	75ab	24a
	GoalTender	4	SC	0.125	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
12	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	88ab	100a	100a	90ab	22a
	GoalTender	4	SC	0.25	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
13	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	82ab	100a	97a	62bc	13b
	GoalTender	4	SC	0.5	lb ai/a	POTP					
	GoalTender	4	SC	0.125	lb ai/a	PO1					
14	Non-Treated Weed Free						75ab	93a	83a	10d	0c
	Caparol	4	L	1	lb ai/a	POTP					
	Caparol	4	L	2	lb ai/a	PO1					
LSD P=.05							32.6	12.8	18.7	35.7	8.0
Standard Deviation							19.4	7.6	11.1	21.3	4.7
CV							31.67	11.24	17.33	33.66	53.35

Evaluation of GoalTender Application Rate and Timing for Celery Tolerance and Weed Control - Schreur Farms - 2022

Pest Code						PIGWEED	YENS	COGR	TOTAL BL
Crop Name									
Rating Date						14Jul2022	14Jul2022	14Jul2022	14Jul2022
Rating Type						RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						SC	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Chateau SW	51WDG		0.096	lb ai/a	PRE	66b	33cde	63b	58c
	Dual Magnum	7.62EC		1.9	lb ai/a	PRE				
	GoalTender	4SC		0.125	lb ai/a	POTP				
	Caparol	4L		2	lb ai/a	PO1				
2	Chateau SW	51WDG		0.096	lb ai/a	PRE	88a	61abc	78ab	73abc
	Dual Magnum	7.62EC		1.9	lb ai/a	PRE				
	GoalTender	4SC		0.25	lb ai/a	POTP				
	Caparol	4L		2	lb ai/a	PO1				
3	Chateau SW	51WDG		0.096	lb ai/a	PRE	95a	78a	95a	91a
	Dual Magnum	7.62EC		1.9	lb ai/a	PRE				
	GoalTender	4SC		0.5	lb ai/a	POTP				
	Caparol	4L		2	lb ai/a	PO1				
4	Chateau SW	51WDG		0.096	lb ai/a	PRE	31c	32de	17cd	35d
	Dual Magnum	7.62EC		1.9	lb ai/a	PRE				
	Caparol	4L		2	lb ai/a	PO1				
5	Chateau SW	51WDG		0.096	lb ai/a	PRE	17c	17ef	25c	24d
	Dual Magnum	7.62EC		1.9	lb ai/a	PRE				
	GoalTender	4SC		0.062	lb ai/a	PO1				
6	Chateau SW	51WDG		0.096	lb ai/a	PRE	20c	8ef	32c	20d
	Dual Magnum	7.62EC		1.9	lb ai/a	PRE				
	GoalTender	4SC		0.125	lb ai/a	PO1				
7	Chateau SW	51WDG		0.096	lb ai/a	PRE	30c	17ef	30c	27d
	Dual Magnum	7.62EC		1.9	lb ai/a	PRE				
	GoalTender	4SC		0.25	lb ai/a	PO1				
8	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	89a	50a-d	90a	80ab
	GoalTender	4SC		0.125	lb ai/a	POTP				
	Caparol	4L		2	lb ai/a	PO1				
9	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	88a	37cde	86a	70bc
	GoalTender	4SC		0.25	lb ai/a	POTP				
	Caparol	4L		2	lb ai/a	PO1				
10	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	96a	67ab	94a	90a
	GoalTender	4SC		0.5	lb ai/a	POTP				
	Caparol	4L		2	lb ai/a	PO1				
11	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	90a	37cde	92a	68bc
	GoalTender	4SC		0.125	lb ai/a	POTP				
	GoalTender	4SC		0.125	lb ai/a	PO1				
12	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	94a	47bcd	96a	80ab
	GoalTender	4SC		0.25	lb ai/a	POTP				
	GoalTender	4SC		0.125	lb ai/a	PO1				
13	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	96a	62abc	94a	83ab
	GoalTender	4SC		0.5	lb ai/a	POTP				
	GoalTender	4SC		0.125	lb ai/a	PO1				
14	Non-Treated Weed Free						98a	0f	0d	33d
	Caparol	4L		1	lb ai/a	POTP				
	Caparol	4L		2	lb ai/a	PO1				
LSD P=.05							15.7	29.0	20.4	19.8
Standard Deviation							9.3	17.3	12.1	11.8
CV							13.08	44.45	19.04	19.82

Evaluation of GoalTender Application Rate and Timing for Celery Tolerance and Weed Control - Schreur Farms - 2022

Pest Code								
Crop Name							CELERY	CELERY
Rating Date							18Aug2022	18Aug2022
Rating Type							HARVEST	HARVEST
Rating Unit/Min/Max							NO./20 FT	KG/20 FT
Assessed By							MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing		
1	Chateau SW	51	WDG	0.096	lb ai/a	PRE	36a	48.18a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE		
	GoalTender	4	SC	0.125	lb ai/a	POTP		
	Caparol	4	L	2	lb ai/a	PO1		
2	Chateau SW	51	WDG	0.096	lb ai/a	PRE	34a	46.39a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE		
	GoalTender	4	SC	0.25	lb ai/a	POTP		
	Caparol	4	L	2	lb ai/a	PO1		
3	Chateau SW	51	WDG	0.096	lb ai/a	PRE	36a	52.88a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE		
	GoalTender	4	SC	0.5	lb ai/a	POTP		
	Caparol	4	L	2	lb ai/a	PO1		
4	Chateau SW	51	WDG	0.096	lb ai/a	PRE	36a	48.64a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE		
	Caparol	4	L	2	lb ai/a	PO1		
5	Chateau SW	51	WDG	0.096	lb ai/a	PRE	35a	43.78a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE		
	GoalTender	4	SC	0.062	lb ai/a	PO1		
6	Chateau SW	51	WDG	0.096	lb ai/a	PRE	35a	40.78a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE		
	GoalTender	4	SC	0.125	lb ai/a	PO1		
7	Chateau SW	51	WDG	0.096	lb ai/a	PRE	38a	43.05a
	Dual Magnum	7.62	EC	1.9	lb ai/a	PRE		
	GoalTender	4	SC	0.25	lb ai/a	PO1		
8	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	35a	46.63a
	GoalTender	4	SC	0.125	lb ai/a	POTP		
	Caparol	4	L	2	lb ai/a	PO1		
9	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	37a	45.31a
	GoalTender	4	SC	0.25	lb ai/a	POTP		
	Caparol	4	L	2	lb ai/a	PO1		
10	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	36a	50.32a
	GoalTender	4	SC	0.5	lb ai/a	POTP		
	Caparol	4	L	2	lb ai/a	PO1		
11	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	37a	51.39a
	GoalTender	4	SC	0.125	lb ai/a	POTP		
	GoalTender	4	SC	0.125	lb ai/a	PO1		
12	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	37a	53.07a
	GoalTender	4	SC	0.25	lb ai/a	POTP		
	GoalTender	4	SC	0.125	lb ai/a	PO1		
13	Dual Magnum	7.62	EC	1.9	lb ai/a	POTP	36a	50.37a
	GoalTender	4	SC	0.5	lb ai/a	POTP		
	GoalTender	4	SC	0.125	lb ai/a	PO1		
14	Non-Treated Weed Free						37a	48.27a
	Caparol	4	L	1	lb ai/a	POTP		
	Caparol	4	L	2	lb ai/a	PO1		
LSD P=.05							2.5	7.600
Standard Deviation							1.5	4.528
CV							4.09	9.48

Celery Tolerance and Purple Amaranth Control with GoalTender - Eding Farm - 2022

Project Code: 113-22-3 Location: Hamilton, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Celery Variety:CR-1
Planting Method: Transplanted Planting Date: 5/22/2022
Harvest Date: 8/11/2022
Plant Spacing: 4 in Row Spacing: 15 in; 2 rows/plot
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 2.7 ft wide x 30 ft long

Soil Type: Houghton Muck OM: 36.6% pH: 7.3
Sand: 49% Silt: 7% Clay: 8% CEC: NA

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
POTP	5/23/22	1:40-3:10 PM	75/65 F	Moist	SE 1 mph	31%	60%	N
PO1	6/28/22	11:00-11:30 AM	71/66 F	Moist	S 3-11 mph	47%	0%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/23/22	Celery	3-4″		Good
5/23/22	No weeds		Preemergence	
6/28/22	Celery	6-8″	8-9 LS	Good
6/28/22	PUAM = Purple Amaranth	6-8″	Vegetative	Many
6/28/22	LATH = Ladysthumb	6″	Vegetative	Moderate
6/28/22	COBT = Common Beggar-Ticks	6″	Vegetative	Moderate
6/28/22	Grasses	2-4″	Vegetative	Few-Moderate

Additional Weeds Observed Throughout Season

COPU = Common Purslane
WIMU = Wild Mustard
Total WC = Overall control of broadleaves, sedges, and grass spp
Total BL = Overall control of broadleaf spp
Grasses = Overall control of grass spp.

Notes and Comments
1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.

Michigan State University

Celery Tolerance and Purple Amaranth Control with GoalTender - Eding Farm - 2022

Trial ID:113-22-3

Protocol ID:113-22-3 Location:Hamilton, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code							GRASSES	TOTAL BL	
Crop Name						CELERY			CELERY
Rating Date						31May2022	31May2022	31May2022	08Jun2022
Rating Type						RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						0b	0a	0d	0b
2	Caparol	4L		1	lb ai/a	POTP, PO1	7b	37a	35bcd	8b
3	Caparol	4L		2	lb ai/a	POTP	8b	87a	32bcd	7b
	GoalTender	4SC		0.125	lb ai/a	PO1				
4	Chateau SW	51WDG		0.096	lb ai/a	POTP	70a	92a	92a	45a
	GoalTender	4SC		0.125	lb ai/a	PO1				
5	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	12b	70a	52abc	10b
	GoalTender	4SC		0.125	lb ai/a	PO1				
6	Prowl H20	3.8CS		1.9	lb ai/a	POTP	13b	33a	20cd	8b
	GoalTender	4SC		0.125	lb ai/a	PO1				
7	Zidua	4.17SC		0.106	lb ai/a	POTP	15b	100a	93a	8b
	GoalTender	4SC		0.125	lb ai/a	PO1				
8	GoalTender	4SC		0.25	lb ai/a	POTP	70a	100a	67abc	37a
	GoalTender	4SC		0.065	lb ai/a	PO1				
9	Chateau SW	51WDG		0.096	lb ai/a	POTP	72a	70a	95a	43a
	GoalTender	4SC		0.25	lb ai/a	POTP				
	GoalTender	4SC		0.065	lb ai/a	PO1				
10	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	58a	98a	73ab	42a
	GoalTender	4SC		0.25	lb ai/a	POTP				
	GoalTender	4SC		0.065	lb ai/a	PO1				
11	Prowl H20	3.8CS		1.9	lb ai/a	POTP	70a	63a	70abc	30a
	GoalTender	4SC		0.25	lb ai/a	POTP				
	GoalTender	4SC		0.065	lb ai/a	PO1				
12	Zidua	4.17SC		0.106	lb ai/a	POTP	62a	67a	73ab	43a
	GoalTender	4SC		0.25	lb ai/a	POTP				
	GoalTender	4SC		0.065	lb ai/a	PO1				
LSD P=.05							16.8	64.4	51.1	15.8
Standard Deviation							9.9	38.0	30.2	9.4
CV							26.14	55.91	51.62	39.84

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 22 because error mean square = 0.
^Calculated from residual.

Celery Tolerance and Purple Amaranth Control with GoalTender - Eding Farm - 2022

Pest Code							PUAM	COPU	LATH	GRASSES	
Crop Name											CELERY
Rating Date							08Jun2022	08Jun2022	08Jun2022	08Jun2022	28Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weed Free						8d	67a	85a	75ab	0a
2	Caparol	4L		1	lb ai/a	POTP, PO1	28c	85a	87a	73abc	0a
3	Caparol	4L		2	lb ai/a	POTP	10d	90a	87a	87ab	0a
	GoalTender	4SC		0.125	lb ai/a	PO1					
4	Chateau SW	51WDG		0.096	lb ai/a	POTP	92ab	100a	95a	90ab	0a
	GoalTender	4SC		0.125	lb ai/a	PO1					
5	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	93ab	97a	85a	88ab	3a
	GoalTender	4SC		0.125	lb ai/a	PO1					
6	Prowl H20	3.8CS		1.9	lb ai/a	POTP	10d	95a	28b	40c	0a
	GoalTender	4SC		0.125	lb ai/a	PO1					
7	Zidua	4.17SC		0.106	lb ai/a	POTP	97ab	100a	95a	100a	7a
	GoalTender	4SC		0.125	lb ai/a	PO1					
8	GoalTender	4SC		0.25	lb ai/a	POTP	85ab	97a	88a	97a	5a
	GoalTender	4SC		0.065	lb ai/a	PO1					
9	Chateau SW	51WDG		0.096	lb ai/a	POTP	97ab	100a	95a	92ab	0a
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
10	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	98a	100a	97a	97a	8a
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
11	Prowl H20	3.8CS		1.9	lb ai/a	POTP	80b	100a	67a	62bc	0a
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
12	Zidua	4.17SC		0.106	lb ai/a	POTP	97ab	95a	90a	97a	13a
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
LSD P=.05							17.6	25.6	34.5	33.8	8.8
Standard Deviation							10.4	15.1	20.4	20.0	5.2
CV							15.66	16.15	24.51	24.07	169.52

Celery Tolerance and Purple Amaranth Control with GoalTender - Eding Farm - 2022

Pest Code							PUAM	LATH	GRASSES	COBT	
Crop Name											CELERY
Rating Date							28Jun2022	28Jun2022	28Jun2022	28Jun2022	08Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weed Free						0c	0e	0d	0a	0f
2	Caparol	4L		1	lb ai/a	POTP, PO1	3c	33b-e	30cd	33a	13e
3	Caparol	4L		2	lb ai/a	POTP	3c	27cde	3d	33a	38abc
	GoalTender	4SC		0.125	lb ai/a	PO1					
4	Chateau SW	51WDG		0.096	lb ai/a	POTP	63a	97a	72abc	98a	38abc
	GoalTender	4SC		0.125	lb ai/a	PO1					
5	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	23bc	58a-e	80ab	55a	45a
	GoalTender	4SC		0.125	lb ai/a	PO1					
6	Prowl H20	3.8CS		1.9	lb ai/a	POTP	0c	0e	0d	0a	40ab
	GoalTender	4SC		0.125	lb ai/a	PO1					
7	Zidua	4.17SC		0.106	lb ai/a	POTP	68a	88ab	93a	90a	32bcd
	GoalTender	4SC		0.125	lb ai/a	PO1					
8	GoalTender	4SC		0.25	lb ai/a	POTP	18bc	45a-e	37bcd	40a	32bcd
	GoalTender	4SC		0.065	lb ai/a	PO1					
9	Chateau SW	51WDG		0.096	lb ai/a	POTP	50ab	83a-d	75ab	65a	29bcd
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
10	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	48ab	85abc	95a	58a	23de
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
11	Prowl H20	3.8CS		1.9	lb ai/a	POTP	7c	25de	48bc	23a	27cd
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
12	Zidua	4.17SC		0.106	lb ai/a	POTP	63a	87ab	97a	60a	29bcd
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
LSD P=.05							33.6	58.9	45.0	70.4	12.1
Standard Deviation							19.8	34.8	26.6	41.6	7.1
CV							68.35	66.44	50.61	89.58	24.76

Celery Tolerance and Purple Amaranth Control with GoalTender - Eding Farm - 2022

Pest Code							STUNTING	WIMU	LATH	TOTAL WC	PUAM
Crop Name							CELERY				
Rating Date							08Jul2022	08Jul2022	08Jul2022	08Jul2022	08Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							SC	SC	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weed Free						30bcd	33bcd	33b-e	40a-d	33bc
2	Caparol	4L		1	lb ai/a	POTP, PO1	43ab	27cd	27cde	7d	5c
3	Caparol	4L		2	lb ai/a	POTP	50a	30bcd	18de	8d	0c
	GoalTender	4SC		0.125	lb ai/a	PO1					
4	Chateau SW	51WDG		0.096	lb ai/a	POTP	23cd	82ab	84ab	62ab	66ab
	GoalTender	4SC		0.125	lb ai/a	PO1					
5	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	35a-d	57a-d	53a-e	43a-d	53ab
	GoalTender	4SC		0.125	lb ai/a	PO1					
6	Prowl H20	3.8CS		1.9	lb ai/a	POTP	52a	3d	3e	8d	8c
	GoalTender	4SC		0.125	lb ai/a	PO1					
7	Zidua	4.17SC		0.106	lb ai/a	POTP	18d	88a	87a	75a	80a
	GoalTender	4SC		0.125	lb ai/a	PO1					
8	GoalTender	4SC		0.25	lb ai/a	POTP	42abc	46a-d	48a-e	33bcd	17c
	GoalTender	4SC		0.065	lb ai/a	PO1					
9	Chateau SW	51WDG		0.096	lb ai/a	POTP	20d	81ab	78abc	65ab	67ab
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
10	Dual Magnum	7.62EC		1.9	lb ai/a	POTP	28bcd	80abc	70a-d	60abc	55ab
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
11	Prowl H20	3.8CS		1.9	lb ai/a	POTP	47ab	23d	20de	23cd	10c
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
12	Zidua	4.17SC		0.106	lb ai/a	POTP	20d	83ab	77abc	68ab	82a
	GoalTender	4SC		0.25	lb ai/a	POTP					
	GoalTender	4SC		0.065	lb ai/a	PO1					
LSD P=.05							19.0	53.4	52.8	37.3	33.4
Standard Deviation							11.2	31.6	31.2	22.1	19.7
CV							32.9	59.75	62.4	53.64	49.67

Celery Tolerance and Purple Amaranth Control with GoalTender - Eding Farm - 2022

Pest Code								
Crop Name							CELERY	CELERY
Rating Date							11Aug2022	11Aug2022
Rating Type							HARVEST	HARVEST
Rating Unit/Min/Max							NO./20 F	KG/20 FT
Assessed By							MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing		
1	Non-Treated Weed Free						32a	23.31a
2	Caparol		4L	1	lb ai/a	POTP, PO1	29a	18.46a
3	Caparol		4L	2	lb ai/a	POTP	30a	19.52a
	GoalTender		4SC	0.125	lb ai/a	PO1		
4	Chateau SW		51WDG	0.096	lb ai/a	POTP	32a	29.87a
	GoalTender		4SC	0.125	lb ai/a	PO1		
5	Dual Magnum		7.62EC	1.9	lb ai/a	POTP	34a	26.71a
	GoalTender		4SC	0.125	lb ai/a	PO1		
6	Prowl H20		3.8CS	1.9	lb ai/a	POTP	30a	17.32a
	GoalTender		4SC	0.125	lb ai/a	PO1		
7	Zidua		4.17SC	0.106	lb ai/a	POTP	34a	27.91a
	GoalTender		4SC	0.125	lb ai/a	PO1		
8	GoalTender		4SC	0.25	lb ai/a	POTP	33a	21.66a
	GoalTender		4SC	0.065	lb ai/a	PO1		
9	Chateau SW		51WDG	0.096	lb ai/a	POTP	31a	22.74a
	GoalTender		4SC	0.25	lb ai/a	POTP		
	GoalTender		4SC	0.065	lb ai/a	PO1		
10	Dual Magnum		7.62EC	1.9	lb ai/a	POTP	31a	22.95a
	GoalTender		4SC	0.25	lb ai/a	POTP		
	GoalTender		4SC	0.065	lb ai/a	PO1		
11	Prowl H20		3.8CS	1.9	lb ai/a	POTP	32a	19.87a
	GoalTender		4SC	0.25	lb ai/a	POTP		
	GoalTender		4SC	0.065	lb ai/a	PO1		
12	Zidua		4.17SC	0.106	lb ai/a	POTP	30a	22.77a
	GoalTender		4SC	0.25	lb ai/a	POTP		
	GoalTender		4SC	0.065	lb ai/a	PO1		
LSD P=.05							4.2	9.128
Standard Deviation							2.5	5.391
CV							7.88	23.69

Effect of Herbicides on Large Crabgrass Control and Celery - Willbrandt Celery Farms - 2022

Project Code: 113-22-4 Location: Decatur, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Celery Variety: CR-1
Planting Method: Transplant Planting Date:6/24/2022
Harvest Date: no harvest
Plant Spacing: 4″ Row Spacing: 15 in; 2 rows/plot
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 2.7 ft wide x 30 ft long

Soil Type: Houghton Muck OM: 52.1% pH: 7.1
Sand: 67% Silt: 28.5% Clay: 4.5% CEC: NA

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
POST	7/14/22	1:10-2:00 PM	85/76 F	Moist	NE 2-3 mph	47%	65%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
7/14/22	Celery	4-5″	Vegetative	Good
7/14/22	LACG	2-4″	Vegetative	Low-Moderate

Notes and Comments
1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Dual Magnum, Prowl H2O, and Zidua applied at registered rate at planting by grower.
4. Maintenance application of Caparol (2 lb ai/a) made on July 8,2022.
5. Overall, there was low pressure of large crabgrass in the trial area. One week after application, large crabgrass less than 2″ was controlled effectively (>85%) with only SelectMax or SelectMax combination with Fusilade or Fusilade + Poast + Assure, Quinstar, and Callisto. Large crabgrass more than 2″ was controlled effectively (>75%) with only SelectMax combination with Fusilade or Fusilade + Poast + Assure, and Callisto. The lowest number of large crabgrass reported from Callisto at 14 DAA; however, the highest level of injury (94%)was also reported from this treatment.

Michigan State University

Effect of Herbicides on Large Crabgrass Control and Celery - Willbrandt Celery Farms - 2022

Trial ID:113-22-4 Location:Decatur, MI Trial Year:2022

Protocol ID:113-22-4 Investigator (Creator):Dr. Sushila Chaudhari

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
Pest Code								LACG > 2in	LACG < 2in		LACG	LACG
Crop Name							CELERY			CELERY		
Rating Date							19Jul2022	19Jul2022	19Jul2022	27Jul2022	27Jul2022	27Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	STAND COUNT
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	NO./PLOT
Assessed By							MHM, CG	MHM, CG	MHM, CG	SC, CG	SC, CG	SC, CG
1	Untreated Check						0b	40a	48a	0c	0b	17a
2	Select Max	0.97EC		0.12	lb ai/a	POST	7b	13a	100a	0c	0b	9a
	NIS	100SL		0.25	% v/v	POST						
3	Poast	1.53EC		0.38	lb ai/a	POST	3b	33a	72a	0c	0b	11a
	COC	100SL		1.25	% v/v	POST						
	Bronc (AMS)	38L		1	% v/v	POST						
4	Fusilade DX	2EC		0.38	lb ai/a	POST	8b	35a	85a	0c	0b	15a
	COC	100SL		1.25	% v/v	POST						
5	Assure II	0.88EC		0.083	lb ai/a	POST	3b	10a	73a	0c	0b	19a
	COC	100SL		1.25	% v/v	POST						
6	Select Max	0.97EC		0.12	lb ai/a	POST	5b	13a	93a	0c	15b	24a
	Fusilade DX	2EC		0.38	lb ai/a	POST						
	NIS	100SL		0.25	% v/v	POST						
7	Select Max	0.97EC		0.12	lb ai/a	POST	3b	7a	67a	0c	10b	18a
	Assure II	0.88EC		0.08	lb ai/a	POST						
	NIS	100SL		0.25	% v/v	POST						
8	Select Max	0.97EC		0.12	lb ai/a	POST	5b	75a	93a	0c	13b	3a
	Poast	1.53EC		0.38	lb ai/a	POST						
	Fusilade DX	2EC		0.38	lb ai/a	POST						
	Assure II	0.88EC		0.08	lb ai/a	POST						
	NIS	100SL		0.25	% v/v	POST						
9	QuinStar 4L	3.8L		0.37	lb ai/a	POST	42a	22a	97a	18b	7b	7a
10	Callisto	4SC		0.24	lb ai/a	POST	35a	95 a	93a	94a	65a	2a
	NIS	100SL		0.25	% v/v	POST						
LSD P=.05							11.6	52.6	47.6	4.3	15.9	14.7
Standard Deviation							6.7	29.3	27.4	2.5	9.3	8.6
CV							60.38	106.46	33.3	22.56	84.31	68.85

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=3; Average=2
^Calculated from residual.

Tiafenacil for Preplant and Preemergence Weed Control in Pickling Cucumber - HTRC - 2022

Project Code: 108-22-1 | Location: Holt, MI
Block: 108/109

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Cucumber, pickling | Variety: 88% Expedition + 12% Sire
Planting Method: Seeded | Planting Date: 6/6/2022
Harvest Date: 7/26/2022
Plant Spacing: 3 inch | Row Spacing: 14 inch; 3 rows/plot
Tillage Type: Conventional | Study Design: RCB Replications: 4
Plot Size: 5.4 ft wide x 25 ft long

Soil Type: Spinks Loamy Sand | OM: 2% | pH: 6.2
Sand: 44% Silt: 33.3% | Clay: 22.7% | CEC: 6.7

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PRP	6/1/22	2-2:40 PM	74/72 F	Dry	SW 4-7 mph	62%	90%	N
PRE	6/8/22	12:45-1 PM	70/64 F	Moist	E 4-5 mph	57%	100%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/1/22	No Crop or Weeds		Preplant	
6/8/22	No Weeds		Preemergence	
	Cucumber planted but no germination			

Additional Weeds Observed Throughout Season

Redroot pigweed, wild mustard, common lambsquarters, and large crabgrass
Total weed control (WC) include all above weeds for 6/22/2022 and 7/6/2022 but for 7/15/2022 includes only broadleaves.

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 0-100; 0 = no injury, 100 = complete kill.
3. Select Max 0.97 EC at 16 fl oz per ac plus 0.25% NIS was applied on 6/25/2022 for large crabgrass control in whole study area.
4. Crop injury was recorded as lower germination and crop stunting at initial rating (6/16/2022, 6/22/2022, 7/6/202) and then percent reduction in ground cover from cucumber vines reported at later stage on 7/15/2022.
5. No hand weeding performed through the study period. Therefore, the nontreated and some treated plots had very low yields because of higher weed competition.

Results:
Weed control: Preemergence application provided some level of control. Weed control increased with the increase rate of tiafenacil. Preplant application provided lower weed control as compared to preemergence application.
Crop response: Some level of crop stunting reported from the highest rate of tiafenacil (0.067 lb/ac) which is shown by reduced vine biomass (decrease in vine biomass as increase rate of tiafenacil) especially when tiafenacil is used at both preplant and preemergence timings. There were more #3 grades because harvest was delayed intentionally so that non-treated, Gramoxone, and tiafenacil 0.022 plots produce some yields (due to heavy weed pressure cucumber vines were growing slow in these plots). Overall, tiafenacil (0.022 and 0.045) has potential to be used in pickling cucumber for preplant and preemergence or both application timings for weed control (especially under stale seed bed situation).

Michigan State University

Tiafenacil for Preplant and Preemergence Weed Control in Pickling Cucumber - HTRC - 2022

Trial ID:108-22-1

Protocol ID:108-22-1 Location:Holt, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code									TOTAL WC		TOTAL WC
Crop Name							CUKE	CUKE		CUKE	
Rating Date							16Jun2022	22Jun2022	22Jun2022	06Jul2022	06Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weed Free						0a	0c	0e	0b	0e
2	Gramoxone 3SL	3SL		1	lb ai/a	PRP,PRE	0a	0c	46d	0b	3e
	COC	100SL		1	% v/v	PRP,PRE					
3	DCC-3825	70WDG		0.022	lb ai/a	PRP	0a	0c	55cd	0b	21d
	MSO	100SL		1	% v/v	PRP					
4	DCC-3825	70WDG		0.045	lb ai/a	PRP	0a	1bc	68bc	3b	45c
	MSO	100SL		1	% v/v	PRP					
5	DCC-3825	70WDG		0.067	lb ai/a	PRP	0a	5a	83ab	0b	58bc
	MSO	100SL		1	% v/v	PRP					
6	DCC-3825	70WDG		0.022	lb ai/a	PRE	0a	0c	81ab	0b	51bc
	MSO	100SL		1	% v/v	PRE					
7	DCC-3825	70WDG		0.045	lb ai/a	PRE	1a	0c	85ab	3b	66ab
	MSO	100SL		1	% v/v	PRE					
8	DCC-3825	70WDG		0.067	lb ai/a	PRE	23a	3abc	90a	15a	78a
	MSO	100SL		1	% v/v	PRE					
9	DCC-3825	70WDG		0.022	lb ai/a	PRP,PRE	0a	0c	88a	3b	61b
	MSO	100SL		1	% v/v	PRP,PRE					
10	DCC-3825	70WDG		0.045	lb ai/a	PRP,PRE	4a	1bc	94a	10ab	80a
	MSO	100SL		1	% v/v	PRP,PRE					
11	DCC-3825	70WDG		0.067	lb ai/a	PRP,PRE	6a	4ab	94a	15a	78a
	MSO	100SL		1	% v/v	PRP,PRE					
LSD P=.05							20.0	2.8	18.3	10.2	15.8
Standard Deviation							13.8	2.0	12.7	7.1	10.9
CV							451.31	157.25	17.85	164.25	22.25

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Tiafenacil for Preplant and Preemergence Weed Control in Pickling Cucumber - HTRC - 2022

Pest Code								TOTAL WC		
Crop Name							CUKE		CUKE	CUKE
Rating Date							15Jul2022	15Jul2022	26Jul2022	26Jul2022
Rating Type							RATING	RATING	HARV CUKE	HARVBIOMASS
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	KG/PLOT	KG/PLOT
Assessed By							SC	SC	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated Weed Free						70a	0e	2.42d	4.24e
2	Gramoxone 3SL	3SL		1	lb ai/a	PRP,PRE	66a	0e	3.10d	5.15de
	COC	100SL		1	% v/v	PRP,PRE				
3	DCC-3825	70WDG		0.022	lb ai/a	PRP	56ab	13e	8.45cd	7.43cde
	MSO	100SL		1	% v/v	PRP				
4	DCC-3825	70WDG		0.045	lb ai/a	PRP	31cd	45d	16.53bc	9.56b-e
	MSO	100SL		1	% v/v	PRP				
5	DCC-3825	70WDG		0.067	lb ai/a	PRP	35bc	73c	23.71ab	9.99bcd
	MSO	100SL		1	% v/v	PRP				
6	DCC-3825	70WDG		0.022	lb ai/a	PRE	16cd	76bc	24.13ab	13.01ab
	MSO	100SL		1	% v/v	PRE				
7	DCC-3825	70WDG		0.045	lb ai/a	PRE	11cd	86abc	28.80a	14.22ab
	MSO	100SL		1	% v/v	PRE				
8	DCC-3825	70WDG		0.067	lb ai/a	PRE	24cd	90ab	27.09a	11.91abc
	MSO	100SL		1	% v/v	PRE				
9	DCC-3825	70WDG		0.022	lb ai/a	PRP,PRE	8d	83abc	26.96a	16.74a
	MSO	100SL		1	% v/v	PRP,PRE				
10	DCC-3825	70WDG		0.045	lb ai/a	PRP,PRE	19cd	90ab	28.13a	12.77abc
	MSO	100SL		1	% v/v	PRP,PRE				
11	DCC-3825	70WDG		0.067	lb ai/a	PRP,PRE	34bc	93a	25.90ab	11.92abc
	MSO	100SL		1	% v/v	PRP,PRE				
LSD P=.05							23.8	16.7	10.071	5.360
Standard Deviation							16.5	11.6	6.974	3.712
CV							49.08	19.65	35.65	34.93

Tiafenacil for Preplant and Preemergence Weed Control in Pickling Cucumber - HTRC - 2022

Pest Code									
Crop Name							CUKE	CUKE	CUKE
Rating Date							26Jul2022	26Jul2022	26Jul2022
Rating Type							GRADE1	GRADE2	GRADE3
Rating Unit/Min/Max							KG/PLOT	KG/PLOT	KG/PLOT
Assessed By							GM	GM	GM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						0.25c	0.72c	1.32d
2	Gramoxone 3SL	3SL		1	lb ai/a	PRP,PRE	0.26c	0.71c	2.12d
	COC	100SL		1	% v/v	PRP,PRE			
3	DCC-3825	70WDG		0.022	lb ai/a	PRP	0.42abc	1.37b	6.29cd
	MSO	100SL		1	% v/v	PRP			
4	DCC-3825	70WDG		0.045	lb ai/a	PRP	0.51ab	1.64ab	14.07bc
	MSO	100SL		1	% v/v	PRP			
5	DCC-3825	70WDG		0.067	lb ai/a	PRP	0.58a	2.06a	18.67ab
	MSO	100SL		1	% v/v	PRP			
6	DCC-3825	70WDG		0.022	lb ai/a	PRE	0.59a	2.18a	20.81ab
	MSO	100SL		1	% v/v	PRE			
7	DCC-3825	70WDG		0.045	lb ai/a	PRE	0.54ab	2.08a	25.51a
	MSO	100SL		1	% v/v	PRE			
8	DCC-3825	70WDG		0.067	lb ai/a	PRE	0.44abc	1.43b	24.42a
	MSO	100SL		1	% v/v	PRE			
9	DCC-3825	70WDG		0.022	lb ai/a	PRP,PRE	0.58a	2.05a	25.27a
	MSO	100SL		1	% v/v	PRP,PRE			
10	DCC-3825	70WDG		0.045	lb ai/a	PRP,PRE	0.52ab	1.59ab	25.08a
	MSO	100SL		1	% v/v	PRP,PRE			
11	DCC-3825	70WDG		0.067	lb ai/a	PRP,PRE	0.34bc	1.43b	23.34ab
	MSO	100SL		1	% v/v	PRP,PRE			
LSD P=.05							0.204	0.596	9.380
Standard Deviation							0.141	0.412	6.495
CV							30.98	26.32	38.24

Determine the Optimum Rate of Homeplate For Weed Control – 2022

Project Code: Homeplate-field-1 | Location: Holt, MI | Block: 67-68

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Fallow | Variety: NA
Planting Method: NA | Planting Date: NA
Harvest Date: NA
Plant Spacing: NA | Row Spacing: 10′
Tillage Type: Conventional | Study Design: RCB | Replications: 3
Plot Size: 5.4 ft wide x 25 ft long

Soil Type: Capac Loam | OM: 2.3% | pH: 7.3
Sand: 46.1% | Silt: 28.7% | Clay: 25.2% | CEC: 9.5

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
POST	8/24/22	11:15-11:45 AM	81/70 F	Dry	N 3-6 mph	50%	0%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
8/24/22	COPU = Common Purslane	1-4″ dia	Vegetative	Many
8/24/22	COLQ = Common Lambsquarter	1-3″	Vegetative	Many
8/24/22	LACG = Large Crabgrass	1-3″	Vegetative	Many
8/24/22	RRPW = RedRoot Pigweed	1-3″	Vegetative	Moderate

Additional Weeds Observed Throughout Season

Grasses = Overall control of grass spp.
Other BL = Overall control of RRPW, COPU, and Wild Mustard

Notes and Comments

1. Spray applied with 4 nozzle boom. FF11004, 40 gpa, 29 psi, 3.2 mph, CO2 backpack sprayer.
2. Weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Field was prepared with conventional tillage practices to stimulate new weed growth. Treatments applied after this flush of weeds reached desired height.
4. Homeplate has very limited activity for grasses and provide 23% control when used at 12% v/v. At least 6% v/v Homeplate solution required to achieve good broadleaf weed control.

Michigan State University

Determine the Optimum Rate of Homeplate For Weed Control – 022

Trial ID:Homeplate-field-1

Protocol ID:Homeplate-field-1 Location:HTRC, Holt, MI Trial Year:2022

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code							COLQ	GRASSES	OTHER BL	COLQ	GRASSES	OTHER BL
Rating Date							01Sep2022	01Sep2022	01Sep2022	09Sep2022	09Sep2022	09Sep2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							SC	SC	SC	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Nontreated					POST	0d	0b	0d	0d	0a	0d
2	Homeplate	100L		1%	v/v	POST	3d	0b	3d	0d	0a	0d
3	Homeplate	100L		3%	v/v	POST	37c	0b	35c	25c	0a	25c
4	Homeplate	100L		6%	v/v	POST	73b	15ab	63b	64b	8a	52b
5	Homeplate	100L		9%	v/v	POST	81b	20a	60b	68b	13a	51b
6	Homeplate	100L		12%	v/v	POST	95a	33a	85a	85a	23a	78a
LSD P=.05							11.5	19.6	20.9	14.0	19.4	18.3
Standard Deviation							6.3	10.8	11.5	7.7	10.7	10.0
CV							13.12	94.73	28.06	19.05	142.47	29.27

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Project Code: 135-22-1 Location: Benton Harbor, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Hops Variety: Comet
Harvest Date: 8/30/22
Plant Spacing: 7′ Row Spacing: 12′
Planting Date: 2019 Study Design: RCB Replications: 3
Plot Size: 5.5 ft wide x 28 ft long

Soil Type: Spinks Fine Loamy Sand OM: 2% pH: 5.6
Sand: 86% Silt: 5.4% Clay: 8.6% CEC: 6.1

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
WI	3/15/22	12:20-1:15 PM	47/38 F	Dry/ Slightly Moist	SW 5-7 mph	68%	30%	N
SPR	4/26/22	10:55-11:20 AM	41/45 F	Moist	NW 7-10 mph	64%	98%	N
PO1	6/9/22	11:20-12:20 AM	78/50 F	Dry	W 4.6 mph	71%	25%	N
PO2	6/23/22	10:50-11:55 AM	86/70 F	Dry	E 3.6 mph	23%	10%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
3/15/22	Hops		Preemergence	
3/15/22	QUGR = Quackgrass		Mostly Dead	Moderate
3/15/22	ORGR = Orchard Grass		Mostly Dead	Moderate
3/15/22	PUDN = Purple Deadnettle	1/2″	Vegetative	Few
3/15/22	MECW = Mouseear Chickweed	1/2"	Vegetative	Few
3/15/22	CRWS = Creeping Woodsorrel	1/2″	Vegetative	Few
3/15/22	RESO = Red Sorrel	1/2"	Vegetative	Few
3/15/22	WIRA = Wild Radish	1″	Vegetative	Few
3/15/22	BLDO = Broadleaf Dock	1″	Vegetative	Few
3/15/22	SFGE = Small Flower Geranium	1/2"	Vegetative	Few
3/15/22	BLCA = Bladder Campion	1″	Vegetative	Few
4/26/22	Hops	2-10″		many
4/26/22	QUGR	4-6″	Vegetative	Many
4/26/22	SFGE	1-3″	Vegetative	Few
4/26/22	CORW = Common Ragweed	1/2-1″	Vegetative	Many
4/26/22	COLQ = Common Lambsquarters	1/2-1″	Vegetative	Few
4/26/22	RESO	1-2″	Vegetative	Moderate
4/26/22	BLCA = Bladder Campion	2-3″	Vegetative	Moderate
6/9/22	QUGR	≤ 2′	Vegetative	Many
6/9/22	YENS = Yellow Nutsedge	≤ 1′	Vegetative	Moderate-Many
6/9/22	BLCA = Bladder Campion	≤ 2.5′	Vegetative	Few-Moderate
6/9/22	HAVE = Hairy Vetch	8-10″	Flowering	Moderate
6/9/22	CORW	6-10″	Vegetative	Moderate
6/9/22	HOWE = Horseweed	4-5″	Vegetative	Few-Moderate
6/23/22	QUGR	6-12″	Vegetative	Many
6/23/22	YENS	6-10″	Vegetative	Moderate-Many
6/23/22	BLCM	5-12″	flowering	Few-Moderate
6/23/22	HAVE	8-12″	flowering	Moderate
6/23/22	HOWE	10-12″	Vegetative	Few-Moderate

Additional Weeds Observed Throughout Season

Grasses = Overall control of grass spp
Total BL = Overall control of broadleaf spp.
COCW = Common Chickweed
High Hops = Hops growing up the vine
Low Hops = Hops on ground level before traveling up vine.

Notes and Comments

1. Spray applied with 4 nozzle boom (WI and SPR application) and 2 nozzle boom (PO1 and PO2). FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Maintenance application of Prowl H2O (4 lb ai/a) + Chateau (0.191 lb ai/a) applied to whole study area on 3/15/22.
4. Maintenance application of Select Max to untreated plots on 5/12/22.
5. After winter application, at the time of weekly rating no weed or hop growth observed until April 14th due to the cold weather; therefore, no rating data collected before April 14th. At April 26th rating, all the plots had similar level of weed control and hop emergence as April 14th; therefore, no data mention for that rating.
6. Weed control was reported similar from all treatments after winter application and mainly grasses survived. Initially at 1 week after spring application (May 5th) significantly higher grass control observed from treatment 5 and 6; but no difference in control were reported at 2 and 4 week ratings (May 12 and 25). Other broadleaf weeds control was reported very good and similar from all the treatments after spring application until the first PO1 application (rating May 5, 12, and 25th). One WAP2 [(week after PO2 application) on June 30th], grass control reported higher from Reviton (treatments 3 to 6) application as compared to Aim. Similar trend was reported for weed control for rest of the ratings, but level of control reduced with time.

Higher level of crop injury reported from spring application of tiafenacil (0.044 and 0.088 lb/ac; treatment 5 and 6) than spring application of Aim at 1 and 2 weeks after spring applications (May 5 and 12 ratings). Hop plants recover from the spring application injury by 4 weeks after spring application and all the treatments has similar crop growth. One WAP1 [(week after PO1 application) on June 14th], injury to high hop vines was reported from 15 to 33% from Reviton treatments and 35% from Aim. Injury to lower hop foliage was reported higher from both Reviton rates (trt 3 to 6; 52 to 72%) as compared to Aim. One WAP2 (June 30th], highest injury (40%) to high hop vines was reported from treatment 3. Injury to lower hop foliage was reported significantly higher (>90%) from both Reviton rates (trt 3 to 6) as compared to Aim (32%). Similar trend was reported for injury ratings for rest of the ratings but the level of injury reduced with time. There was no difference reported for hop height and yield with respect to treatments.

Michigan State University

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Trial ID:135-22-1 Location:Benton Harbor, MI Trial Year:2022

Protocol ID:135-22-1 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Nicole Soldan

Pest Code						SFGE	GRASS	BLCA	TOTAL BL	
Crop Name										HOPS
Rating Date						14Apr2022	14Apr2022	14Apr2022	14Apr2022	05May2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						0b	0a	0c	0b	0c
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	100a	33a	97a	92a	38b
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	100a	26a	88b	87a	43b
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	100a	17a	93ab	88a	47b
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	100a	0a	90ab	83a	80a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	100a	0a	93ab	92a	77a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							.	59.8	8.3	10.5	23.3
Standard Deviation							0.0	32.9	4.6	5.7	12.8
CV							0.0	260.52	5.94	7.81	26.97

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=25,31; Average=35
Could not calculate LSD (% mean diff) for columns 1 because error mean square = 0.
^Calculated from residual.

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	GRASS	SFGE	HOPS	QUGR	HOPS
Pest Code							GRASS	SFGE		QUGR	
Crop Name									HOPS		HOPS
Rating Date							05May2022	05May2022	12May2022	12May2022	25May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	NS	NS	CG
1	Untreated-Weedy						0d	0b	0c	27a	8a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	18cd	100a	17b	7a	3a
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	37c	77a	18b	33a	5a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	40bc	100a	22ab	20a	5a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	72ab	100a	33a	27a	7a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	77a	100a	32a	40a	5a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							34.4	30.0	13.0	40.9	5.2
Standard Deviation							18.9	16.5	7.2	22.5	2.8
CV							46.66	20.77	35.35	87.98	51.09

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code						SFGE	GRASSES	CORW	RESO	COCW
Crop Name										
Rating Date						25May2022	25May2022	25May2022	25May2022	25May2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						45b	48a	70a	70a	68a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	100a	18b	100a	100a	100a
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	100a	23b	97a	100a	97a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	100a	23b	100a	97a	97a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	98a	15b	100a	97a	98a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	100a	22b	100a	100a	100a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							36.3	14.4	39.1	37.2	40.4
Standard Deviation							20.0	7.9	21.5	20.5	22.2
CV							22.03	31.62	22.74	21.8	23.8

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code						HOWE	BLCA		HIGH	LOW
Crop Name								HOPS	HOPS	HOPS
Rating Date						25May2022	25May2022	09Jun2022	14Jun2022	14Jun2022
Rating Type						RATING	RATING	HEIGHT AVG	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	FT/VINE	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG, NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						83a	48a	11.44a	0c	0d
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	100a	97a	10.17a	35a	30c
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	100a	68a	12.83a	33a	52b
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	100a	100a	11.83a	22ab	72a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	98a	67a	13.81a	13bc	63ab
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	100a	43a	14.70a	15bc	65ab
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							21.8	71.1	3.600	17.2	18.4
Standard Deviation							12.0	39.1	1.979	9.5	10.1
CV							12.34	55.36	15.88	48.03	21.54

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code							BLCA	QUGR		HIGH
Crop Name									HOPS	HOPS
Rating Date							14Jun2022	14Jun2022	23Jun2022	30Jun2022
Rating Type							RATING	RATING	HEIGHT AVG	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	FT/VINE	%, 0, 100
Assessed By							NS	NS	CG, NS	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						33a	0b	14.01a	0b
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	100a	3b	14.83a	8a
	COC	100SL		1	% v/v	WI,SPR,PO1,2				
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	90a	62a	16.38a	40a
	MSO	100SL		1	% v/v	WI,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2				
	Aim	2EC		0.031	lb ai/a	SPR				
	COC	100SL		1	% v/v	SPR				
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	100a	65a	14.75a	17a
	MSO	100SL		1	% v/v	WI,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2				
	Aim	2EC		0.031	lb ai/a	SPR				
	COC	100SL		1	% v/v	SPR				
5	Aim	2EC		0.031	lb ai/a	WI	100a	57a	17.50a	19a
	COC	100SL		1	% v/v	WI				
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2				
	MSO	100SL		1	% v/v	SPR,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2				
6	Aim	2EC		0.031	lb ai/a	WI	90a	70a	17.40a	15a
	COC	100SL		1	% v/v	WI				
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2				
	MSO	100SL		1	% v/v	SPR,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2				
LSD P=.05							48.1	20.4	3.940	29.4
Standard Deviation							26.4	11.2	2.166	16.1
CV							30.9	26.19	13.7	94.64

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code							GRASSES	LOW	HIGH	LOW	GRASSES
Crop Name								HOPS	HOPS	HOPS	
Rating Date							30Jun2022	30Jun2022	07Jul2022	07Jul2022	07Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						0b	0c	0a	0c	0c
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	0b	32b	3a	25b	7c
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	43a	92a	40a	72a	70a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	47a	90a	23a	68a	75a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	40a	92a	13a	60a	67ab
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	45a	93a	17a	60a	60b
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							13.2	18.2	25.2	14.9	9.9
Standard Deviation							7.2	10.0	13.9	8.2	5.5
CV							24.84	15.04	86.06	17.3	11.75

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code							HIGH	LOW	BLCA
Crop Name						HOPS	HOPS	HOPS	
Rating Date						19Jul2022	19Jul2022	19Jul2022	19Jul2022
Rating Type						HEIGHT AVG	RATING	RATING	RATING
Rating Unit/Min/Max						FT/VINE	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG, MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weedy						15.94a	0c	0c	0a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	15.79a	3c	15bc	0a
	COC	100SL		1	% v/v	WI,SPR,PO1,2				
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	15.06a	30a	43ab	0a
	MSO	100SL		1	% v/v	WI,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2				
	Aim	2EC		0.031	lb ai/a	SPR				
	COC	100SL		1	% v/v	SPR				
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	15.65a	8bc	30ab	0a
	MSO	100SL		1	% v/v	WI,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2				
	Aim	2EC		0.031	lb ai/a	SPR				
	COC	100SL		1	% v/v	SPR				
5	Aim	2EC		0.031	lb ai/a	WI	13.71a	24a	47a	2a
	COC	100SL		1	% v/v	WI				
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2				
	MSO	100SL		1	% v/v	SPR,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2				
6	Aim	2EC		0.031	lb ai/a	WI	14.54a	20ab	57a	0a
	COC	100SL		1	% v/v	WI				
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2				
	MSO	100SL		1	% v/v	SPR,PO1,PO2				
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2				
LSD P=.05							2.247	15.5	29.6	5.6
Standard Deviation							1.235	8.5	16.3	2.2
CV							8.17	59.86	50.93	774.6

Performance of Tiafenacil on Comet Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code							GRASSES	
Crop Name								HOPS
Rating Date							19Jul2022	30Aug2022
Rating Type							RATING	HARVEST AVG
Rating Unit/Min/Max							%, 0, 100	KG/VINE
Assessed By							MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing		
1	Untreated-Weedy						0c	4.59a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	0c	4.79a
	COC	100SL		1	% v/v	WI,SPR,PO1,2		
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	28a	5.42a
	MSO	100SL		1	% v/v	WI,PO1,PO2		
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2		
	Aim	2EC		0.031	lb ai/a	SPR		
	COC	100SL		1	% v/v	SPR		
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	23ab	5.71a
	MSO	100SL		1	% v/v	WI,PO1,PO2		
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2		
	Aim	2EC		0.031	lb ai/a	SPR		
	COC	100SL		1	% v/v	SPR		
5	Aim	2EC		0.031	lb ai/a	WI	18ab	4.72a
	COC	100SL		1	% v/v	WI		
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2		
	MSO	100SL		1	% v/v	SPR,PO1,PO2		
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2		
6	Aim	2EC		0.031	lb ai/a	WI	12bc	5.22a
	COC	100SL		1	% v/v	WI		
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2		
	MSO	100SL		1	% v/v	SPR,PO1,PO2		
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2		
LSD P=.05							15.4	2.341
Standard Deviation							8.4	1.287
CV							62.08	25.37

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Project Code: 135-22-2 Location: BentonHarbor, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Hops Variety: Newport
Harvest Date: 8/30/22
Plant Spacing: 7′ Row Spacing: 12′
Planting Date: 2019 Study Design: RCB Replications: 3
Plot Size: 5.5 ft wide x 28 ft long

Soil Type: Spinks Fine Loamy Sand OM: 2% pH: 5.6
Sand: 86% Silt: 5.4% Clay: 8.6% CEC: 6.1

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
WI	3/15/22	12:20-1:15 PM	47/38 F	Dry/ Slightly Moist	SW 5-7 mph	68%	30%	N
SPR	4/26/22	10:55-11:20 AM	41/45 F	Moist	NW 7-10 mph	64%	98%	N
PO1	6/9/22	11:20-12:20 AM	78/50 F	Dry	W 4.6 mph	71%	25%	N
PO2	6/23/22	10:50-11:55 AM	86/70 F	Dry	E 3.6 mph	23%	10%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
3/15/22	Hops		Preemergence	
3/15/22	QUGR = Quackgrass		Mostly Dead	Moderate
3/15/22	ORGR = Orchard Grass		Mostly Dead	Moderate
3/15/22	PUDN = Purple Deadnettle	1/2″	Vegetative	Few
3/15/22	MECW = Mouseear Chickweed	1/2"	Vegetative	Few
3/15/22	CRWS = Creeping Woodsorrel	1/2″	Vegetative	Few
3/15/22	RESO = Red Sorrel	1/2"	Vegetative	Few
3/15/22	WIRA = Wild Radish	1″	Vegetative	Few
3/15/22	BLDO = Broadleaf Dock	1″	Vegetative	Few
3/15/22	SFGE = Small Flower Geranium	1/2"	Vegetative	Few
3/15/22	BLCA = Bladder Campion	1″	Vegetative	Few
4/26/22	Hops	2-10″		many
4/26/22	QUGR	4-6″	Vegetative	Many
4/26/22	SFGE	1-3″	Vegetative	Few
4/26/22	CORW = Common Ragweed	1/2-1″	Vegetative	Many
4/26/22	COLQ = Common Lambsquarters	1/2-1″	Vegetative	Few
4/26/22	RESO	1-2″	Vegetative	Moderate
4/26/22	BLCA = Bladder Campion	2-3″	Vegetative	Moderate
6/9/22	QUGR	≤ 2′	Vegetative	Many
6/9/22	YENS = Yellow Nutsedge	≤ 1′	Vegetative	Moderate-Many
6/9/22	BLCA = Bladder Campion	≤ 2.5′	Vegetative	Few-Moderate
6/9/22	HAVE = Hairy Vetch	8-10″	Flowering	Moderate
6/9/22	CORW	6-10″	Vegetative	Moderate
6/9/22	HOWE = Horseweed	4-5″	Vegetative	Few-Moderate
6/23/22	QUGR	6-12″	Vegetative	Many
6/23/22	YENS	6-10″	Vegetative	Moderate-Many
6/23/22	BLCM	5-12″	flowering	Few-Moderate
6/23/22	HAVE	8-12″	flowering	Moderate
6/23/22	HOWE	10-12″	Vegetative	Few-Moderate

Additional Weeds Observed Throughout Season

Grasses = Overall control of grass spp
Total BL = Overall control of broadleaf spp.
COCW = Common Chickweed
High Hops = Hops growing up the vine
Low Hops = Hops on ground level before traveling up vine.

Notes and Comments

1. Spray applied with 4 nozzle boom (WI and SPR application) and 2 nozzle boom (PO1 and PO2). FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Maintenance application of Prowl H2O (4 lb ai/a) + Chateau (0.191 lb ai/a) applied to whole study area on 3/15/22.
4. Maintenance application of Select Max to untreated plots on 5/12/22.
5. After winter application, at the time of weekly rating no weed or hop growth observed until April 14th due to the cold weather; therefore, no rating data collected before April 14th. At April 26th rating, all the plots had similar level of weed control and hop emergence as April 14th; therefore, no data mention for that rating.
6. Weed control was reported similar from all treatments after winter application and mainly grasses survived (30 DAA1; April 14). Initially at 9 DAA2 (May 5th) higher grass control observed from treatment 4, 5, and 6; but no difference between treatments and reduced level of grass control was reported at 16 and 30 DAA2 (May 12 and 26). Other broadleaf weeds control was reported very good and similar from all the treatments after spring application until the first PO1 application (rating May 5, 12, and 26th). At 7 DAA4 (June 30th), grass control reported higher from Reviton (treatments 3 to 6) application as compared to Aim. Similar trend was reported for weed control for rest of the ratings, but level of control reduced with time.

Higher level of crop injury reported from spring application of tiafenacil (0.044 and 0.088 lb/ac; treatment 5 and 6) than spring application of Aim at 9 and 16 DAA2 (May 5 and 12 ratings). Hop plants recover from the spring application injury by 30 DAA2 (May 26 rating) except from treatment 5 that showed 37% crop injury. At 5 DAA3 (June 14th), injury to high hop vines was reported from 12 to 37% from Reviton treatments and 3% from Aim. Injury to lower hop foliage was reported higher from two sequential (Spring and PO1) Reviton applications (trt 5 and 6; 78%) as compared to Aim and two Reviton applications (Winter and PO1). At 7 DAA4 (June 30th), injury to high hop vines was reported from 0 to 7% from all the treatments. At 7 DAA4, injury to lower hop foliage was reported significantly higher (>88%) from both Reviton rates (trt 3 to 6) as compared to Aim (32%). Similar trend was reported for injury ratings for rest of the ratings but the level of injury reduced with time. There was no difference reported for hop height and yield with respect to treatments.

Michigan State University

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Trial ID:135-22-2 Location:Benton Harbor, MI Trial Year:2022

Protocol ID:135-22-2 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Nicole Soldan

Pest Code						SFGE	GRASSES	BLCA	TOTAL BL	
Crop Name										HOPS
Rating Date						14Apr2022	14Apr2022	14Apr2022	14Apr2022	05May2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						0b	0a	0b	0c	38b
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	92a	58a	93a	91a	45b
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	98a	58a	97a	90ab	50b
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	100a	65a	88a	88ab	68ab
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	100a	23a	90a	90ab	92a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	67a	60a	90a	82b	90a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							43.3	58.5	12.6	8.6	39.1
Standard Deviation							23.8	32.1	6.9	4.7	21.5
CV							31.25	72.75	9.1	6.44	33.62

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=6,13,14,24,31,32,34,35,36,37,38,40,41,42,43,44,45; Average=7,8,33,39
Could not calculate LSD (% mean diff) for columns 27,28,29 because error mean square = 0.
^Calculated from residual.

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code							GRASSES	SFGE '	BLCA		QUGR
Crop Name										HOPS	
Rating Date							05May2022	05May2022	05May2022	12May2022	12May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						42a	100a	100a	15b	78a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	62a	90a	83a	27b	52a
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	68a	92a	92a	12b	50a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	80a	100a	82a	18b	50a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	82a	100a	100a	67a	33a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	90a	100a	93a	60a	75a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							50.8	20.3	21.4	26.4	47.3
Standard Deviation							27.5	10.8	11.4	14.5	26.0
CV							38.91	11.13	12.4	43.9	46.06

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code							SFGE	CORW	BLCA	
Crop Name										HOPS
Rating Date							12May2022	12May2022	12May2022	26May2022
Rating Type							RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	NS	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						67a	53a	74a	5a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	100a	53a	74a	5a
	COC	100SL		1%	v/v	WI,SPR,PO1,2				
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	100a	73a	43a	5a
	MSO	100SL		1%	v/v	WI,PO1,PO2				
	Bronc (AMS)	38L		1%	v/v	WI,PO1,PO2				
	Aim	2EC		0.031	lb ai/a	SPR				
	COC	100SL		1%	v/v	SPR				
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	87a	100a	32a	3a
	MSO	100SL		1%	v/v	WI,PO1,PO2				
	Bronc (AMS)	38L		1%	v/v	WI,PO1,PO2				
	Aim	2EC		0.031	lb ai/a	SPR				
	COC	100SL		1%	v/v	SPR				
5	Aim	2EC		0.031	lb ai/a	WI	100a	100a	57a	37a
	COC	100SL		1%	v/v	WI				
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2				
	MSO	100SL		1%	v/v	SPR,PO1,PO2				
	Bronc (AMS)	38L		1%	v/v	SPR,PO1,PO2				
6	Aim	2EC		0.031	lb ai/a	WI	100a	100a	73a	5a
	COC	100SL		1%	v/v	WI				
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2				
	MSO	100SL		1%	v/v	SPR,PO1,PO2				
	Bronc (AMS)	38L		1%	v/v	SPR,PO1,PO2				
LSD P=.05							42.9	68.1	43.1	40.6
Standard Deviation							23.6	37.4	21.6	22.3
CV							25.56	46.77	36.69	223.05

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	YENS	CORW	LATH	COMW	QUGR
Pest Code							YENS	CORW	LATH	COMW	QUGR
Crop Name											
Rating Date							26May2022	26May2022	26May2022	26May2022	26May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
1	Untreated-Weedy						20a	35a	68a	67a	42a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	17a	30a	100a	100a	48a
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	25a	65a	97a	100a	33a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	15a	93a	100a	73a	25a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	37a	97a	100a	73a	7a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	3a	100a	100a	80a	30a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							21.6	60.9	40.1	67.0	59.8
Standard Deviation							11.9	33.5	22.0	36.8	32.9
CV							61.15	47.81	23.41	44.78	106.62

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code							COCW	SFGE	HOWE		HIGH
Crop Name										HOPS	HOPS
Rating Date							26May2022	26May2022	26May2022	09Jun2022	14Jun2022
Rating Type							RATING	RATING	RATING	HEIGHT AVG	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	FT/VINE	%, 0, 100
Assessed By							CG	CG	CG	CG, NS	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						100a	65a	80a	10.44a	0a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	100a	100a	100a	11.08a	3a
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	100a	95a	90a	11.36a	12a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	80b	97a	100a	10.94a	15a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	93a	100a	90a	10.08a	37a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	77b	100a	97a	11.25a	17a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							12.0	39.1	24.3	3.152	41.5
Standard Deviation							6.6	21.5	13.4	1.707	22.8
CV							7.18	23.15	14.42	15.72	164.14

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	LOW	YENS	CORW	SFGE	QUGR
Pest Code							LOW	YENS	CORW	SFGE	QUGR
Crop Name							HOPS				
Rating Date							14Jun2022	14Jun2022	14Jun2022	14Jun2022	14Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
1	Untreated-Weedy						0c	0b	0b	0b	0b
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	42b	10a	100a	100a	0b
	COC	100SL		1%	v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	45b	10a	100a	100a	77a
	MSO	100SL		1%	v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1%	v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	58ab	10a	100a	100a	80a
	MSO	100SL		1%	v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1%	v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	78a	10a	100a	100a	80a
	COC	100SL		1%	v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1%	v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	78a	10a	100a	100a	80a
	COC	100SL		1%	v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1%	v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	SPR,PO1,PO2					
LSD P=.05							20.5	.	.	.	4.3
Standard Deviation							11.2	0.0	0.0	0.0	2.4
CV							22.36	0.0	0.0	0.0	4.47

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code								HIGH	BLCA	GRASSES	LOW
Crop Name							HOPS	HOPS			HOPS
Rating Date							23Jun2022	30Jun2022	30Jun2022	30Jun2022	30Jun2022
Rating Type							HEIGHT AVG	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							FT/VINE	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS, CG	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						13.48ab	0a	0a	0c	0d
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	14.68a	3a	8a	3c	45c
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	15.58a	3a	0a	37b	90ab
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	15.08a	6a	3a	47b	88b
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	15.44a	1a	10a	50b	98ab
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	10.28b	7a	4a	67a	100a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							3.253	4.9	8.1	14.4	10.0
Standard Deviation							1.761	2.7	2.3	7.8	5.4
CV							12.5	79.58	46.98	22.99	7.7

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Pest Code						HIGH	LOW	GRASSES	BLCA	
Crop Name						HOPS	HOPS			HOPS
Rating Date						07Jul2022	07Jul2022	07Jul2022	07Jul2022	19Jul2022
Rating Type						RATING	RATING	RATING	RATING	HEIGHT AVG
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	FT/VINE
Assessed By						MHM	MHM	MHM	MHM	CG, MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						0a	0d	33a	0a	13.84a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	10a	30c	33a	8a	14.26a
	COC	100SL		1%	v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	7a	67b	73a	5a	15.97a
	MSO	100SL		1%	v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1%	v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	7a	82a	70a	0a	15.50a
	MSO	100SL		1%	v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1%	v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	5a	83a	60a	5a	14.90a
	COC	100SL		1%	v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1%	v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	18a	90a	68a	5a	14.91a
	COC	100SL		1%	v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1%	v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1%	v/v	SPR,PO1,PO2					
LSD P=.05							16.3	12.0	66.3	10.4	2.538
Standard Deviation							8.8	6.5	35.9	4.0	1.374
CV							113.56	11.1	63.67	106.57	9.22

Performance of Tiafenacil on Newport Hops - IR4 - Hop Head Farms - Benton Harbor - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	HIGH	LOW	BLCA	GRASSES	
Pest Code							HIGH	LOW	BLCA	GRASSES	
Crop Name							HOPS	HOPS			HOPS
Rating Date							19Jul2022	19Jul2022	19Jul2022	19Jul2022	30Aug2022
Rating Type							RATING	RATING	RATING	RATING	HARVEST AVG
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	KG/VINE
Assessed By							CG	CG	CG	CG	NS
1	Untreated-Weedy						0a	0a		5a	2.75a
2	Aim	2EC		0.031	lb ai/a	WI,SPR,PO1,2	5a	0a	55a	8a	2.81a
	COC	100SL		1	% v/v	WI,SPR,PO1,2					
3	Reviton	2.83SC		0.044	lb ai/a	WI,PO1,PO2	3a	0a	72a	0a	3.60a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
4	Reviton	2.83SC		0.088	lb ai/a	WI,PO1,PO2	10a	7a	39a	0a	3.74a
	MSO	100SL		1	% v/v	WI,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	WI,PO1,PO2					
	Aim	2EC		0.031	lb ai/a	SPR					
	COC	100SL		1	% v/v	SPR					
5	Aim	2EC		0.031	lb ai/a	WI	8a	5a	74a	0a	4.49a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.044	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
6	Aim	2EC		0.031	lb ai/a	WI	20a	27a	40a	0a	3.41a
	COC	100SL		1	% v/v	WI					
	Reviton	2.83SC		0.088	lb ai/a	SPR,PO1,PO2					
	MSO	100SL		1	% v/v	SPR,PO1,PO2					
	Bronc (AMS)	38L		1	% v/v	SPR,PO1,PO2					
LSD P=.05							15.3	23.4	43.2	10.0	1.140
Standard Deviation							8.3	12.7	19.0	5.4	0.617
CV							106.55	200.18	34.0	240.6	17.8

Weed Control in Mint – Irrer - 2022

Project Code: 121-22-1 Location: St. Johns, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Mint Variety: Spearmint
Planting Method: Roots Planting Date: 2018
Harvest Date: First harvest 7/8/2022 & second harvest 8/29/22
Plant Spacing: Meadow Row Spacing: Solid
Tillage Type: NA Study Design: RCBD Replications: 3
Plot Size: 5.3 ft wide x 50 ft long

Soil Type: Capac Loam OM: 3.7% pH: 6.6
Sand: 42.2% Silt: 30.6% Clay: 27.2% CEC: 12.1

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
DORM	3/21/22	1:20-2:25 PM	60/45 F	Dry	E 2 mph	52%	70%	N
POST-HRVT	7/15/22	9:50-10:20 AM	77/71 F	Dry	S 7 mph	52%	70%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
3/21/22	Mint		Dormant	
3/21/22	No Weeds			
7/15/22	Mint	0″	Post First Harvest	Very few bud started growth
7/15/22	No Weeds			

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 0-100; 0 = no injury, 100 = complete kill.
3. No weeds observed in the field for duration of study.
4. First mint harvest was performed by grower on 7/8/2022, and no biomass data was collected from any treatment.
5. Post-harvest herbicide application was made on 7 days after first mint harvest.
6. Mint biomass data was collected from each plot by using two 5′ by 2′ quadrats in each plot at the time of second mint harvest on 8/29/2022.
5. Injury reported as % stunting/delay in regrowth. On March 4 (2 WAA), crop injury data was not collected because the mint plants had not started growing yet; this was due to the cold spring. No injury was reported on 7/7/2022 close to harvest.
6. On 4/20/22, injury to treatment 10 reported as yellowing of leaves; no stunting was observed at that time.

Results: There were no weeds in the field to evaluate for weed control. It was pretty much weed-free trial with no weeds in whole study area. There was delayed mint growth from Sharpen, Sharpen plus Zidua, Chateau plus Zidua, and Reviton from dormant application at first rating which was taken 4 (4/20/2022) week after application (WAA). However, mint crop recovered from all the injury very quickly and close to harvest no negative impact reported on mint growth from any of the treatments. Similarly, there was delayed mint regrowth from Reviton post-harvest application; however, plants recovered from initial injury and no difference was reported in mint biomass data which was collected at the time of second mint harvest.

Michigan State University

Weed Control in Mint - Irrer - 2022

Trial ID:121-22-1

Protocol ID:121-22-1 Location:St. Johns, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Crop Name						MINT	MINT	MINT	MINT	MINT
Rating Date						20Apr2022	05May2022	11Jun2022	20Jul2022	28Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	SC	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weedy						0c	0c	0c	0c	0c
2	Sinbar	80WDG		0.4	lb ai/a	DORM	10c	0c	0c	0c	0c
	GoalTender	4SC		0.313	lb ai/a	DORM					
	Gramoxone 3SL	3SL		0.49	lb ai/a	DORM					
	NIS	100SL		0.25	lb ai/a	DORM					
3	Zidua	4.17SC		0.09	lb ai/a	DORM	0c	0c	0c	0c	0c
4	Zidua	4.17SC		0.18	lb ai/a	DORM	0c	0c	0c	0c	0c
5	Sharpen	2.85SC		0.045	lb ai/a	DORM	52b	2bc	2bc	0c	0c
	MSO	100SL		1	% v/v	DORM					
	N Pak (AMS)	100L		2	% v/v	DORM					
6	Sharpen	2.85SC		0.045	lb ai/a	DORM	72a	7b	4bc	0c	0c
	Zidua	4.17SC		0.09	lb ai/a	DORM					
	MSO	100SL		1	% v/v	DORM					
	N Pak (AMS)	100L		2	% v/v	DORM					
7	Aim	2EC		0.01	lb ai/a	DORM	0c	0c	0c	0c	0c
	Zidua	4.17SC		0.131	lb ai/a	DORM					
	MSO	100SL		1	% v/v	DORM					
	N Pak (AMS)	100L		2	% v/v	DORM					
8	Chateau SW	51WDG		0.104	lb ai/a	DORM	73a	67a	26a	0c	0c
	Zidua	4.17SC		0.133	lb ai/a	DORM					
9	Reviton	2.83SC		0.045	lb ai/a	DORM	52b	2bc	2bc	0c	0c
	NIS	100SL		0.25	% v/v	DORM					
10	Reviton	2.83SC		0.09	lb ai/a	DORM	60ab	3bc	2bc	0c	0c
	NIS	100SL		0.25	% v/v	DORM					
11	Starane Ultra	2.8L		0.123	lb ai/a	DORM	0c	0c	6b	0c	0c
	NIS	100SL		0.25	% v/v	DORM					
12	Starane Ultra	2.8L		0.246	lb ai/a	DORM	0c	0c	5b	0c	0c
	NIS	100SL		0.25	% v/v	DORM					
13	Reviton	2.83SC		0.045	lb ai/a	POST-HRVT	0c	0c	0c	63b	32b
	NIS	100SL		0.25	% v/v	POST-HRVT					
14	Reviton	2.83SC		0.09	lb ai/a	POST-HRVT	0c	0c	0c	78a	65a
	NIS	100SL		0.25	% v/v	POST-HRVT					
LSD P=.05							14.0	5.2	4.8	4.8	2.5
Standard Deviation							8.3	3.1	2.9	2.9	1.5
CV							36.68	54.39	86.97	28.37	21.69

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Weed Control in Mint – Irrer - 2022

Crop Name							MINT	MINT	MINT
Rating Date							12Aug2022	23Aug2022	29Aug2022
Rating Type							RATING	RATING	HARVEST
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	KG/PLOT
Assessed By							MHM	MHM	HT
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weedy						0c	0c	3.24a
2	Sinbar	80WDG		0.4	lb ai/a	DORM	0c	0c	3.49a
	GoalTender	4SC		0.313	lb ai/a	DORM			
	Gramoxone 3SL	3SL		0.49	lb ai/a	DORM			
	NIS	100SL		0.25	lb ai/a	DORM			
3	Zidua	4.17SC		0.09	lb ai/a	DORM	0c	0c	3.22a
4	Zidua	4.17SC		0.18	lb ai/a	DORM	0c	0c	3.62a
5	Sharpen	2.85SC		0.045	lb ai/a	DORM	0c	0c	3.38a
	MSO	100SL		1%	v/v	DORM			
	N Pak (AMS)	100L		2%	v/v	DORM			
6	Sharpen	2.85SC		0.045	lb ai/a	DORM	0c	0c	3.15a
	Zidua	4.17SC		0.09	lb ai/a	DORM			
	MSO	100SL		1%	v/v	DORM			
	N Pak (AMS)	100L		2%	v/v	DORM			
7	Aim	2EC		0.01	lb ai/a	DORM	0c	0c	3.49a
	Zidua	4.17SC		0.131	lb ai/a	DORM			
	MSO	100SL		1%	v/v	DORM			
	N Pak (AMS)	100L		2%	v/v	DORM			
8	Chateau SW	51WDG		0.104	lb ai/a	DORM	0c	0c	3.38a
	Zidua	4.17SC		0.133	lb ai/a	DORM			
9	Reviton	2.83SC		0.045	lb ai/a	DORM	0c	0c	3.31a
	NIS	100SL		0.25%	v/v	DORM			
10	Reviton	2.83SC		0.09	lb ai/a	DORM	0c	0c	3.88a
	NIS	100SL		0.25%	v/v	DORM			
11	Starane Ultra	2.8L		0.123	lb ai/a	DORM	0c	0c	3.53a
	NIS	100SL		0.25%	v/v	DORM			
12	Starane Ultra	2.8L		0.246	lb ai/a	DORM	0c	0c	3.05a
	NIS	100SL		0.25%	v/v	DORM			
13	Reviton	2.83SC		0.045	lb ai/a	POST-HRVT	7b	4b	3.53a
	NIS	100SL		0.25%	v/v	POST-HRVT			
14	Reviton	2.83SC		0.09	lb ai/a	POST-HRVT	17a	15a	2.42a
	NIS	100SL		0.25%	v/v	POST-HRVT			
LSD P=.05							1.8	2.3	0.790
Standard Deviation							1.0	1.4	0.471
CV							62.9	97.85	14.12

Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2022

Project Code: 112-22-1 Location: East Lansing, MI
Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Onion, Dry Bulb Variety: Champ
Planting Method: Seeded Planting Date: 4/28/22
Harvest Date: 9/9/22
Plant Spacing: 1″ Row Spacing: 10″; 2 rows/plot
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 2.7 ft wide x 30 ft long

Soil Type: Houghton Muck OM: 56.2% pH: 6.7
Sand: 53% Silt: 43.5% Clay: 3.5% CEC: NA

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PRE	5/2/22	10:40-11:15 AM	48/48 F	Moist	W 7-9 mph	87%	100%	N
DPRE	5/12/22	9:15-10:00 AM	74/59 F	Damp	SE 2-4mph	40%	50%	N
PO1	5/24/22	9:00-10:00 AM	56/55 F	Moist	NE 2-4.5 mph	52%	50%	N
PO2	6/2/22	10:00-10:30 AM	61/65 F	Moist	N 2-4.7 mph	66%	50%	N
PO3	6/17/22	8:15-8:40 AM	70/74 F	Damp	W 4-6 mph	60%	15%	N
PO4	6/24/22	10:10-11:00 AM	83/73 F	Dry	S 3-5 mph	32%	10%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/2/22	Onion		Preemergence	
5/2/22	Rye Cover Crop	1″	Emerging - Veg	Good
5/12/22	Onion	1/4"	Loop	<10%
5/12/22	Cotyledons	<1″	Cotyledon	Many
5/24/22	Onion	2-3″	1 LS	Good
5/24/22	HANS = Hairy Nightshade	1-2″	Vegetative	Many
5/24/22	LATH = Ladysthumb	1-3″	Vegetative	Many
5/24/22	RRPW = Redroot Pigweed	1″	Cotyledon-1 LS	Moderate
6/2/22	Onion	3-4″	2 LS	Good
6/2/22	HANS	1-2″	Vegetative	Many
6/2/22	LATH	1-3″	Vegetative	Many
6/17/22	Onion	4-5″	3 LS	Good
6/17/22	HANS	2-3″	Vegetative	Moderate
6/17/22	LATH	2-6″	Vegetative	Moderate
6/17/22	RRPW	1-2″	Vegetative	Few
6/17/22	YENS = Yellow Nutsedge	3-4″	Vegetative	Moderate
6/24/22	Onion	6-8″	5-6 LS	Good
6/24/22	HANS	2-4″	Vegetative	Few
6/24/22	LATH	3-6″	Vegetative	Moderate
6/24/22	YENS	5-7″	Vegetative	Many

Additional Weeds Observed Throughout Season

COPU = Common Purslane

Notes and Comments:
1. Spray applied with 2 nozzle shielded boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO_2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Handweeding performed in all the plots starting from August 1, 2022.
4. Significant amount of crop injury reported in rye from DPRE tiafenacil application regardless of rates. Higher weed control was reported from DPRE application of tiafenacil compered to Buctril DPRE. There is potential to use tiafenacil in onion production system for weed control at DPRE and 3 or higher leaf-stage onions. Maximum crop injury was reported when application made at 2-leaf stage. The potential use rates are from 0.022 to 0.045 lb ai/ac.

Michigan State University

Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2022

Trial ID:112-22-1 Location:East Lansing, MI Trial Year:2022

Protocol ID:112-22-1 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	ONION	LATH	HANS	RRPW	RYE COVER CROP
Pest Code								LATH	HANS	RRPW	
Crop Name							ONION				RYE COVER CROP
Rating Date							20May2022	20May2022	20May2022	20May2022	20May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
1	Non-Treated						0b	0e	0e	0e	0c
	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
2	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0b	55d	55d	55d	10b
	Buctril	2EC		0.187	lb ai/a	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
3	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	5a	65c	65c	65c	100a
	DCC-3825	70WDG		0.022	lb ai/a	DPRE					
	MSO	100SL		1%	v/v	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
4	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	5a	77b	77b	77b	100a
	DCC-3825	70WDG		0.045	lb ai/a	DPRE					
	MSO	100SL		1%	v/v	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
5	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	5a	90a	90a	90a	100a
	DCC-3825	70WDG		0.089	lb ai/a	DPRE					
	MSO	100SL		1%	v/v	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
6	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	3ab	3e	3e	3e	3c
	DCC-3825	70WDG		0.022	lb ai/a	PO2					
	MSO	100SL		1%	v/v	PO2					
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4					
7	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0b	0e	0e	0e	0c
	DCC-3825	70WDG		0.044	lb ai/a	PO2					
	MSO	100SL		1%	v/v	PO2					
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4					
8	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0b	0e	0e	0e	0c
	DCC-3825	70WDG		0.022	lb ai/a	PO3					
	MSO	100SL		1%	v/v	PO3					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4					
9	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0b	3e	3e	3e	3c
	DCC-3825	70WDG		0.044	lb ai/a	PO3					
	MSO	100SL		1%	v/v	PO3					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4					
10	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	2ab	2e	2e	2e	3c
	DCC-3825	70WDG		0.022	lb ai/a	PO4					
	MSO	100SL		1%	v/v	PO4					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3					
11	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0b	0e	0e	0e	0c
	DCC-3825	70WDG		0.044	lb ai/a	PO4					
	MSO	100SL		1%	v/v	PO4					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3					
LSD P=.05							3.4	9.4	9.4	9.4	5.4
Standard Deviation							2.0	5.5	5.5	5.5	3.2
CV							109.16	20.55	20.55	20.55	10.87

Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
Pest Code								LATH	HANS		LATH	HANS
Crop Name							ONION			ONION		
Rating Date							02Jun2022	02Jun2022	02Jun2022	10Jun2022	10Jun2022	10Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM	MHM
1	Non-Treated						0c	32b	47d	0c	65b	75b
	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
2	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	90a	92ab	2c	97a	100a
	Buctril	2EC		0.187	lb ai/a	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
3	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	92a	95a	7c	97a	100a
	DCC-3825	70WDG		0.022	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
4	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	2b	93a	95a	3c	97a	100a
	DCC-3825	70WDG		0.045	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
5	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	5a	95a	100a	8c	93a	100a
	DCC-3825	70WDG		0.089	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
6	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	43b	75bc	70a	90a	100a
	DCC-3825	70WDG		0.022	lb ai/a	PO2						
	MSO	100SL		1%	v/v	PO2						
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4						
7	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	33b	52d	42b	92a	100a
	DCC-3825	70WDG		0.044	lb ai/a	PO2						
	MSO	100SL		1%	v/v	PO2						
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4						
8	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	25b	48d	0c	70b	72b
	DCC-3825	70WDG		0.022	lb ai/a	PO3						
	MSO	100SL		1%	v/v	PO3						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4						
9	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	27b	57cd	0c	63b	73b
	DCC-3825	70WDG		0.044	lb ai/a	PO3						
	MSO	100SL		1%	v/v	PO3						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4						
10	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	45b	55d	2c	68b	72b
	DCC-3825	70WDG		0.022	lb ai/a	PO4						
	MSO	100SL		1%	v/v	PO4						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3						
11	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0c	33b	53d	0c	60b	68b
	DCC-3825	70WDG		0.044	lb ai/a	PO4						
	MSO	100SL		1%	v/v	PO4						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3						
LSD P=.05							1.5	22.2	18.5	15.1	14.8	9.1
Standard Deviation							0.9	13.1	10.9	8.9	8.7	5.3
CV							143.61	23.61	15.59	73.23	10.72	6.12

Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
Pest Code								HANS	LATH	RRPW		RRPW
Crop Name							ONION				ONION	
Rating Date							16Jun2022	16Jun2022	16Jun2022	16Jun2022	24Jun2022	24Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	NS	NS
1	Non-Treated						0d	68b	40b	90bc	0c	83a
	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
2	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0d	97a	92a	97ab	0c	100a
	Buctril	2EC		0.187	lb ai/a	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
3	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	3cd	100a	95a	100a	7c	97a
	DCC-3825	70WDG		0.022	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
4	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	5cd	100a	95a	100a	3c	100a
	DCC-3825	70WDG		0.045	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
5	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	7c	100a	92a	100a	13c	100a
	DCC-3825	70WDG		0.089	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
6	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	63a	100a	78a	98ab	40ab	92a
	DCC-3825	70WDG		0.022	lb ai/a	PO2						
	MSO	100SL		1%	v/v	PO2						
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4						
7	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	47b	100a	82a	100a	32b	93a
	DCC-3825	70WDG		0.044	lb ai/a	PO2						
	MSO	100SL		1%	v/v	PO2						
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4						
8	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0d	42c	20b	75d	37ab	90a
	DCC-3825	70WDG		0.022	lb ai/a	PO3						
	MSO	100SL		1%	v/v	PO3						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4						
9	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	0d	53bc	27b	85c	47a	90a
	DCC-3825	70WDG		0.044	lb ai/a	PO3						
	MSO	100SL		1%	v/v	PO3						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4						
10	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	3cd	70b	45b	82cd	3c	60a
	DCC-3825	70WDG		0.022	lb ai/a	PO4						
	MSO	100SL		1%	v/v	PO4						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3						
11	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	2cd	50c	23b	85c	3c	83a
	DCC-3825	70WDG		0.044	lb ai/a	PO4						
	MSO	100SL		1%	v/v	PO4						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3						
LSD P=.05							5.6	17.0	28.3	10.0	13.5	25.7
Standard Deviation							3.3	10.0	16.6	5.9	7.9	15.1
CV							27.95	12.48	26.55	6.38	47.21	16.78

Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2022

Pest Code						LATH	YENS		YENS	LATH	COPU
Crop Name								ONION			
Rating Date						24Jun2022	24Jun2022	29Jun2022	29Jun2022	29Jun2022	29Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS	NS	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						30cd	40a	0d	48a	80cd	100a
	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
2	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	87a	57a	0d	68a	90ab	100a
	Buctril	2EC		0.187	lb ai/a	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
3	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	67ab	63a	2d	68a	90ab	100a
	DCC-3825	70WDG		0.022	lb ai/a	DPRE					
	MSO	100SL		1%	v/v	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
4	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	90a	53a	8bcd	62a	95a	100a
	DCC-3825	70WDG		0.045	lb ai/a	DPRE					
	MSO	100SL		1%	v/v	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
5	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	87a	70a	5cd	78a	93ab	100a
	DCC-3825	70WDG		0.089	lb ai/a	DPRE					
	MSO	100SL		1%	v/v	DPRE					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4					
6	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	65ab	63a	33a	75a	87abc	100a
	DCC-3825	70WDG		0.022	lb ai/a	PO2					
	MSO	100SL		1%	v/v	PO2					
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4					
7	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	73a	77a	18bc	83a	87abc	100a
	DCC-3825	70WDG		0.044	lb ai/a	PO2					
	MSO	100SL		1%	v/v	PO2					
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4					
8	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	60abc	70a	22ab	72a	80cd	100a
	DCC-3825	70WDG		0.022	lb ai/a	PO3					
	MSO	100SL		1%	v/v	PO3					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4					
9	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	67ab	63a	35a	57a	85bcd	100a
	DCC-3825	70WDG		0.044	lb ai/a	PO3					
	MSO	100SL		1%	v/v	PO3					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4					
10	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	33bcd	53a	5cd	60a	77d	100a
	DCC-3825	70WDG		0.022	lb ai/a	PO4					
	MSO	100SL		1%	v/v	PO4					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3					
11	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	17d	30a	3d	35a	80cd	100a
	DCC-3825	70WDG		0.044	lb ai/a	PO4					
	MSO	100SL		1%	v/v	PO4					
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3					
LSD P=.05							33.5	49.1	14.3	50.9	9.9	.
Standard Deviation							19.7	28.8	8.4	29.9	5.8	0.0
CV							32.04	49.53	70.2	46.55	6.79	0.0

Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2022

Pest Code						RRPW	GRASS		HANS	LATH	
Crop Name								ONION			ONION
Rating Date						29Jun2022	29Jun2022	06Jul2022	06Jul2022	06Jul2022	21Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						93b	100a	0e	85a	53d	0d
	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
2	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	97a	1e	100a	95ab	0d
	Buctril	2EC		0.187	lb ai/a	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
3	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	90b	0e	98a	95ab	3d
	DCC-3825	70WDG		0.022	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
4	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	97a	3de	98a	97a	2d
	DCC-3825	70WDG		0.045	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
5	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	100a	4de	100a	98a	7cd
	DCC-3825	70WDG		0.089	lb ai/a	DPRE						
	MSO	100SL		1%	v/v	DPRE						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4						
6	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	100a	28a	100a	72c	38a
	DCC-3825	70WDG		0.022	lb ai/a	PO2						
	MSO	100SL		1%	v/v	PO2						
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4						
7	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	100a	22b	100a	80bc	17b
	DCC-3825	70WDG		0.044	lb ai/a	PO2						
	MSO	100SL		1%	v/v	PO2						
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4						
8	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	100a	7cd	100a	72c	3d
	DCC-3825	70WDG		0.022	lb ai/a	PO3						
	MSO	100SL		1%	v/v	PO3						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4						
9	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	100a	11c	98a	73c	13bc
	DCC-3825	70WDG		0.044	lb ai/a	PO3						
	MSO	100SL		1%	v/v	PO3						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4						
10	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	97a	2de	92a	65cd	3d
	DCC-3825	70WDG		0.022	lb ai/a	PO4						
	MSO	100SL		1%	v/v	PO4						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3						
11	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	100a	100a	2e	97a	70c	2d
	DCC-3825	70WDG		0.044	lb ai/a	PO4						
	MSO	100SL		1%	v/v	PO4						
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3						
LSD P=.05							3.0	5.4	5.3	9.9	15.1	8.8
Standard Deviation							1.7	3.2	3.1	5.8	8.9	5.1
CV							1.75	3.22	42.47	6.01	11.2	64.12

Evaluation of New Herbicides in Onion Crop Tolerance and Weed Control - Keilen - 2022

Pest Code							
Crop Name							ONION
Rating Date							09Sep2022
Rating Type							HARVEST
Rating Unit/Min/Max							KG/PLOT
Assessed By							NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	
1	Non-Treated						41.13a
	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4	
2	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	41.84a
	Buctril	2EC		0.187	lb ai/a	DPRE	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4	
3	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	36.54a
	DCC-3825	70WDG		0.022	lb ai/a	DPRE	
	MSO	100SL		1	% v/v	DPRE	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4	
4	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	32.98a
	DCC-3825	70WDG		0.045	lb ai/a	DPRE	
	MSO	100SL		1	% v/v	DPRE	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4	
5	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	32.54a
	DCC-3825	70WDG		0.089	lb ai/a	DPRE	
	MSO	100SL		1	% v/v	DPRE	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3,4	
6	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	25.62a
	DCC-3825	70WDG		0.022	lb ai/a	PO2	
	MSO	100SL		1	% v/v	PO2	
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4	
7	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	33.94a
	DCC-3825	70WDG		0.044	lb ai/a	PO2	
	MSO	100SL		1	% v/v	PO2	
	GoalTender	4SC		0.125	lb ai/a	PO1,3,4	
8	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	36.44a
	DCC-3825	70WDG		0.022	lb ai/a	PO3	
	MSO	100SL		1	% v/v	PO3	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4	
9	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	31.63a
	DCC-3825	70WDG		0.044	lb ai/a	PO3	
	MSO	100SL		1	% v/v	PO3	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,4	
10	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	36.57a
	DCC-3825	70WDG		0.022	lb ai/a	PO4	
	MSO	100SL		1	% v/v	PO4	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3	
11	Prowl H20	3.8CS		1.9	lb ai/a	PRE,PO1	34.22a
	DCC-3825	70WDG		0.044	lb ai/a	PO4	
	MSO	100SL		1	% v/v	PO4	
	GoalTender	4SC		0.125	lb ai/a	PO1,2,3	
LSD P=.05							14.255
Standard Deviation							8.369
CV							24.01

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 23 because error mean square = 0.
^Calculated from residual.

Effects of Low-dose Applications of 2,4-D and Dicamba on Onion - Keilen - 2022

Project Code: 112-22-2 Location: Holt, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Hope Thome
Crop: Onion, Dry Bulb Variety: Champ
Planting Method: Seeded Planting Date: 4/28/22
Harvest Date: 9/9/2022
Plant Spacing: 1″ Row Spacing: 10″ 2 rows/plot
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 2.7 ft wide x 30 ft long

Soil Type: Houghton Muck OM: 56.2% pH: 6.7
Sand: 53% Silt: 43.5% Clay: 3.5% CEC: NA

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
1-2 LS	5/24/22	9:00-10:00 AM	56/55 F	Moist	NE 2-4.5 mph	52%	50%	N
4-5 LS	6/29/22	4:00-4:30 PM	79/79 F	Dry	SE 1-3 mph	30%	30%	N
2-4 CM Bulbs	7/26/22	2:15-2:40 PM	79/65 F	Damp	SE 0-3 mph	41%	50%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/24/22	Onion	2-3″	1 LS	Good
5/24/22	HANS = Hairy Nightshade	1-2″	Vegetative	Many
5/24/22	LATH = Ladysthumb	1-3″	Vegetative	Many
5/24/22	RRPW = Redroot Pigweed	1″	Cotyledon- 1 LS	Moderate
6/29/22	Onion	8-10″	5 LS	Good
6/29/22	No Weeds			
7/26/22	Onion	10-12″	2-4 CM Bulbs	Good
7/26/22	No Weeds			

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 0-100; 0 = no injury, 100 = complete kill.
3. Weed control throughout season was controlled by the grower since the focus of this study was on crop injury to the low doses of herbicides.
4. Very little injury was observed to onions throughout the study. No impact of 2,4-D or dicamba drift reported on onion yield and quality regardless of drift rates or timing. Future research should examine the persistence of 2,4-D/dicamba and select metabolites from onion bulbs tissues following exposure to reduced rates of 2,4-D/dicamba under field conditions.

Michigan State University

Effects of Low-dose Applications of 2,4-D and Dicamba on Onion - Keilen - 2022

Trial ID:112-22-2

Protocol ID:112-22-2 Location:East Lansing, MI Trial Year:2022

Study Director:Hope Thome

Investigator (Creator):Dr. Sushila Chaudhari

Crop Name							ONION	ONION	ONION	ONION	ONION	ONION
Rating Date							02Jun2022	10Jun2022	16Jun2022	06Jul2022	21Jul2022	28Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM, HT	MHM	MHM, HT	MHM	MHM, HT	MHM, HT
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-Treated						0c	0b	0b	0a	0b	0a
2	Embed	3.8L		1.812g ai/a		1-2 LS	0c	0b	0b	0a	0b	0a
3	Embed	3.8L		45.34g ai/a		1-2 LS	2b	0b	2ab	2a	2ab	2a
4	Xtendimax	2.9L		0.904g ai/a		1-2 LS	0c	0b	0b	5a	3a	2a
5	Xtendimax	2.9L		22.6g ai/a		1-2 LS	5a	3a	3a	3a	3a	5a
6	Embed	3.8L		1.812g ai/a		4-5 LS	0c	0b	0b	5a	0b	2a
7	Embed	3.8L		45.34g ai/a		4-5 LS	0c	0b	0b	3a	0b	2a
8	Xtendimax	2.9L		0.904g ai/a		4-5 LS	0c	0b	0b	1a	0b	0a
9	Xtendimax	2.9L		22.6g ai/a		4-5 LS	0c	0b	0b	3a	2ab	0a
10	Embed	3.8L		1.812g ai/a		9-10 LS	0c	0b	0b	0a	0b	0a
11	Embed	3.8L		45.34g ai/a		9-10 LS	0c	0b	0b	0a	0b	0a
12	Xtendimax	2.9L		0.904g ai/a		9-10 LS	0c	0b	0b	0a	0b	0a
13	Xtendimax	2.9L		22.6g ai/a		9-10 LS	0c	0b	0b	0a	0b	0a
LSD P=.05							1.3	1.3	1.9	5.4	2.6	3.6
Standard Deviation							0.8	0.8	1.1	3.2	1.5	2.2
CV							156.12	312.25	288.19	178.54	197.03	240.22

Crop Name							ONION	ONION	ONION	ONION	ONION
Rating Date							04Aug2022	09Aug2022	16Aug2022	09Sep2022	28Oct2022
Rating Type							RATING	RATING	RATING	HARVEST	SUBSAMPLE
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	KG/PLOT	G/BULB
Assessed By							HT	HT	HT	NS	HT
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0a	0b	0b	38.91a	120.00a
2	Embed	3.8L		1.812g ai/a		1-2 LS	0a	0b	0b	37.02a	106.27a
3	Embed	3.8L		45.34g ai/a		1-2 LS	0a	0b	0b	41.24a	124.95a
4	Xtendimax	2.9L		0.904g ai/a		1-2 LS	0a	0b	0b	43.30a	114.28a
5	Xtendimax	2.9L		22.6g ai/a		1-2 LS	2a	5a	3a	32.85a	100.28a
6	Embed	3.8L		1.812g ai/a		4-5 LS	0a	0b	0b	46.71a	125.86a
7	Embed	3.8L		45.34g ai/a		4-5 LS	0a	2b	0b	41.47a	105.14a
8	Xtendimax	2.9L		0.904g ai/a		4-5 LS	0a	0b	0b	45.19a	127.74a
9	Xtendimax	2.9L		22.6g ai/a		4-5 LS	0a	0b	0b	39.18a	118.29a
10	Embed	3.8L		1.812g ai/a		9-10 LS	2a	0b	0b	43.54a	133.72a
11	Embed	3.8L		45.34g ai/a		9-10 LS	2a	0b	0b	46.66a	129.16a
12	Xtendimax	2.9L		0.904g ai/a		9-10 LS	0a	0b	0b	41.32a	134.14a
13	Xtendimax	2.9L		22.6g ai/a		9-10 LS	0a	0b	0b	41.17a	104.32a
LSD P=.05							2.3	2.6	1.3	20.038	57.504
Standard Deviation							1.4	1.6	0.8	11.891	34.124
CV							360.56	302.33	312.25	28.7	28.73

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Tiafenacil for Preplant and Preemergence Weed Control in Summer Squash - HTRC - 2022

Project Code: 108-22-2 Location: Holt, MI
Block: 109

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Zucchini Variety: Black Beauty
Planting Method: Seeded Planting Date: 6/6/22
Harvest Date: 11 Harvests between 7/15/22 - 8/18/22
Plant Spacing: 5″ Row Spacing: 8′; 1 row/bed
Tillage Type: Conventional Study Design: RCB Replications: 4
Plot Size: 5.4 ft wide x 30 ft long

Soil Type: Capac Loam OM: 2% pH: 6.2
Sand: 44% Silt: 33.3% Clay: 22.7% CEC: 6.7

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PRP	6/1/22	2:45-3:15 PM	74/72 F	Dry	SW 4-7 mph	62%	90%	N
PRE	6/8/22	1:00-1:20 PM	70/64 F	Moist	E 4-5 mph	57%	100%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/1/22	Zucchini		PrePlant	
6/1/22	No Weeds		Preemergence	
6/8/22	Zucchini		After seeding	No emergence
6/8/22	No Weeds		Preemergence	

Additional Weeds Observed Throughout Season

Total WC = Overall control of broadleaves, sedges, and grasses

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 0-100; 0 = no injury, 100 = complete kill. Mainly, crop injury was reported as reduced crop germination.
3. Some plots had decreased germination due to ground squirrels eating seeds after planting. Therefore, higher injury rating (noted as % reduced stand) was reported on June 16, 2022.
4. Harvest grading parameters:
   - Marketable = 8+ inches long with 1.5–2.5 inches diameter; also if less than 8" but 2.5" diameter
   - Oversize = >2.5 inches diameter
   - Cull = misshapen, off-color, or decaying fruit
5. Weed-free plots had lower yield due to the initial weed competition and then plant got damage from late season hand weeding events.
6. Weeds in row middles were managed by mowing.
7. Select Max 0.97 EC at 16 fl oz per ac plus 0.25% NIS was applied on 6/25/2022 for large crabgrass control in whole study area.
8. Overall, very minimal crop injury reported from both pre-plant (PRP) and preemergence (PRE) tiafenacil application. In general, higher level of weed control was reported from preemergence (PRE) application of tiafenacil as compared to pre-plant (PRP). There was no impact of application timing and rates reported on summer squash yield and number.

Michigan State University

Tiafenacil for Preplant and Preemergence Weed Control in Summer Squash - HTRC - 2022

Trial ID:108-22-2 Location:Holt, MI Trial Year:2022

Protocol ID:108-22-2 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Pest Code												
Crop Name							ZUCCHINI	ZUCCHINI	TOTAL WC	ZUCCHINI	TOTAL WC
Rating Date							16Jun2022	22Jun2022	22Jun2022	06Jul2022	06Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weed Free						10a	0a	0d	0b	0d
2	DCC-3825	70WDG		0.022	lb ai/a	PRP	39a	0a	58c	0b	6d
	MSO	100SL		1%	v/v	PRP					
3	DCC-3825	70WDG		0.045	lb ai/a	PRP	14a	0a	58c	0b	10d
	MSO	100SL		1%	v/v	PRP					
4	DCC-3825	70WDG		0.067	lb ai/a	PRP	20a	3a	71bc	0b	38bc
	MSO	100SL		1%	v/v	PRP					
5	DCC-3825	70WDG		0.022	lb ai/a	PRE	25a	0a	86ab	0b	34c
	MSO	100SL		1%	v/v	PRE					
6	DCC-3825	70WDG		0.045	lb ai/a	PRE	20a	0a	88ab	0b	60a
	MSO	100SL		1%	v/v	PRE					
7	DCC-3825	70WDG		0.067	lb ai/a	PRE	40a	1a	88ab	0b	56ab
	MSO	100SL		1%	v/v	PRE					
8	DCC-3825	70WDG		0.022	lb ai/a	PRP,PRE	29a	1a	89ab	0b	50abc
	MSO	100SL		1%	v/v	PRP,PRE					
9	DCC-3825	70WDG		0.045	lb ai/a	PRP,PRE	35a	5a	89ab	1b	61a
	MSO	100SL		1%	v/v	PRP,PRE					
10	DCC-3825	70WDG		0.067	lb ai/a	PRP,PRE	25a	4a	91a	9a	61a
	MSO	100SL		1%	v/v	PRP,PRE					
LSD P=.05							38.0	3.7	17.8	4.0	19.7
Standard Deviation							26.2	2.5	12.3	2.7	13.6
CV							102.34	184.82	17.15	273.86	36.05

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Tiafenacil for Preplant and Preemergence Weed Control in Summer Squash - HTRC - 2022

Pest Code											
Crop Name							ZUCCHINI	ZUCCHINI	ZUCCHINI	ZUCCHINI
Rating Date							18Jul2022			
Rating Type							STAND COUNT	MARKETABLE	MARKETABLE	OVERSIZE
Rating Unit/Min/Max							NO./PLOT	NO./PLOT	KG/PLOT	NO./PLOT
Assessed By							MHM,CG			
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated Weed Free						16a	29a	8.86a	2a
2	DCC-3825	70WDG		0.022	lb ai/a	PRP	16a	41a	13.91a	2a
	MSO	100SL		1%	v/v	PRP				
3	DCC-3825	70WDG		0.045	lb ai/a	PRP	17a	55a	19.19a	8a
	MSO	100SL		1%	v/v	PRP				
4	DCC-3825	70WDG		0.067	lb ai/a	PRP	22a	64a	22.08a	8a
	MSO	100SL		1%	v/v	PRP				
5	DCC-3825	70WDG		0.022	lb ai/a	PRE	14a	52a	18.94a	12a
	MSO	100SL		1%	v/v	PRE				
6	DCC-3825	70WDG		0.045	lb ai/a	PRE	17a	65a	22.53a	11a
	MSO	100SL		1%	v/v	PRE				
7	DCC-3825	70WDG		0.067	lb ai/a	PRE	11a	45a	16.26a	12a
	MSO	100SL		1%	v/v	PRE				
8	DCC-3825	70WDG		0.022	lb ai/a	PRP,PRE	17a	59a	19.67a	9a
	MSO	100SL		1%	v/v	PRP,PRE				
9	DCC-3825	70WDG		0.045	lb ai/a	PRP,PRE	16a	59a	20.23a	11a
	MSO	100SL		1%	v/v	PRP,PRE				
10	DCC-3825	70WDG		0.067	lb ai/a	PRP,PRE	14a	71a	25.54a	15a
	MSO	100SL		1%	v/v	PRP,PRE				
LSD P=.05							10.2	32.1	11.275	8.8
Standard Deviation							7.0	22.1	7.771	6.1
CV							44.24	41.04	41.51	68.26

Pest Code									
Crop Name							ZUCCHINI	ZUCCHINI	ZUCCHINI
Rating Date									
Rating Type							OVERSIZE	CULL	CULL
Rating Unit/Min/Max							KG/PLOT	NO./PLOT	KG/PLOT
Assessed By									
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						1.07a	2a	0.26a
2	DCC-3825	70WDG		0.022	lb ai/a	PRP	1.82a	2a	0.54a
	MSO	100SL		1%	v/v	PRP			
3	DCC-3825	70WDG		0.045	lb ai/a	PRP	6.31a	2a	0.82a
	MSO	100SL		1%	v/v	PRP			
4	DCC-3825	70WDG		0.067	lb ai/a	PRP	6.01a	3a	0.96a
	MSO	100SL		1%	v/v	PRP			
5	DCC-3825	70WDG		0.022	lb ai/a	PRE	9.52a	3a	1.07a
	MSO	100SL		1%	v/v	PRE			
6	DCC-3825	70WDG		0.045	lb ai/a	PRE	9.18a	3a	1.19a
	MSO	100SL		1%	v/v	PRE			
7	DCC-3825	70WDG		0.067	lb ai/a	PRE	9.14a	3a	0.59a
	MSO	100SL		1%	v/v	PRE			
8	DCC-3825	70WDG		0.022	lb ai/a	PRP,PRE	7.58a	2a	0.31a
	MSO	100SL		1%	v/v	PRP,PRE			
9	DCC-3825	70WDG		0.045	lb ai/a	PRP,PRE	8.52a	3a	1.33a
	MSO	100SL		1%	v/v	PRP,PRE			
10	DCC-3825	70WDG		0.067	lb ai/a	PRP,PRE	12.76a	3a	1.20a
	MSO	100SL		1%	v/v	PRP,PRE			
LSD P=.05							7.263	3.8	1.395
Standard Deviation							5.006	2.6	0.962
CV							69.61	105.61	116.32

Tiafenacil use in Transplanted Tomato and Bell Peppers - HTRC - 2022

Project Code: 101-22-1 Location: Holt, MI
Block: 62

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Tomato & Bell Pepper Variety: Primo Red & Aristotle
Planting Method: Transplant Planting Date: 6/17/22
Harvest Date: 3 Harvests from 9/7/22-10/5/22
Plant Spacing: 22″ Row Spacing: 1 row of each crop planted as staggered on 2.5′ bed
Tillage Type: Conventional Study Design: RCB Replications: 4
Plot Size: 5.4 ft wide x 25 ft long (2.5′ beds at 8′ center)

Soil Type: Capac Loam OM: 1.3% pH: 7.0
Sand: 66.7% Silt: 18.9% Clay: 14.4% CEC: 6.1

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PRTP Under	6/13/22	11:15-11:30 AM	81/62 F	Moist	E 5.3 mph	45%	10%	N
PRTP Over/Wa	6/14/22	7:45-8:00 AM	66/68 F	Saturated	SE 1-2 mph	91%	100%	Y
PRTP Over	6/16/22	11:05-11:20 AM	80/76 F	Saturated	W 7-9 mph	72%	30%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/13/22	No weeds or Crop		Preemergence	
6/14/22	No weeds or Crop		Preemergence	
6/16/22	No weeds or Crop		Preemergence	

Additional Weeds Observed Throughout Season

No weeds observed in study due to use of plastic mulch.

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 0-100; 0 = no injury, 100 = complete kill.
3. PRTP UNDER was applied to the soil surface before plastic mulch was set in field. PRTP OVER/WA was applied over the plastic mulch and then field was overhead irrigated with 0.25″ of water afterwards (7 hours after application). PRTP OVER was applied over the plastic mulch.
4. Crop was transplanted into plastic mulch one day after the last application (PRTP OVER).
5. Maintenance application of Select Max 0.97 EC (16 fl oz/ac) + NIS (0.25%) and Dual Magnum applied to aisles to control grasses and broadleaf.
6. At first rating, higher injury ratings were reported from treatments 4 and 9 in bell pepper and treatments 3 and 4 in tomato due to the plant loss after transplanting. However, the cause of plant death was not clearly distinguishable from the transplanting stress or due to herbicides. After July 6th rating, plants were evaluated for herbicide injury but no new injury symptoms were noticed from any of the herbicide treatments. There has been no impact of tiafenacil application rate or timing reported on total yields (weight and numbers) of bell pepper and tomato.

Michigan State University

Tiafenacil use in Transplanted Tomato and Bell Peppers - HTRC - 2022

Trial ID:101-22-1

Protocol ID:101-22-1 Location:Holt, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Crop Name							BELL PEPP	TOMATO	BELL PEPP
Rating Date							06Jul2022	06Jul2022	27Jul2022
Rating Type							RATING	RATING	STAND COUNT
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	NO./PLOT
Assessed By							CG	CG	RM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						0c	0a	10a
2	DCC-3825	70	WDG	0.022	lb ai/a	PRTP OVER	3c	6a	10ab
	MSO	100	SL	1%	v/v	PRTP OVER			
3	DCC-3825	70	WDG	0.045	lb ai/a	PRTP OVER	4c	13a	10a
	MSO	100	SL	1%	v/v	PRTP OVER			
4	DCC-3825	70	WDG	0.067	lb ai/a	PRTP OVER	33a	15a	8b
	MSO	100	SL	1%	v/v	PRTP OVER			
5	DCC-3825	70	WDG	0.022	lb ai/a	PRTP OVER/WA	1c	10a	10a
	MSO	100	SL	1%	v/v	PRTP OVER/WA			
6	DCC-3825	70	WDG	0.045	lb ai/a	PRTP OVER/WA	1c	8a	11a
	MSO	100	SL	1%	v/v	PRTP OVER/WA			
7	DCC-3825	70	WDG	0.067	lb ai/a	PRTP OVER/WA	9bc	4a	9ab
	MSO	100	SL	1%	v/v	PRTP OVER/WA			
8	DCC-3825	70	WDG	0.022	lb ai/a	PRTP UNDER	4c	8a	11a
	MSO	100	SL	1%	v/v	PRTP UNDER			
9	DCC-3825	70	WDG	0.045	lb ai/a	PRTP UNDER	26ab	4a	8b
	MSO	100	SL	1%	v/v	PRTP UNDER			
10	DCC-3825	70	WDG	0.067	lb ai/a	PRTP UNDER	8c	6a	10a
	MSO	100	SL	1%	v/v	PRTP UNDER			
LSD P=.05							18.1	9.2	2.1
Standard Deviation							12.5	6.3	1.4
CV							142.79	87.13	14.91

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Tiafenacil use in Transplanted Tomato and Bell Peppers - HTRC - 2022

Crop Name							TOMATO	BELL PEPP	TOMATO
Rating Date							27Jul2022	26Jul2022	26Jul2022
Rating Type							STAND COUNT	AVG HEIGHT	AVG HEIGHT
Rating Unit/Min/Max							NO./PLOT	CM/PLANT	CM/PLANT
Assessed By							RM	MJ	MJ
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						10a	25.44a	38.88a
2	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER	10a	25.06a	39.25a
	MSO	100SL		1%	v/v	PRTP OVER			
3	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER	9a	25.71a	38.73a
	MSO	100SL		1%	v/v	PRTP OVER			
4	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER	9a	22.41a	41.71a
	MSO	100SL		1%	v/v	PRTP OVER			
5	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER/WA	10a	25.69a	41.29a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
6	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER/WA	9a	24.94a	42.49a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
7	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER/WA	10a	26.16a	41.25a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
8	DCC-3825	70WDG		0.022	lb ai/a	PRTP UNDER	9a	25.17a	41.13a
	MSO	100SL		1%	v/v	PRTP UNDER			
9	DCC-3825	70WDG		0.045	lb ai/a	PRTP UNDER	10a	25.04a	44.91a
	MSO	100SL		1%	v/v	PRTP UNDER			
10	DCC-3825	70WDG		0.067	lb ai/a	PRTP UNDER	11a	24.20a	41.51a
	MSO	100SL		1%	v/v	PRTP UNDER			
LSD P=.05							1.5	3.494	6.246
Standard Deviation							1.1	2.408	4.305
CV							11.13	9.64	10.47

Crop Name							BELL PEPP	BELL PEPP	BELL PEPP
Rating Date							07Sep2022	07Sep2022	20Sep2022
Rating Type							HARVEST	HARVEST	HARVEST
Rating Unit/Min/Max							NO./PLOT	KG/PLOT	NO./PLOT
Assessed By							MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						21a	4.29a	15a
2	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER	21a	4.43a	17a
	MSO	100SL		1%	v/v	PRTP OVER			
3	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER	32a	6.93a	19a
	MSO	100SL		1%	v/v	PRTP OVER			
4	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER	17a	3.70a	21a
	MSO	100SL		1%	v/v	PRTP OVER			
5	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER/WA	22a	4.80a	16a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
6	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER/WA	21a	4.40a	18a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
7	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER/WA	19a	4.13a	12a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
8	DCC-3825	70WDG		0.022	lb ai/a	PRTP UNDER	21a	4.94a	12a
	MSO	100SL		1%	v/v	PRTP UNDER			
9	DCC-3825	70WDG		0.045	lb ai/a	PRTP UNDER	16a	3.54a	12a
	MSO	100SL		1%	v/v	PRTP UNDER			
10	DCC-3825	70WDG		0.067	lb ai/a	PRTP UNDER	20a	4.05a	14a
	MSO	100SL		1%	v/v	PRTP UNDER			
LSD P=.05							11.3	2.732	8.1
Standard Deviation							7.8	1.883	5.5
CV							37.04	41.66	35.74

Tiafenacil use in Transplanted Tomato and Bell Peppers - HTRC - 2022

Crop Name							BELL PEPP	BELL PEPP	BELL PEPP
Rating Date							20Sep2022	05Oct2022	05Oct2022
Rating Type							HARVEST	HARVEST	HARVEST
Rating Unit/Min/Max							KG/PLO	NO./PLOT	KG/PLOT
Assessed By							MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						2.40a	1a	0.10a
2	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER	2.96a	2a	0.32a
	MSO	100SL		1%	v/v	PRTP OVER			
3	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER	3.45a	2a	0.25a
	MSO	100SL		1%	v/v	PRTP OVER			
4	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER	3.60a	1a	0.09a
	MSO	100SL		1%	v/v	PRTP OVER			
5	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER/WA	2.72a	1a	0.10a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
6	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER/WA	2.94a	2a	0.19a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
7	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER/WA	1.92a	2a	0.23a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
8	DCC-3825	70WDG		0.022	lb ai/a	PRTP UNDER	1.91a	1a	0.13a
	MSO	100SL		1%	v/v	PRTP UNDER			
9	DCC-3825	70WDG		0.045	lb ai/a	PRTP UNDER	2.03a	3a	0.50a
	MSO	100SL		1%	v/v	PRTP UNDER			
10	DCC-3825	70WDG		0.067	lb ai/a	PRTP UNDER	2.45a	2a	0.21a
	MSO	100SL		1%	v/v	PRTP UNDER			
LSD P=.05							1.374	2.2	0.322
Standard Deviation							0.947	1.5	0.222
CV							35.91	100.7	104.9

Crop Name							BELL PEPP	BELL PEPP	BELL PEPP
Rating Date									
Rating Type							HRVT TOTAL	HRVT TOTAL	STAND COUNT
Rating Unit/Min/Max							NO./PLOT	KG/PLOT	NO./PLOT
Assessed By									RM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						36a	6.79a	10a
2	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER	40a	7.71a	10ab
	MSO	100SL		1%	v/v	PRTP OVER			
3	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER	52a	10.63a	10a
	MSO	100SL		1%	v/v	PRTP OVER			
4	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER	39a	7.38a	8b
	MSO	100SL		1%	v/v	PRTP OVER			
5	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER/WA	39a	7.62a	10a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
6	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER/WA	41a	7.53a	11a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
7	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER/WA	33a	6.28a	9ab
	MSO	100SL		1%	v/v	PRTP OVER/WA			
8	DCC-3825	70WDG		0.022	lb ai/a	PRTP UNDER	34a	6.98a	11a
	MSO	100SL		1%	v/v	PRTP UNDER			
9	DCC-3825	70WDG		0.045	lb ai/a	PRTP UNDER	32a	6.06a	8b
	MSO	100SL		1%	v/v	PRTP UNDER			
10	DCC-3825	70WDG		0.067	lb ai/a	PRTP UNDER	35a	6.71a	10a
	MSO	100SL		1%	v/v	PRTP UNDER			
LSD P=.05							15.2	3.398	2.1
Standard Deviation							10.5	2.342	1.4
CV							27.56	31.79	14.91

Tiafenacil use in Transplanted Tomato and Bell Peppers - HTRC - 2022

Crop Name							BELL PEPP	TOMATO	TOMATO
Rating Date								07Sep2022	07Sep2022
Rating Type							HRVT TOTAL	HARVEST	HARVEST
Rating Unit/Min/Max							KG/PLANT	NO./PLOT	KG/PLOT
Assessed By								MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						0.68a	28abc	6.84abc
2	DCC-3825		70WDG	0.022	lb ai/a	PRTP OVER	0.81a	28abc	6.85abc
	MSO		100SL	1%	v/v	PRTP OVER			
3	DCC-3825		70WDG	0.045	lb ai/a	PRTP OVER	1.06a	23bc	5.14bc
	MSO		100SL	1%	v/v	PRTP OVER			
4	DCC-3825		70WDG	0.067	lb ai/a	PRTP OVER	0.99a	17c	4.38c
	MSO		100SL	1%	v/v	PRTP OVER			
5	DCC-3825		70WDG	0.022	lb ai/a	PRTP OVER/WA	0.74a	36a	8.18ab
	MSO		100SL	1%	v/v	PRTP OVER/WA			
6	DCC-3825		70WDG	0.045	lb ai/a	PRTP OVER/WA	0.70a	37a	8.68a
	MSO		100SL	1%	v/v	PRTP OVER/WA			
7	DCC-3825		70WDG	0.067	lb ai/a	PRTP OVER/WA	0.68a	33ab	8.45a
	MSO		100SL	1%	v/v	PRTP OVER/WA			
8	DCC-3825		70WDG	0.022	lb ai/a	PRTP UNDER	0.66a	37a	9.14a
	MSO		100SL	1%	v/v	PRTP UNDER			
9	DCC-3825		70WDG	0.045	lb ai/a	PRTP UNDER	0.70a	36a	8.96a
	MSO		100SL	1%	v/v	PRTP UNDER			
10	DCC-3825		70WDG	0.067	lb ai/a	PRTP UNDER	0.69a	27abc	6.43abc
	MSO		100SL	1%	v/v	PRTP UNDER			
LSD P=.05							0.320	11.9	3.075
Standard Deviation							0.221	8.2	2.119
CV							28.6	27.4	29.01

Crop Name							TOMATO	TOMATO	TOMATO
Rating Date							19Sep2022	19Sep2022	30Sep2022
Rating Type							HARVEST	HARVEST	HARVEST
Rating Unit/Min/Max							NO./PLOT	KG/PLOT	NO./PLOT
Assessed By							MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						173a	38.61a	138bc
2	DCC-3825		70WDG	0.022	lb ai/a	PRTP OVER	156a	35.91a	148ab
	MSO		100SL	1%	v/v	PRTP OVER			
3	DCC-3825		70WDG	0.045	lb ai/a	PRTP OVER	120a	28.34a	196a
	MSO		100SL	1%	v/v	PRTP OVER			
4	DCC-3825		70WDG	0.067	lb ai/a	PRTP OVER	117a	29.64a	192a
	MSO		100SL	1%	v/v	PRTP OVER			
5	DCC-3825		70WDG	0.022	lb ai/a	PRTP OVER/WA	113a	24.97a	136bc
	MSO		100SL	1%	v/v	PRTP OVER/WA			
6	DCC-3825		70WDG	0.045	lb ai/a	PRTP OVER/WA	119a	28.32a	93c
	MSO		100SL	1%	v/v	PRTP OVER/WA			
7	DCC-3825		70WDG	0.067	lb ai/a	PRTP OVER/WA	152a	35.77a	121bc
	MSO		100SL	1%	v/v	PRTP OVER/WA			
8	DCC-3825		70WDG	0.022	lb ai/a	PRTP UNDER	141a	33.16a	115bc
	MSO		100SL	1%	v/v	PRTP UNDER			
9	DCC-3825		70WDG	0.045	lb ai/a	PRTP UNDER	173a	41.48a	161ab
	MSO		100SL	1%	v/v	PRTP UNDER			
10	DCC-3825		70WDG	0.067	lb ai/a	PRTP UNDER	162a	38.37a	163ab
	MSO		100SL	1%	v/v	PRTP UNDER			
LSD P=.05							52.3	13.285	52.5
Standard Deviation							36.0	9.156	36.2
CV							25.29	27.37	24.75

Tiafenacil use in Transplanted Tomato and Bell Peppers - HTRC - 2022

Crop Name							TOMATO	TOMATO	TOMATO
Rating Date							30Sep2022		
Rating Type							HARVEST	HRVT TOTAL	HRVT TOTAL
Rating Unit/Min/Max							KG/PLOT	NO./PLOT	KG/PLOT
Assessed By							MHM		
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weed Free						25.93bc	340a	71.38a
2	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER	27.88abc	332a	70.64a
	MSO	100SL		1%	v/v	PRTP OVER			
3	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER	36.87a	338a	70.34a
	MSO	100SL		1%	v/v	PRTP OVER			
4	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER	37.34a	326a	71.37a
	MSO	100SL		1%	v/v	PRTP OVER			
5	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER/WA	25.18bc	284a	58.33a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
6	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER/WA	18.64c	249a	55.64a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
7	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER/WA	22.33bc	307a	66.55a
	MSO	100SL		1%	v/v	PRTP OVER/WA			
8	DCC-3825	70WDG		0.022	lb ai/a	PRTP UNDER	21.74bc	293a	64.04a
	MSO	100SL		1%	v/v	PRTP UNDER			
9	DCC-3825	70WDG		0.045	lb ai/a	PRTP UNDER	28.42abc	369a	78.85a
	MSO	100SL		1%	v/v	PRTP UNDER			
10	DCC-3825	70WDG		0.067	lb ai/a	PRTP UNDER	31.21ab	352a	76.01a
	MSO	100SL		1%	v/v	PRTP UNDER			
LSD P=.05							9.946	93.8	21.164
Standard Deviation							6.855	64.7	14.587
CV							24.88	20.3	21.35

Crop Name							TOMATO	TOMATO
Rating Date								
Rating Type							STAND COUNT	HRVT TOTAL
Rating Unit/Min/Max							NO./PLOT	KG/PLANT
Assessed By							RM	
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing		
1	Non-Treated Weed Free						10ab	7.12a
2	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER	10ab	6.87a
	MSO	100SL		1%	v/v	PRTP OVER		
3	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER	9bc	7.95a
	MSO	100SL		1%	v/v	PRTP OVER		
4	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER	9c	8.64a
	MSO	100SL		1%	v/v	PRTP OVER		
5	DCC-3825	70WDG		0.022	lb ai/a	PRTP OVER/WA	10abc	6.15a
	MSO	100SL		1%	v/v	PRTP OVER/WA		
6	DCC-3825	70WDG		0.045	lb ai/a	PRTP OVER/WA	9bc	6.44a
	MSO	100SL		1%	v/v	PRTP OVER/WA		
7	DCC-3825	70WDG		0.067	lb ai/a	PRTP OVER/WA	10abc	6.66a
	MSO	100SL		1%	v/v	PRTP OVER/WA		
8	DCC-3825	70WDG		0.022	lb ai/a	PRTP UNDER	9bc	7.20a
	MSO	100SL		1%	v/v	PRTP UNDER		
9	DCC-3825	70WDG		0.045	lb ai/a	PRTP UNDER	10ab	7.72a
	MSO	100SL		1%	v/v	PRTP UNDER		
10	DCC-3825	70WDG		0.067	lb ai/a	PRTP UNDER	11a	7.28a
	MSO	100SL		1%	v/v	PRTP UNDER		
LSD P=.05							1.5	2.085
Standard Deviation							1.0	1.437
CV							10.93	19.95

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Project Code: 101-22-2 Location: Holt, MI
Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Pepper, Processing Variety: Large Red Cherry, Hot Hungarian Wax
Planting Method: Transplant Planting Date: 6/16/22
Harvest Date: 3 Harvests between 7/28 & 10/5
Plant Spacing: 18″ Row Spacing: 1 row of each crop planted as staggered on 2.5′ bed
Tillage Type: Conventional Study Design: RCB Replications: 3
Plot Size: 5.4 ft wide x 25 ft long (2.5′ beds at 5.5′ center)
Soil Type: Oakville Fine Sand OM: 1.8% pH: 6.4
Sand: 82.9% Silt: 7% Clay: 10.1% CEC: 4.7

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	7/7/22	1:00-2:00 PM	87/83 F	Damp	SE 1-2 mph	50%	75%	N
PO2	7/29/22	10:30-12:00 PM	81/78 F	Damp	NNW 2-4 mph	50%	25%	Y

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
7/7/22	Banana & Cherry Pepper	6-8″	Budding	Good
7/7/22	COPU = Common Purslane	3-5″	Vegetative	Many
7/7/22	RRPW = Redroot Pigweed	2-6″	Vegetative	Many
7/7/22	LACG = Large Crabgrass	2-5″	Vegetative	Many
7/29/22	Banana & Cherry Pepper	8-12″	Flower-Fruit	Good
7/29/22	LACG	1-12″	Veg-Seed Set	Many
7/29/22	RRPW	1-8″	Vegetative	Few
7/29/22	CAWE = Carpetweed	2-5″ dia	Vegetative	Many
7/29/22	Vetch spp.	1-3″	Vegetative	Moderate
7/29/22	COLQ = Common Lambsquarters	1-3″	Vegetative	Few

Additional Weeds Observed Throughout Season

Total BL = Overall control of broadleaf, sedges, and grass spp.
HAVE = Hairy Vetch
PRPW = Prostrate Pigweed
PW Spp = Overall control of both RRPW & PRPW
COTYLEDO = Overall control of various weeds in cotyledon growth stage

Notes and Comments

1. Spray applied with 2 nozzle shielded nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO_2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Herbicides applied to row middles. There was very high pressure of large crabgrass in the plots so later during the season (in August) row middles were managed by mowing (two times).
4. Damage to crop in plots 301, 305, and 309 most likely due to drift from excess application mixture.
5. Weed counts taken from one 30cm X 30cm area of each plot. The "Other" pest code for weed counts refers to other weed species included HAVE and COPU.
6. One and two applications of tiafenacil 0.022 to 0.066 lb ai/ac provided higher broadleaf control as compared to one and two applications of paraquat, respectively. Banana pepper was reported more sensitive (shown higher injury) to tifenacil as compared to cherry pepper. There was some negative effect of tiafenacil application reported on pepper plant height at initial rating; however, plants recovered from crop injury and no impact of herbicide reported on crop height and # plant per plot. In general, lower per plant yield reported from two applications of tiafenacil 0.066 lb ai/ac as compared to paraquat. Non-treated (weedy) plots also had lower yields than both paraquat treatmetns due to the higher weed pressure. There is a potential to use tiafenacil 0.022 to .044 lb ai/ac in pepper production system to control row middle weed.

Michigan State University

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Trial ID:101-22-2

Protocol ID:101-22-2 Location:Holt, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code									COPU	LACG	RRPW	CAWE
Crop Name							PEPPER	PEPPER				
Crop Variety							BANANA	CHERRY				
Rating Date							13Jul2022	13Jul2022	13Jul2022	13Jul2022	13Jul2022	13Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-Treated						0e	0d	0c	0d	0c	0b
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	23b-e	18bcd	98a	73a	100a	100a
	COC	100SL		1	% v/v	PO1						
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	17cde	13bcd	100a	72a	100a	100a
	COC	100SL		1	% v/v	PO1,PO2						
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	8de	10cd	100a	35c	78b	97a
	MSO	100SL		1	% v/v	PO1						
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	52ab	35abc	100a	53b	85ab	100a
	MSO	100SL		1	% v/v	PO1						
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	62a	52a	100a	37c	98a	100a
	MSO	100SL		1	% v/v	PO1						
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	42abc	43ab	100a	33c	93ab	98a
	MSO	100SL		1	% v/v	PO1,PO2						
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	38a-d	32a-d	100a	32c	87ab	97a
	MSO	100SL		1	% v/v	PO1,PO2						
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	55ab	55a	100a	53b	100a	100a
	MSO	100SL		1	% v/v	PO1,PO2						
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	7de	7cd	77b	0d	7c	5b
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2						
	COC	100SL		1.25	% v/v	PO1,PO2						
LSD P=.05							33.2	32.0	2.2	13.0	16.6	5.4
Standard Deviation							19.4	18.7	1.3	7.6	9.6	3.1
CV							63.8	70.4	1.43	19.57	12.89	3.95

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=5,7,13,14
^Calculated from residual.

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Pest Code						PRPW			LACG	CAWE	COPU
Crop Name							PEPPER	PEPPER			
Crop Variety							BANANA	CHERRY			
Rating Date						13Jul2022	19Jul2022	19Jul2022	19Jul2022	19Jul2022	19Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0b	0a	0a	0f	0c	0c
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	100a	10a	7a	82a	100a	100a
	COC	100SL		1	% v/v	PO1						
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	100a	8a	7a	75ab	100a	100a
	COC	100SL		1	% v/v	PO1,PO2						
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	90a	13a	10a	38cd	100a	100a
	MSO	100SL		1	% v/v	PO1						
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	93a	30a	12a	58abc	100a	100a
	MSO	100SL		1	% v/v	PO1						
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	85a	28a	33a	33de	100a	100a
	MSO	100SL		1	% v/v	PO1						
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	92a	32a	32a	48cd	100a	97ab
	MSO	100SL		1	% v/v	PO1,PO2						
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	85a	28a	27a	35cde	100a	100a
	MSO	100SL		1	% v/v	PO1,PO2						
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	98a	32a	38a	53bcd	100a	100a
	MSO	100SL		1	% v/v	PO1,PO2						
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	11b	3a	0a	13ef	67b	70b
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2						
	COC	100SL		1.25	% v/v	PO1,PO2						
LSD P=.05							18.9	28.4	32.9	24.5	31.3	28.5
Standard Deviation							11.0	16.6	19.2	14.3	18.3	16.6

Pest Code						PRPW	RRPW	COTYLEDO		
Crop Name									PEPPER	PEPPER
Crop Variety									BANANA	CHERRY
Rating Date						19Jul2022	19Jul2022	19Jul2022	28Jul2022	28Jul2022
Rating Type						RATING	RATING	RATING	STAND COUNT	STAND COUNT
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	NO./PLOT	NO./PLOT
Assessed By						MHM	MHM	MHM	MHM, MJ	MHM, MJ
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated						0b	0b	0d	15a	16a
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	100a	100a	23c	17a	17a
	COC	100SL		1	% v/v	PO1					
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	100a	100a	27c	16a	17a
	COC	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	67a	67a	72ab	15a	16a
	MSO	100SL		1	% v/v	PO1					
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	93a	78a	80ab	15a	16a
	MSO	100SL		1	% v/v	PO1					
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	97a	100a	85a	14a	16a
	MSO	100SL		1	% v/v	PO1					
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	90a	100a	62b	14a	15a
	MSO	100SL		1	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	77a	73a	73ab	15a	15a
	MSO	100SL		1	% v/v	PO1,PO2					
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	97a	97a	88a	15a	15a
	MSO	100SL		1	% v/v	PO1,PO2					
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	4b	4b	18cd	17a	17a
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2					
	COC	100SL		1.25	% v/v	PO1,PO2					
LSD P=.05							35.4	36.8	22.2	2.9	1.9
Standard Deviation							20.6	21.4	13.0	1.7	1.1

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Pest Code									CAWE	LACG
Crop Name							PEPPER	PEPPER		
Crop Variety							BANANA	CHERRY		
Rating Date							28Jul2022	28Jul2022	28Jul2022	28Jul2022
Rating Type							CROP HEIGHT	CROP HEIGHT	WEED COUNT	WEED COUNT
Rating Unit/Min/Max							CM/PLANT	CM/PLANT	# per 0.9 m^2	# per 0.9 m^2
Assessed By							MJ, GM	MJ, NB	MJ, GM, NB	MJ, GM, NB
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated						24.69ab	29.07a	23a	3bcd
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	24.60ab	29.39a	11b	2d
	COC	100SL		1	% v/v	PO1				
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	24.71ab	28.40a	15b	2cd
	COC	100SL		1	% v/v	PO1,PO2				
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	23.81abc	27.34a	3c	3cd
	MSO	100SL		1	% v/v	PO1				
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	21.23cd	27.68a	1c	6ab
	MSO	100SL		1	% v/v	PO1				
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	20.60d	26.77a	0c	3cd
	MSO	100SL		1	% v/v	PO1				
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	22.36bcd	25.46a	1c	5abc
	MSO	100SL		1	% v/v	PO1,PO2				
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	21.43cd	30.55a	1c	5a-d
	MSO	100SL		1	% v/v	PO1,PO2				
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	21.36cd	22.94a	0c	5abc
	MSO	100SL		1	% v/v	PO1,PO2				
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	25.38a	29.99a	27a	6a
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2				
	COC	100SL		1.25	% v/v	PO1,PO2				
LSD P=.05							2.720	5.894	6.1	2.7
Standard Deviation							1.585	3.436	3.5	1.6

Pest Code							RRPW	PRPW	OTHER		
Crop Name										PEPPER	PEPPER
Crop Variety										BANANA	CHERRY
Rating Date							28Jul2022	28Jul2022	28Jul2022	29Jul2022	29Jul2022
Rating Type							WEED COUNT	WEED COUNT	WEED COUNT	RATING	RATING
Rating Unit/Min/Max							# per 0.9 m^2	# per 0.9 m^2	# per 0.9 m^2	%, 0, 100	%, 0, 100
Assessed By							MJ, GM, NB	MJ, GM, NB	MJ, GM, NB	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						2a	1b	3abc	0a	0c
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	1a	4a	3ab	3a	3c
	COC	100SL		1	% v/v	PO1					
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	2a	1b	4a	7a	7bc
	COC	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	1a	0b	2bcd	10a	7bc
	MSO	100SL		1	% v/v	PO1					
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	1a	0b	1cd	28a	12abc
	MSO	100SL		1	% v/v	PO1					
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	0a	0b	1bcd	28a	22ab
	MSO	100SL		1	% v/v	PO1					
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	1a	0b	3ab	23a	20ab
	MSO	100SL		1	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	0a	0b	1bcd	25a	7bc
	MSO	100SL		1	% v/v	PO1,PO2					
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	0a	0b	1bcd	20a	23a
	MSO	100SL		1	% v/v	PO1,PO2					
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	0a	0b	0d	5a	0c
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2					
	COC	100SL		1.25	% v/v	PO1,PO2					
LSD P=.05							2.5	0.9	2.1	26.6	16.1
Standard Deviation							1.5	0.5	1.2	15.5	9.4

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Pest Code							TOTAL BL	LACG			LACG
Crop Name									PEPPER BANANA	PEPPER CHERRY	
Crop Variety											
Rating Date							29Jul2022	29Jul2022	04Aug2022	04Aug2022	04Aug2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0f	0d	0c	0c	0d
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	63d	45ab	2bc	2c	7cd
	COC	100SL		1	% v/v	PO1					
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	65d	53a	8bc	10c	48a
	COC	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	78bc	5d	7bc	10c	3d
	MSO	100SL		1	% v/v	PO1					
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	87ab	18cd	3bc	5c	0d
	MSO	100SL		1	% v/v	PO1					
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	88a	17cd	10bc	10c	3d
	MSO	100SL		1	% v/v	PO1					
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	75c	3d	37a	47a	18bc
	MSO	100SL		1	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	87ab	3d	25ab	20bc	23b
	MSO	100SL		1	% v/v	PO1,PO2					
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	87ab	30bc	42a	43ab	45a
	MSO	100SL		1	% v/v	PO1,PO2					
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	45e	0d	0c	0c	0d
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2					
	COC	100SL		1.25	% v/v	PO1,PO2					
LSD P=.05							9.4	21.4	24.3	25.7	14.7
Standard Deviation							5.5	12.5	14.2	15.0	8.6

Pest Code							RRPW	PRPW	COLQ	CAWE	
Crop Name											PEPPER BANANA
Crop Variety											
Rating Date							04Aug2022	04Aug2022	04Aug2022	04Aug2022	17Aug2022
Rating Type							RATING	RATING	RATING	RATING	STAND COUNT
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	NO./PLOT, -, -
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0d	0d	0d	0d	15a
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	17cd	17cd	10cd	10d	17a
	COC	100SL		1	% v/v	PO1					
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	100a	100a	100a	100a	16a
	COC	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	17cd	17cd	47bc	18cd	15a
	MSO	100SL		1	% v/v	PO1					
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	50bc	47bc	93a	50bc	16a
	MSO	100SL		1	% v/v	PO1					
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	48bc	48bc	85ab	32cd	14a
	MSO	100SL		1	% v/v	PO1					
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	70ab	70ab	70ab	80ab	14a
	MSO	100SL		1	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	100a	100a	100a	100a	15a
	MSO	100SL		1	% v/v	PO1,PO2					
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	100a	100a	100a	100a	15a
	MSO	100SL		1	% v/v	PO1,PO2					
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	20cd	20cd	13cd	10d	17a
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2					
	COC	100SL		1.25	% v/v	PO1,PO2					
LSD P=.05							41.1	42.2	42.2	33.1	3.2
Standard Deviation							23.9	24.6	24.6	19.3	1.8

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
Pest Code										COLQ
Crop Name							PEPPER	PEPPER	PEPPER	
Crop Variety							CHERRY	BANANA	CHERRY	
Rating Date							17Aug2022	17Aug2022	17Aug2022	17Aug2022
Rating Type							STAND COUNT	CROP HEIGHT	CROP HEIGHT	WEED COUNT
Rating Unit/Min/Max							NO./PLOT	CM/PLANT	CM/PLANT	# per 0.9 m2
Assessed By							MHM	HT, NB	HT, NB	HT, NB
1	Non-Treated						16a	30.33a	36.54a	0a
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	17a	34.23a	40.97a	1a
	COC	100SL		1	% v/v	PO1				
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	15a	32.28a	36.64a	0a
	COC	100SL		1	% v/v	PO1,PO2				
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	15a	33.21a	39.86a	0a
	MSO	100SL		1	% v/v	PO1				
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	15a	34.61a	41.76a	0a
	MSO	100SL		1	% v/v	PO1				
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	16a	32.24a	41.90a	0a
	MSO	100SL		1	% v/v	PO1				
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	14a	30.92a	35.63a	0a
	MSO	100SL		1	% v/v	PO1,PO2				
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	16a	32.31a	43.57a	0a
	MSO	100SL		1	% v/v	PO1,PO2				
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	14a	30.00a	33.68a	0a
	MSO	100SL		1	% v/v	PO1,PO2				
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	17a	33.62a	42.29a	0a
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2				
	COC	100SL		1.25	% v/v	PO1,PO2				
LSD P=.05							1.8	5.549	10.928	0.8
Standard Deviation							1.1	3.235	6.371	0.5

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
Pest Code							PW SPP	CAWE	LACG	OTHER
Crop Name										
Crop Variety										
Rating Date							17Aug2022	17Aug2022	17Aug2022	17Aug2022
Rating Type							WEED COUNT	WEED COUNT	WEED COUNT	WEED COUNT
Rating Unit/Min/Max							# per 0.9 m^2	# per 0.9 m^2	# per 0.9 m^2	# per 0.9 m^2
Assessed By							HT, NB	HT, NB	HT, NB	HT, NB
1	Non-Treated						0a	2a	7a	3a
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	1a	3a	3bcd	9a
	COC	100SL		1	% v/v	PO1				
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	0a	0a	3bcd	10a
	COC	100SL		1	% v/v	PO1,PO2				
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	0a	0a	3bcd	11a
	MSO	100SL		1	% v/v	PO1				
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	3a	0a	2cd	7a
	MSO	100SL		1	% v/v	PO1				
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	1a	0a	3bcd	13a
	MSO	100SL		1	% v/v	PO1				
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	1a	0a	4abc	6a
	MSO	100SL		1	% v/v	PO1,PO2				
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	0a	0a	1d	4a
	MSO	100SL		1	% v/v	PO1,PO2				
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	0a	0a	5ab	7a
	MSO	100SL		1	% v/v	PO1,PO2				
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	2a	2a	4bcd	4a
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2				
	COC	100SL		1.25	% v/v	PO1,PO2				
LSD P=.05							2.8	3.4	2.8	11.2
Standard Deviation							1.6	2.0	1.7	6.5

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Pest Code									COLQ	COPU	RRPW
Crop Name							PEPPER	PEPPER			
Crop Variety							BANANA	CHERRY			
Rating Date							26Aug2022	26Aug2022	26Aug2022	26Aug2022	26Aug2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0a	0a	0d	0c	0e
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	0a	2a	0d	67b	0e
	COC	100SL		1	% v/v	PO1					
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	5a	8a	93a	97ab	93ab
	COC	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	7a	8a	62c	93ab	70d
	MSO	100SL		1	% v/v	PO1					
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	12a	5a	78b	97ab	77cd
	MSO	100SL		1	% v/v	PO1					
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	12a	13a	87ab	100a	83bc
	MSO	100SL		1	% v/v	PO1					
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	20a	32a	83ab	90ab	90ab
	MSO	100SL		1	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	18a	13a	90ab	97ab	85abc
	MSO	100SL		1	% v/v	PO1,PO2					
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	20a	23a	93a	100a	97a
	MSO	100SL		1	% v/v	PO1,PO2					
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	3a	0a	62c	97ab	65d
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2					
	COC	100SL		1.25	% v/v	PO1,PO2					
LSD P=.05							17.8	21.2	13.4	33.0	11.8
Standard Deviation							10.4	12.3	7.8	19.2	6.9

Pest Code							PRPW	TOTAL BL			
Crop Name									PEPPER	PEPPER	PEPPER
Crop Variety									BANANA	BANANA	BANANA
Rating Date							26Aug2022	26Aug2022	07Sep2022	22Sep2022	05Oct2022
Rating Type							RATING	RATING	HARVEST	HARVEST	HARVEST
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	KG/PLOT	KG/PLOT	KG/PLOT
Assessed By							MHM	MHM	SWMREC	SWMREC	SWMREC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0e	0.0f	2.49d	1.88d	0.58a
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	0e	0.0f	8.24a	4.87ab	1.20a
	COC	100SL		1	% v/v	PO1					
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	97a	85.0ab	7.89a	4.77ab	1.23a
	COC	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	73cd	66.7de	6.97ab	3.05bcd	0.66a
	MSO	100SL		1	% v/v	PO1					
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	73cd	71.7d	5.04bc	3.75a-d	0.82a
	MSO	100SL		1	% v/v	PO1					
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	80bc	78.3c	4.60cd	4.18abc	1.05a
	MSO	100SL		1	% v/v	PO1					
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	87ab	83.3bc	5.33bc	5.26a	1.10a
	MSO	100SL		1	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	88ab	86.7ab	5.49bc	3.73a-d	0.96a
	MSO	100SL		1	% v/v	PO1,PO2					
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	93a	90.0a	4.48cd	4.29abc	1.65a
	MSO	100SL		1	% v/v	PO1,PO2					
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	67d	63.3e	6.66abc	2.74cd	0.91a
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2					
	COC	100SL		1.25	% v/v	PO1,PO2					
LSD P=.05							12.4	6.13	2.368	1.920	0.704
Standard Deviation							7.2	3.57	1.380	1.119	0.411

Tiafenacil for Row Middle Weed Control in Hot Banana and Cherry Pepper - SWMREC - 2022

Pest Code											
Crop Name							PEPPER	PEPPER	PEPPER	PEPPER
Crop Variety							BANANA	BANANA	CHERRY	CHERRY
Rating Date									01Sep2022	22Sep2022
Rating Type							TOTAL HRVT	TOTAL HRVT	HARVEST	HARVEST
Rating Unit/Min/Max							KG/PLOT	KG/PLANT	KG/PLOT	KG/PLOT
Assessed By									MHM	SWMREC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated						4.95d	0.34d	4.44cd	2.00d
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	14.31a	0.82ab	8.52a	4.21abc
	COC	100SL		1	% v/v	PO1				
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	13.89ab	0.86a	7.59ab	4.21abc
	COC	100SL		1	% v/v	PO1,PO2				
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	10.67abc	0.69abc	5.45bc	3.47bcd
	MSO	100SL		1	% v/v	PO1				
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	9.60c	0.61c	5.86abc	4.90ab
	MSO	100SL		1	% v/v	PO1				
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	9.83c	0.68abc	3.94cd	4.24abc
	MSO	100SL		1	% v/v	PO1				
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	11.69abc	0.78abc	2.51d	2.87cd
	MSO	100SL		1	% v/v	PO1,PO2				
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	10.18c	0.65bc	5.47bc	5.56a
	MSO	100SL		1	% v/v	PO1,PO2				
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	10.42bc	0.71abc	1.80d	3.42bcd
	MSO	100SL		1	% v/v	PO1,PO2				
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	10.32bc	0.62c	4.26cd	1.95d
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2				
	COC	100SL		1.25	% v/v	PO1,PO2				
LSD P=.05							3.700	0.195	2.895	1.878
Standard Deviation							2.157	0.114	1.688	1.095

Pest Code									
Crop Name							PEPPER	PEPPER	PEPPER
Crop Variety							CHERRY	CHERRY	CHERRY
Rating Date							05Oct2022		
Rating Type							HARVEST	TOTAL HRVT	TOTAL HRVT
Rating Unit/Min/Max							KG/PLOT	KG/PLOT	KG/PLANT
Assessed By							SWMREC		
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated						0.50cd	6.94b	0.42b
2	Gramoxone 3SL	3SL		1	lb ai/a	PO1	1.13b	13.86a	0.84a
	COC	100SL		1	% v/v	PO1			
3	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	1.18b	12.98a	0.85a
	COC	100SL		1	% v/v	PO1,PO2			
4	DCC-3825	70WDG		0.022	lb ai/a	PO1	0.94bcd	9.86ab	0.64ab
	MSO	100SL		1	% v/v	PO1			
5	DCC-3825	70WDG		0.045	lb ai/a	PO1	1.19b	11.94a	0.78a
	MSO	100SL		1	% v/v	PO1			
6	DCC-3825	70WDG		0.067	lb ai/a	PO1	1.14b	9.32ab	0.59ab
	MSO	100SL		1	% v/v	PO1			
7	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	1.38ab	6.77b	0.46b
	MSO	100SL		1	% v/v	PO1,PO2			
8	DCC-3825	70WDG		0.045	lb ai/a	PO1,PO2	1.90a	12.92a	0.83a
	MSO	100SL		1	% v/v	PO1,PO2			
9	DCC-3825	70WDG		0.067	lb ai/a	PO1,PO2	1.05bc	6.27b	0.42b
	MSO	100SL		1	% v/v	PO1,PO2			
10	Basagran	4SL		0.5	lb ai/a	PO1,PO2	0.40d	6.61b	0.40b
	Scythe	4.2EC		0.107	lb ai/a	PO1,PO2			
	COC	100SL		1.25	% v/v	PO1,PO2			
LSD P=.05							0.558	4.676	0.293
Standard Deviation							0.325	2.726	0.171

Performance of Florpyrauxifen-benzyl on Blueberry - Year 2 - TNRC - 2022

Project Code: 127-22-1 Location: Fennville, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Blueberry Variety: Bluecrop
Planting Method: Transplanted Planting Date: 2010
Harvest Date: 4 harvests 1/week; 7/11/22, 7/18,22, 7/25/22, 8/2/22
Plant Spacing: 4′ Row Spacing: 12′
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.3 ft wide x 16 ft long

Soil Type: Metea Loamy Fine Sand OM: 4.6% pH: 4.5
Sand: 83.7% Silt: 7.1% Clay: 9.2% CEC: 8.5

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	6/3/22	1:20-200 PM	71/74 F	Dry	NW 4-6mph	38%	0%	N
PO2	7/1/22	1:30-2:15 PM	81/71 F	Dry	NW 1-5 mph	50%	90%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/3/22	RESO = Red Sorrel	6-10″	Flower	Many
6/3/22	FADA = False Dandelion	6-24″	Flower	Moderate
6/3/22	HOWE = Horseweed	4-8″	Vegetative	Many
6/3/22	FIPA = Field Pansy	3-6″	Flower	Moderate
7/1/22	RESO	2-10″	Flower	Many
7/1/22	FADA	8-12″	Flower	Few
7/1/22	HOWE	4-7″	Vegetative	Moderate

Additional Weeds Observed Throughout Season

Total WC = Overall control of broadleaves, sedges, and grass spp.

Notes and Comments

1. Spray applied with 2-nozzle and 2-nozzle shielded 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 0-100; 0 = no injury, 100 = complete kill. In general, weed pressure was very low through the trial. Main weed species was red sorrel which was present throughout the study area.
3. Treatments 2-8 applied with 2-nozzle shielded boom; treatments 9 & 10 applied with 2-nozzle non-shielded boom.
4. Injury symptoms appeared mainly on new shoots as shoot and leaf curling and leaves showing red color.
5. Two middle blueberry plants from each plot were harvested for yield data. Some exceptions were made for plots with zero-low fruit on at least one of the middle bushes. In those plots, one of the outside bushes was harvested along with one of the middle bushes.
6. Non-treated plots kept weedy throughout season.
7. After blueberry harvest, new shoots were harvested and divided into good, curling, and bad shoots. The number and biomass data was collected for each type of shoot.

Michigan State University

Performance of Florpyrauxifen-benzyl on Blueberry - Year 2 - TNRC - 2022

Trial ID:127-22-1 Location:Fennville, MI Trial Year:2022

Protocol ID:127-22-1 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Nicole Soldan

Pest Code							RESO	FADA	HOWE	
Crop Name						BLBE				BLBE
Rating Date						10Jun2022	10Jun2022	10Jun2022	10Jun2022	16Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated Weedy					PO1,PO2	0a	27a	62a	62a	0a
2	Loyant	0.21L		0.026lb ai/a		PO1	0a	88a	92a	92a	1a
3	Loyant	0.21L		0.053lb ai/a		PO1	3a	88a	78a	90a	3a
4	Loyant	0.21L		0.026lb ai/a		PO2	1a	47a	97a	93a	0a
5	Loyant	0.21L		0.053lb ai/a		PO2	1a	40a	100a	100a	0a
6	Loyant	0.21L		0.013lb ai/a		PO1,PO2	3a	58a	93a	95a	0a
7	Loyant	0.21L		0.026lb ai/a		PO1,PO2	1a	93a	90a	65a	1a
8	Loyant	0.21L		0.053lb ai/a		PO1,PO2	2a	63a	100a	98a	1a
9	Loyant	0.21L		0.026lb ai/a		PO1,PO2	3a	63a	95a	100a	1a
10	Loyant	0.21L		0.035lb ai/a		PO1,PO2	1a	83a	93a	98a	1A
LSD P=.05							3.3	64.1	33.8	37.1	3.1
Standard Deviation							0.4	37.4	19.7	21.6	0.4
CV							126.04	57.32	21.89	24.19	191.72

Pest Code							RESO	FADA	HOWE		RESO	FADA
Crop Name										BLBE		
Rating Date							16Jun2022	16Jun2022	16Jun2022	01Jul2022	01Jul2022	01Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated Weedy					PO1,PO2	13a	100a	99a	0c	12a	57b
2	Loyant	0.21L		0.026lb ai/a		PO1	93a	97a	94a	3abc	60a	97a
3	Loyant	0.21L		0.053lb ai/a		PO1	95a	94a	95a	5a	70a	93a
4	Loyant	0.21L		0.026lb ai/a		PO2	44a	97a	97a	0c	47a	0c
5	Loyant	0.21L		0.053lb ai/a		PO2	37a	99a	100a	0c	17a	100a
6	Loyant	0.21L		0.013lb ai/a		PO1,PO2	60a	99a	98a	0c	52a	92a
7	Loyant	0.21L		0.026lb ai/a		PO1,PO2	94a	95a	97a	2bc	83a	93a
8	Loyant	0.21L		0.053lb ai/a		PO1,PO2	75a	99a	100a	2bc	70a	100a
9	Loyant	0.21L		0.026lb ai/a		PO1,PO2	65a	97a	99a	5a	58a	97a
10	Loyant	0.21L		0.035lb ai/a		PO1,PO2	86a	97a	99a	4ab	63a	100a
LSD P=.05							74.6	6.1	5.6	2.7	59.1	29.2
Standard Deviation							29.5	9.3	8.5	1.6	34.5	17.0
CV							52.35	11.35	0.23	77.24	64.83	20.52

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.
d=Means are reported in de-transformed data units

Performance of Florpyrauxifen-benzyl on Blueberry - Year 2 - TNRC - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
Pest Code							HOWE		RESO	HOWE	
Crop Name								BLBE			BLBE
Rating Date							01Jul2022	11Jul2022	11Jul2022	11Jul2022	
Rating Type							RATING	RATING	RATING	RATING	HARVEST
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	KG/PLOT
Assessed By							MHM	MHM	MHM	MHM	NS
								dAL			
1	Untreated Weedy					PO1,PO2	0c	0e	0a	0b	1.50a
2	Loyant	0.21L		0.026	lb ai/a	PO1	85b	0e	62a	57a	1.84a
3	Loyant	0.21L		0.053	lb ai/a	PO1	95a	3bcd	60a	93a	2.89a
4	Loyant	0.21L		0.026	lb ai/a	PO2	3c	0e	32a	80a	0.91a
5	Loyant	0.21L		0.053	lb ai/a	PO2	97a	1de	22a	100a	1.45a
6	Loyant	0.21L		0.013	lb ai/a	PO1,PO2	97a	0e	40a	90a	1.91a
7	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	97a	2cd	60a	93a	1.98a
8	Loyant	0.21L		0.053	lb ai/a	PO1,PO2	98a	9ab	45a	80a	0.38a
9	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	97a	6abc	52a	90a	0.84a
10	Loyant	0.21L		0.035	lb ai/a	PO1,PO2	98a	14a	45a	85a	1.04a
LSD P=.05							9.6	3.2 - 10.3	41.0	38.2	1.440
Standard Deviation							5.6	0.3t	23.4	21.0	0.839
CV							7.28	63.37t	56.46	27.37	56.88

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
Pest Code								RESO	TOTAL WC	
Crop Name							BLBE			BLBE
Rating Date							17Aug2022	17Aug2022	17Aug2022	25Aug2022
Rating Type							RATING	RATING	RATING	GOOD SHOOTS
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	NO./PLOT
Assessed By							SC	SC	SC	MHM,MJ
1	Untreated Weedy					PO1,PO2	0e	18a	18a	7a
2	Loyant	0.21L		0.026	lb ai/a	PO1	8d	40a	45a	3a
3	Loyant	0.21L		0.053	lb ai/a	PO1	8d	35a	43a	3a
4	Loyant	0.21L		0.026	lb ai/a	PO2	15cd	43a	48a	3a
5	Loyant	0.21L		0.053	lb ai/a	PO2	11d	31a	38a	3a
6	Loyant	0.21L		0.013	lb ai/a	PO1,PO2	10d	35a	37a	2a
7	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	19bc	53a	58a	3a
8	Loyant	0.21L		0.053	lb ai/a	PO1,PO2	27b	55a	60a	0a
9	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	38a	47a	47a	2a
10	Loyant	0.21L		0.035	lb ai/a	PO1,PO2	40a	50a	52a	0a
LSD P=.05							8.2	30.0	33.1	4.5
Standard Deviation							4.8	17.5	19.3	2.6
CV							26.89	42.92	43.26	102.79

Performance of Florpyrauxifen-benzyl on Blueberry - Year 2 - TNRC - 2022

Pest Code									
Crop Name							BLBE	BLBE	BLBE	BLBE
Rating Date							25Aug2022	25Aug2022	25Aug2022	25Aug2022
Rating Type							GOOD SHOOTS	CURLING	CURLING	BAD SHOOTS
Rating Unit/Min/Max							G/PLOT	NO./PLOT	G/PLOT	NO./PLOT
Assessed By							MHM,MJ	MHM,MJ	MHM,MJ	MHM,MJ
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated Weedy					PO1,PO2	36.67a	2a	6.67a	4a
2	Loyant	0.21L		0.026	lb ai/a	PO1	50.00a	1a	3.67a	3a
3	Loyant	0.21L		0.053	lb ai/a	PO1	27.00a	2a	6.67a	6a
4	Loyant	0.21L		0.026	lb ai/a	PO2	7.00a	1a	7.00a	6a
5	Loyant	0.21L		0.053	lb ai/a	PO2	40.00a	2a	6.67a	5a
6	Loyant	0.21L		0.013	lb ai/a	PO1,PO2	7.00a	1a	10.33a	2a
7	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	13.33a	1a	3.33a	8a
8	Loyant	0.21L		0.053	lb ai/a	PO1,PO2	3.33a	1a	6.67a	3a
9	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	23.33a	0a	0.00a	8a
10	Loyant	0.21L		0.035	lb ai/a	PO1,PO2	0.33a	0a	0.00a	5a
LSD P=.05							61.531	3.3	14.979	6.4
Standard Deviation							35.870	1.9	8.732	3.7
CV							172.45	159.73	171.22	72.45

Pest Code									
Crop Name							BLBE	BLBE	BLBE
Rating Date							25Aug2022	25Aug2022	25Aug2022
Rating Type							BAD SHOOTS	TOTAL SHOOT	TOTAL SHOOT
Rating Unit/Min/Max							G/PLOT	NO./PLOT	G/PLOT
Assessed By							MHM,MJ	MHM,MJ	MHM,MJ
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated Weedy					PO1,PO2	23.33a	13a	66.67a
2	Loyant	0.21L		0.026	lb ai/a	PO1	13.33a	8a	67.00a
3	Loyant	0.21L		0.053	lb ai/a	PO1	23.67a	11a	57.33a
4	Loyant	0.21L		0.026	lb ai/a	PO2	23.33a	10a	37.33a
5	Loyant	0.21L		0.053	lb ai/a	PO2	23.33a	10a	70.00a
6	Loyant	0.21L		0.013	lb ai/a	PO1,PO2	3.67a	5a	21.00a
7	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	33.33a	12a	50.00a
8	Loyant	0.21L		0.053	lb ai/a	PO1,PO2	16.67a	5a	26.67a
9	Loyant	0.21L		0.026	lb ai/a	PO1,PO2	37.00a	9a	60.33a
10	Loyant	0.21L		0.035	lb ai/a	PO1,PO2	10.33a	5a	10.67a
LSD P=.05							30.080	10.5	85.725
Standard Deviation							17.535	6.1	49.974
CV							84.3	68.78	107.01

Performance of Post Herbicides in Blueberry for Weed Control - SWMREC - 2022

Project Code: 127-22-2 Location: Benton Harbor, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Blueberry Variety: see notes
Planting Method: Transplants Planting Date: 1993
Harvest Date: NA
Plant Spacing: 4 ft Row Spacing: 10 ft
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.4 ft wide x 30 ft long (4 bushes/plot)

Soil Type: Selfridge Loamy Sand OM: 3.4% pH: 5.2
Sand: 79.2% Silt: 9.6% Clay: 11.2% CEC: 7.5

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	6/14/22	11:30-12:15 PM	91/70 F	Dry-Slightly Damp	SW 2-4 mph	65%	30%	N
PO2	7/13/22	1:00-2:00 PM	84/76 F	Dry	W 0-5 mph	43%	40%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/14/22	BLBE = Blueberry	4-5′	Green Fruit	Good
6/14/22	RESO = Red Sorrel	6-8″	Flower	Many
6/14/22	VICR = Virginia Creeper	3-5″	Vegetative	Moderate
7/13/22	BLBE	4-5′	Fruit	Good
7/13/22	HONE = Horsenettle	6-10″	Vegetative	Moderate
7/13/22	RESO = Red Sorrel	1-6″	Veg-Flower	Moderate

Additional Weeds Observed Throughout Season

Total WC = Overall control of broadleaves, sedges, and grass spp.
Grasses = Overall control of grass spp.
Total BL = Overall control of broadleaf spp.

Notes and Comments

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Each replication had a different variety: Rep 1 = Bluecrop, Rep 2 = Jersey, & Rep 3 = Elliot.
4. At PO2 application, treatment 7 received MSO instead of COC.
5. Most weeds present found in Replication 1. Replication 2 & 3 varieties were larger and had more foliage.
6. Very few weeds observed in replications 2 & 3. RESO only observed in Rep 1. In general, weed pressure was low in all the plots.

Michigan State University

Performance of Post Herbicides in Blueberry for Weed Control - SWMREC - 2022

Trial ID:127-22-2 Location:Benton Harbor, MI Trial Year:2022

Protocol ID:127-22-2 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
Pest Code								RESO	VICR	HONE	
Crop Name							BLBE				BLBE
Rating Date							23Jun2022	23Jun2022	23Jun2022	23Jun2022	30Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	NS	NS	MHM
1	Untreated-Weedy						0d	33a	0b	0c	0a
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	13abc	93a	100a	77ab	3a
	MSO	100SL		1%	v/v	PO1,PO2					
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	18a	100a	90a	97a	1a
	MSO	100SL		1%	v/v	PO1,PO2					
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	13abc	100a	80a	97a	4a
	MSO	100SL		1%	v/v	PO1,PO2					
5	Rely 280	2.34L		1.03	lb ai/a	PO1,PO2	10bc	100a	83a	100a	4a
	MSO	100SL		1%	v/v	PO1,PO2					
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	10bc	100a	97a	97a	10a
	Rely 280	2.34L		1.03	lb ai/a	PO1,PO2					
	MSO	100SL		1%	v/v	PO1,PO2					
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	13abc	80a	100a	90ab	7a
	COC	100SL		1%	v/v	PO1,PO2					
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	10bc	83a	77a	77ab	5a
	Aim	2EC		0.031	lb ai/a	PO1,PO2					
	MSO	100SL		1%	v/v	PO1,PO2					
9	Homeplate	100L		6%	v/v	PO1,PO2	17ab	80a	63a	77ab	4a
10	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	7cd	63a	67a	60b	4a
	COC	100SL		1%	v/v	PO1,PO2					
LSD P=.05							7.9	43.5	46.5	35.5	5.3
Standard Deviation							4.6	25.4	27.1	20.7	3.1
CV							41.06	30.44	35.8	26.9	72.86

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=11; Average=7,20,24
Could not calculate LSD (% mean diff) for columns 10,21 because error mean square = 0.
^Calculated from residual.

Performance of Post Herbicides in Blueberry for Weed Control - SWMREC - 2022

Pest Code								RESO	TOTAL BL		RESO	HONE
Crop Name							BLBE SHOOTS			BLBE		
Rating Date							30Jun2022	30Jun2022	30Jun2022	19Jul2022	19Jul2022	19Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated-Weedy						0a	0a	0f	0a	0	0d
2	DCC-3825		70WDG	0.022	lb ai/a	PO1,PO2	0a	25a	35e	5a	.	70b
	MSO		100SL	1	% v/v	PO1,PO2						
3	DCC-3825		70WDG	0.044	lb ai/a	PO1,PO2	3a	.	67bc	3a	.	88ab
	MSO		100SL	1	% v/v	PO1,PO2						
4	DCC-3825		70WDG	0.066	lb ai/a	PO1,PO2	3a	.	80ab	3a	.	90ab
	MSO		100SL	1	% v/v	PO1,PO2						
5	Rely 280		2.34L	1.03	lb ai/a	PO1,PO2	2a	100a	92a	7a	.	90ab
	MSO		100SL	1	% v/v	PO1,PO2						
6	DCC-3825		70WDG	0.022	lb ai/a	PO1,PO2	3a	100a	93a	10a	100	100a
	Rely 280		2.34L	1.03	lb ai/a	PO1,PO2						
	MSO		100SL	1	% v/v	PO1,PO2						
7	Aim		2EC	0.031	lb ai/a	PO1,PO2	3a	10a	12f	8a	85	78b
	COC		100SL	1	% v/v	PO1,PO2						
8	DCC-3825		70WDG	0.022	lb ai/a	PO1,PO2	5a	60a	58cd	10a	100	72b
	Aim		2EC	0.031	lb ai/a	PO1,PO2						
	MSO		100SL	1	% v/v	PO1,PO2						
9	Homeplate		100L	6	% v/v	PO1,PO2	2a	55a	45de	8a	80	23c
10	Gramoxone 3SL		3SL	1	lb ai/a	PO1,PO2	0a	93a	85ab	13a	100	80ab
	COC		100SL	1	% v/v	PO1,PO2						
LSD P=.05							5.2	126.1	20.7	9.1	.	21.0
Standard Deviation							3.0	9.9	12.1	5.3	.	12.0
CV							139.03	17.94	21.3	77.39	.	17.32

Performance of Post Herbicides in Blueberry for Weed Control - SWMREC - 2022

Pest Code						GRASSES		HONE	RESO	GRASSES	TOTAL WC
Crop Name							BLBE				
Rating Date						19Jul2022	27Jul2022	27Jul2022	27Jul2022	27Jul2022	27Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						0d	0a	0c	0b	0c	0e
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	95ab	0a	78b	92a	90ab	85ab
	MSO	100SL		1	% v/v	PO1,PO2						
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	95ab	0a	92ab	100a	88ab	87ab
	MSO	100SL		1	% v/v	PO1,PO2						
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	95ab	5a	92ab	97a	85ab	88ab
	MSO	100SL		1	% v/v	PO1,PO2						
5	Rely 280	2.34L		1.03	lb ai/a	PO1,PO2	95ab	2a	100a	100a	100a	100a
	MSO	100SL		1	% v/v	PO1,PO2						
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	97a	2a	100a	100a	97a	97ab
	Rely 280	2.34L		1.03	lb ai/a	PO1,PO2						
	MSO	100SL		1	% v/v	PO1,PO2						
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	90b	0a	100a	77a	78ab	68cd
	COC	100SL		1	% v/v	PO1,PO2						
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	95ab	2a	85ab	100a	97a	82bc
	Aim	2EC		0.031	lb ai/a	PO1,PO2						
	MSO	100SL		1	% v/v	PO1,PO2						
9	Homeplate	100L		6	% v/v	PO1,PO2	13c	0a	93ab	67a	72b	58d
10	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	95ab	0a	97a	100a	97a	97ab
	COC	100SL		1	% v/v	PO1,PO2						
LSD P=.05							5.2	5.5	15.8	35.3	22.2	15.5
Standard Deviation							3.0	3.2	9.2	20.6	13.0	9.0
CV							3.91	320.59	11.03	24.73	16.15	11.84

Performance of Post Herbicides in Blueberry for Weed Control - SWMREC - 2022

Pest Code							VICR		HONE	RESO		HONE
Crop Name								BLBE			BLBE	
Rating Date							27Jul2022	09Aug2022	09Aug2022	09Aug2022	26Aug2022	26Aug2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	NS	NS	NS	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated-Weedy						0c	0a	0d	0	0c	0c
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	97a	12a	23cd	70	3c	47b
	MSO	100SL		1	% v/v	PO1,PO2						
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	92ab	10a	40abc	.	15ab	73ab
	MSO	100SL		1	% v/v	PO1,PO2						
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	93a	7a	67ab	90	15ab	87ab
	MSO	100SL		1	% v/v	PO1,PO2						
5	Rely 280	2.34L		1.03	lb ai/a	PO1,PO2	100a	0a	70a	.	7bc	90a
	MSO	100SL		1	% v/v	PO1,PO2						
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	100a	12a	58abc	.	14ab	85ab
	Rely 280	2.34L		1.03	lb ai/a	PO1,PO2						
	MSO	100SL		1	% v/v	PO1,PO2						
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	100a	3a	35a-d	20	10abc	88ab
	COC	100SL		1	% v/v	PO1,PO2						
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	93a	7a	30bcd	20	18a	75ab
	Aim	2EC		0.031	lb ai/a	PO1,PO2						
	MSO	100SL		1	% v/v	PO1,PO2						
9	Homeplate	100L		6	% v/v	PO1,PO2	77b	0a	40abc	0	8abc	60ab
10	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	100a	5a	45abc	.	18a	92a
	COC	100SL		1	% v/v	PO1,PO2						
LSD P=.05							15.8	8.9	37.2	.	10.4	43.0
Standard Deviation							9.2	5.2	20.9	.	6.0	25.1
CV							10.8	94.7	51.19	.	55.33	35.98

Performance of Post Herbicides in Blueberry for Weed Control - SWMREC - 2022

Pest Code							RESO	TOTAL BL
Crop Name								
Rating Date							26Aug2022	26Aug2022
Rating Type							RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100
Assessed By							MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing		
1	Untreated-Weedy						0c	0c
2	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	80a	77a
	MSO	100	SL	1	% v/v	PO1,PO2		
3	DCC-3825	70	WDG	0.044	lb ai/a	PO1,PO2	100a	82a
	MSO	100	SL	1	% v/v	PO1,PO2		
4	DCC-3825	70	WDG	0.066	lb ai/a	PO1,PO2	95a	87a
	MSO	100	SL	1	% v/v	PO1,PO2		
5	Rely 280	2.34	L	1.03	lb ai/a	PO1,PO2	100a	83a
	MSO	100	SL	1	% v/v	PO1,PO2		
6	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	80a	85a
	Rely 280	2.34	L	1.03	lb ai/a	PO1,PO2		
	MSO	100	SL	1	% v/v	PO1,PO2		
7	Aim	2	EC	0.031	lb ai/a	PO1,PO2	20bc	68a
	COC	100	SL	1	% v/v	PO1,PO2		
8	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	40b	73a
	Aim	2	EC	0.031	lb ai/a	PO1,PO2		
	MSO	100	SL	1	% v/v	PO1,PO2		
9	Homeplate	100	L	6	% v/v	PO1,PO2	10c	32b
10	Gramoxone 3SL	3	SL	1	lb ai/a	PO1,PO2	90a	87a
	COC	100	SL	1	% v/v	PO1,PO2		
LSD P=.05							20.4	23.5
Standard Deviation							4.7	13.7
CV							7.71	20.37

Evaluation of Herbicide Program with Broadcast and Vision-Guided Sprayer for Weed Control in Blueberry - HTRC - 2022

Project Code: 127-22-3 Location: Holt, MI
Block: 26

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Blueberry Variety: Bluecrop
Planting Method: Transplants Planting Date: 2008
Harvest Date: NA
Plant Spacing: 4 ft Row Spacing: 10 ft
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.3 ft wide x 60 ft long

Soil Type: Spinks Loamy Snad OM: 4.3% pH: 7.0
Sand: 67.1% Silt: 15.7% Clay: 17.2% CEC: 8.5

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
Spring	5/11/22	1:20-2:15 PM	82/65 F	Dry	NE 0-2mph	55%	90%	N
Summer	7/14/22	11:00 AM - 12:30 PM	82/66 F	Dry	NE 1-5 mph	36%	10%	N
Fall	10/14/22	2:30-3:30 PM	57/49 F	Moist	SW 2-11 mph	25%	60%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/11/22	BLBE	4-5′	Bud break	Good
5/11/22	QUGR = Quackgrass	3-6″	Vegetative	Many - Moderate
5/11/22	DAND = Dandelion	4-6″	Flower	Moderate
5/11/22	PUDN = Purple Deadnettle	3-6″	Flower	Many
10/14/22	PEST = Perennial Sowthistle	3-6″	Vegetative	Many
7/14/22	BLBE	4-6′	Leaf Senescence	Good
7/14/22	PRLE = Prickly Lettuce	6″	Vegetative	Moderate
7/14/22	HOWE = Horseweed	6″	Vegetative	Moderate
7/14/22	BEGR = Bermuda Grass	6″	Vegetative	Many
10/14/22	PRLE	12-18″	Flowering	Moderate
10/14/22	Grass	6-12″	Vegetative	Many

Additional Weeds Observed Throughout Season

GORO = Goldenrod
Grass = grass spp.
VICR = Virginia Creeper
Total WC = Overall control of broadleaves, sedges, and grass spp.
Total BL = Overall control of broadleaf spp.
Grasses = Overall control of grass spp.

Notes and Comments
1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer for treatments 2-4.
2. Spray applied with 4 nozzle vision guided sprayer attached to an ATV for treatments 5-7. TeeJet TP 40-02, 18.13 gpa, 40.61 PSI, 4.4 mph, CO2 vision guided sprayer. Each nozzle covers 25 cm area.
3. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
4. Treatment 4 & 7 received AIM 0.031 lb ai/ac at Fall application.

Evaluation of Herbicide Program with Broadcast and Vision-Guided Sprayer for Weed Control in Blueberry - HTRC - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing
1	Non-Treated					
2	Alion		1.67SC	0.065	lb ai/a	SPRING
	Embed Extra		3.8L	1.4	lb ai/a	SPRING
	Stinger		3L	0.125	lb ai/a	SUMMER
	Gramoxone 2SL		2SL	1	lb ai/a	SUMMER
	Kerb		3.3SC	1.5	lb ai/a	FALL
	Sandea		75WG	0.047	lb ai/a	FALL
	Aim		2EC	0.031	lb ai/a	FALL
3	Chateau SW		51WDG	0.383	lb ai/a	SPRING
	Embed Extra		3.8L	1.4	lb ai/a	SPRING
	Stinger		3L	0.125	lb ai/a	SUMMER
	Rely 280		2.34L	0.88	lb ai/a	SUMMER
	Matrix		25SG	0.063	lb ai/a	FALL
	Aim		2EC	0.031	lb ai/a	FALL
	Kerb		3.3SC	1.5	lb ai/a	FALL
4	Zeus		4F	0.375	lb ai/a	SPRING
	Aim		2EC	0.031	lb ai/a	SPRING
	Callisto		4SC	0.188	lb ai/a	SUMMER
	Gramoxone 2SL		2SL	1	lb ai/a	SUMMER
	Matrix		25SG	0.063	lb ai/a	FALL
	Alion		1.67SC	0.065	lb ai/a	FALL
	Kerb		3.3SC	1.5	lb ai/a	FALL
5	Alion		1.67SC	0.065	lb ai/a	SPRING
	Embed Extra		3.8L	1.4	lb ai/a	SPRING
	Stinger		3L	0.125	lb ai/a	SUMMER
	Gramoxone 2SL		2SL	1	lb ai/a	SUMMER
	Kerb		3.3SC	1.5	lb ai/a	FALL
	Sandea		75WG	0.047	lb ai/a	FALL
	Aim		2EC	0.031	lb ai/a	FALL
6	Chateau SW		51WDG	0.383	lb ai/a	SPRING
	Embed Extra		3.8L	1.4	lb ai/a	SPRING
	Stinger		3L	0.125	lb ai/a	SUMMER
	Rely 280		2.34L	0.88	lb ai/a	SUMMER
	Matrix		25SG	0.063	lb ai/a	FALL
	Aim		2EC	0.031	lb ai/a	FALL
	Kerb		3.3SC	1.5	lb ai/a	FALL
7	Zeus		4F	0.375	lb ai/a	SPRING
	Aim		2EC	0.031	lb ai/a	SPRING
	Callisto		4SC	0.188	lb ai/a	SUMMER
	Gramoxone 2SL		2SL	1	lb ai/a	SUMMER
	Matrix		25SG	0.063	lb ai/a	FALL
	Alion		1.67SC	0.065	lb ai/a	FALL
	Kerb		3.3SC	1.5	lb ai/a	FALL

Michigan State University

Evaluation of Herbicide Program with Broadcast and Vision-Guided Sprayer for Weed Control in Blueberry - HTRC - 2022

Trial ID: 127-22-3 Location:Holt, MI
Protocol ID: 127-22-3 Trial Year:2022
Study Director: Monique Hemker Mose
Investigator (Creator): Dr. Sushila Chaudhari

Pest Code		DAND	PEST	GORO	GRASS	PUDN		DAND
Crop Name	BLBE						BLBE	
Crop Variety								
Rating Date	18May2022	18May2022	18May2022	18May2022	18May2022	18May2022	25May2022	25May2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0a	0c	0d	0b	0b	0b	0a	0c
2	0a	93ab	75ab	100a	87a	97a	0a	100a
3	0a	92ab	92ab	100a	97a	100a	0a	98ab
4	2a	77b	42c	88a	73a	100a	0a	97b
5	0a	92ab	90ab	100a	77a	100a	0a	98ab
6	0a	95ab	98a	100a	93a	100a	0a	100a
7	3a	98a	72b	97a	93a	100a	0a	100a
LSD P=.05	4.5	21.6	24.4	13.5	28.8	3.9	.	3.0
Standard Deviation	2.5	12.1	13.7	7.6	16.2	2.2	0.0	1.7
CV	352.77	15.54	20.47	9.08	21.79	2.56	0.0	1.97

Pest Code	PEST	GORO	GRASS	PUDN	HOWE		PEST	GRASS
Crop Name						BLBE		
Crop Variety								
Rating Date	25May2022	25May2022	25May2022	25May2022	25May2022	06Jun2022	06Jun2022	06Jun2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0c	0b	0b	0b	0b	0a	0c	0c
2	90a	100a	87a	98a	100a	0a	80a	62ab
3	95a	100a	83a	100a	100a	0a	85a	60ab
4	68b	80a	85a	100a	100a	0a	22bc	63ab
5	93a	100a	82a	100a	100a	0a	85a	43b
6	90a	100a	80a	100a	100a	0a	90a	73ab
7	57b	100a	92a	97a	100a	0a	32b	90a
LSD P=.05	18.8	23.3	15.5	4.5	.	.	22.1	39.7
Standard Deviation	10.5	13.1	8.7	2.5	0.0	0.0	12.4	22.3
CV	14.96	15.8	12.02	2.96	0.0	0.0	22.11	39.87

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Due to missing data, larger LSD values (col. 38: >=. and <=0.0) are used for mean comparisons of treatment pairs with missing data.
Missing data estimates are included in columns:Yates=31,40,42
Could not calculate LSD (% mean diff) for columns 7,13,14,17,20,30,33,36,38,41,43,44,48,49,50,51 because error mean square = 0.
^Calculated from residual.

Evaluation of Herbicide Program with Broadcast and Vision-Guided Sprayer for Weed Control in Blueberry - HTRC - 2022

Pest Code	HOWE	GORO	PUDN		HOWE	PEST	GRASS		HOWE
Crop Name				BLBE				BLBE	
Crop Variety									
Rating Date	06Jun2022	06Jun2022	06Jun2022	27Jun2022	27Jun2022	27Jun2022	27Jun2022	21Jul2022	21Jul2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.									
1	0b	0b	0b	0a	0b	0b	0b	0a	0b
2	100a	100a	100a	0a	100a	22b	7b	0a	100a
3	100a	100a	100a	0a	100a	53a	8b	0a	100a
4	100a	85a	100a	0a	100a	3b	23b	2a	93a
5	100a	100a	97a	0a	100a	60a	10b	2a	100a
6	100a	100a	100a	0a	100a	58a	25b	3a	100a
7	100a	100a	100a	0a	95a	8b	73a	0a	100a
LSD P=.05	.	17.5	3.9	.	5.8	26.9	38.7	3.0	7.8
Standard Deviation	0.0	9.8	2.2	0.0	3.3	15.1	21.8	1.7	4.4
CV	0.0	11.75	2.56	0.0	3.85	51.67	103.89	175.0	5.15

Pest Code	PEST	GRASS	VICR		HOWE	PEST	GRASS	VICR	TOTAL WC
Crop Name				BLBE					
Crop Variety									
Rating Date	21Jul2022	21Jul2022	21Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.									
1	0d	0c	0b	0a	0	0d	0d	0	0c
2	93ab	88a	100a	2a		77b	67c		67b
3	90ab	80b	97a	0a		80ab	75bc		78a
4	73c	78b	100a	5a		48c	67c		60b
5	97a	90a	100a	0a		87ab	82ab		85a
6	97a	92a	100a	3a		97a	85a		88a
7	85b	92a	100a	0a		85ab	83ab		85a
LSD P=.05	10.8	8.3	3.9	4.5	.	17.3	9.7	.	11.2
Standard Deviation	6.1	4.7	2.2	2.5	.	9.6	5.5	.	6.3
CV	7.97	6.26	2.56	176.38	.	14.25	8.33	.	9.52

Pest Code		HOWE	PEST	VICR	GRASS	TOTAL BL		PEST
Crop Name	BLBE						BLBE	
Crop Variety								
Rating Date	10Aug2022	10Aug2022	10Aug2022	10Aug2022	10Aug2022	10Aug2022	01Sep2022	01Sep2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0a	0	0d	0	0b	0d	0a	0d
2	0a		67b	80	55a	70c	0a	78ab
3	0a		82ab	80	48a	82abc	0a	82a
4	0a		28c		50a	72c	0a	43c
5	0a		88ab		70a	88ab	0a	87a
6	0a		95a		82a	92a	0a	86a
7	2a		72ab		82a	75bc	0a	52bc
LSD P=.05	1.9	.	27.5	.	33.4	14.2	.	27.4
Standard Deviation	1.1	.	15.4	.	18.8	7.9	0.0	15.1
CV	458.26	.	25.03	.	34.0	11.52	0.0	24.7

Evaluation of Herbicide Program with Broadcast and Vision-Guided Sprayer for Weed Control in Blueberry - HTRC - 2022

Pest Code	VICR	HOWE	GRASSES	TOTAL WC	TOTAL WEEDS	REMAINING MIXTURE AFTER APPLICATION
Crop Name						
Crop Variety						
Rating Date	01Sep2022	01Sep2022	01Sep2022	01Sep2022	19Oct2022	11May2022
Rating Type	RATING	RATING	RATING	RATING	WEED DENSIT	SPRING APP
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	ML, 0, 3785
Assessed By	CG	CG	CG	CG	MHM	NS
Trt No.						
1	0	0	0c	0c	63a	.
2	80		48ab	53ab	42a	1830
3	80		13bc	23bc	35a	1790
4			47ab	43ab	43a	1730
5			57a	58ab	27a	1210
6			65a	65a	20a	1610
7			78a	67a	18a	1470
LSD P=.05	.	.	36.9	35.9	34.1	.
Standard Deviation	.	.	20.7	20.2	19.2	.
CV	.	.	47.04	45.55	54.08	.

Pest Code			
Crop Name	REMAINING MIXTURE	REMAINING MIXTURE	TOTAL REMAINING
Crop Variety	AFTER APPLICATION	AFTER APPLICATION	MIXTURE
Rating Date	14Jul2022	14Oct2022	
Rating Type	SUMMER APP	FALL APP	ALL APPS
Rating Unit/Min/Max	ML, 0, 3785	ML, 0, 3785	ML, 0, 11355
Assessed By	NS	SC	
Trt No.			
1	.	.	.
2	1895	1840	5565
3	1725	1860	5375
4	1865	1900	5495
5	900	1230	3340
6	1030	1310	3950
7	1070	1430	3970
LSD P=.05	.	.	.
Standard Deviation	.	.	.
CV	.	.	.

Evaluation of Alion Based Herbicide Programs in Raspberry for Crop Tolerance and Weed Control - HTRC - 2022

Project Code: 131-22-1 Location: Holt, MI
Block: 128

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Red Raspberry Variety: Caroline
Planting Method: NA Planting Date: 2009
Harvest Date: NA
Plant Spacing: 2 ft Row Spacing: 10 ft
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 5.3 ft wide x 25 ft long

Soil Type: Colwood-Brookston Loams OM: 2.5% pH: 7.0
Sand: 50.1% Silt: 30.7% Clay: 19.2% CEC: 7.2

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PRE	4/3/22	11:20-11:45 AM	40/38 F	Moist	NW 4-6 mph	85%	100%	Y

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
4/3/22	RASP = Raspberry		Dormant	
4/3/22	No Weeds		Preemergence	

Additional Weeds Observed Throughout Season

DAND = Dandelion
Grass = overall grass spp.
PEST = Perennial Sowthistle
COBD = Common Burdock

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 0-100; 0 = no injury, 100 = complete kill.
3. Maintenance weed control application of Princep 90 WG (3.3 lb/ac) applied on 12/17/21 and Casoron 4G (4 lb ai/ac) on 11/16/21.
4. No or minimal level of crop injury reported from any of the herbicide treatments. Very few weeds observed in plots throughout the season. During initial ratings, slightly improved weed control observed from tank mix of Alion plus Rely or RoundUp as compared to RoundUp alone. However, later (at Sept 6, 2022) rating all of the plots had similar level of weed control and observed almost clean plots except PEST.

Michigan State University

Evaluation of Alion Based Herbicide Programs in Raspberry for Crop Tolerance and Weed Control - HTRC - 2022

Trial ID:131-22-1

Protocol ID:131-22-1 Location:Holt, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code							DAND	GRASS		
Crop Name						RASP			RASP	RASP
Rating Date						04May2022	04May2022	04May2022	31May2022	27Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated						0b	0b	0d	0b	0a
2	Roundup PowerMax	5.5L		1.650	lb ai/a	PRE	0b	78a	80c	3ab	0a
	N Pak (AMS)	100L		1%	v/v	PRE					
3	Alion	1.67SC		0.046	lb ai/a	PRE	5a	85a	89a	8a	0a
	Roundup PowerMax	5.5L		1.650	lb ai/a	PRE					
	N Pak (AMS)	100L		1%	v/v	PRE					
4	Alion	1.67SC		0.046	lb ai/a	PRE	5a	85a	85ab	8a	0a
	Rely 280	2.34L		1.170	lb ai/a	PRE					
	N Pak (AMS)	100L		1%	v/v	PRE					
5	Karmex	80DF		2.4	lb ai/a	PRE	3ab	79a	83bc	8a	0a
	Surflan A.S.	4L		3	lb ai/a	PRE					
	Roundup PowerMax	5.5L		1.650	lb ai/a	PRE					
	N Pak (AMS)	100L		1%	v/v	PRE					
LSD P=.05							4.2	14.1	4.9	5.8	.
Standard Deviation							2.7	9.2	3.2	3.8	0.0
CV							109.54	14.06	4.7	75.28	0.0

Pest Code							PEST	GRASS	COBD	DAND	
Crop Name											RASP
Rating Date							27Jun2022	27Jun2022	27Jun2022	27Jun2022	06Sep2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0b	0b	0b	0b	0a
2	Roundup PowerMax	5.5L		1.650	lb ai/a	PRE	66a	9b	75a	68a	0a
	N Pak (AMS)	100L		1%	v/v	PRE					
3	Alion	1.67SC		0.046	lb ai/a	PRE	76a	60a	95a	80a	0a
	Roundup PowerMax	5.5L		1.650	lb ai/a	PRE					
	N Pak (AMS)	100L		1%	v/v	PRE					
4	Alion	1.67SC		0.046	lb ai/a	PRE	79a	55a	100a	100a	0a
	Rely 280	2.34L		1.170	lb ai/a	PRE					
	N Pak (AMS)	100L		1%	v/v	PRE					
5	Karmex	80DF		2.4	lb ai/a	PRE	69a	43a	98a	85a	0a
	Surflan A.S.	4L		3	lb ai/a	PRE					
	Roundup PowerMax	5.5L		1.650	lb ai/a	PRE					
	N Pak (AMS)	100L		1%	v/v	PRE					
LSD P=.05							35.4	25.4	32.5	32.7	.
Standard Deviation							23.0	16.5	21.1	21.3	0.0
CV							39.58	49.65	28.7	31.96	0.0

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 5,10,11 because error mean square = 0.
^Calculated from residual.

Performance of Post Herbicides on Red and Black Raspberry for Cane Growth and Weed Control – HTRC – 2022

Project Code: 131-22-2 & 131-22-3 Location: Holt, MI
Block: 76

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Raspberry, Red; Raspberry, Black Variety: Joan J; Jewell
Planting Method: Transplanted Planting Date: 2016
Harvest Date: NA
Plant Spacing: 2″ Row Spacing: 10′
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 5.4 ft wide x 25 ft long

Soil Type: Marlette Fine Sandy Loam OM: 3.5% pH: 7.1
Sand: 55.1% Silt: 21.7% Clay: 23.2% CEC: 11.8

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	4/29/22	12:15-12:40 PM	60/47 F	Moist	SE 5.5 mph	24%	30%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
4/29/22	RED RASP = Red Raspberry	1/2-2″	Just Emerging	Few
4/29/22	Few to no weeds in plot for RED RASP			
4/29/22	B RASP = Black Raspberry	3-4′	Leaf Break	Good
4/29/22	QUGR = Quackgrass	3-6″	Vegetative	Many
4/29/22	WICA = Wild Carrot	1-3″	Vegetative	Many
4/29/22	DAND = Dandelion	1-3″	Vegetative	Moderate
4/29/22	WHCL = White Clover	1-3″	Vegetative	Moderate

Additional Weeds Observed Throughout Season

WICA = Wild Carrot
CATH = Canada Thistle

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 0-100; 0 = no injury, 100 = complete kill.
3. Applied Surflan (3 qt/ac) plus Karmex (3 lb/ac) to black raspberries on April 3, 2022.
4. All the plots had similar level of weed pressure at the timing of June rating that was basically no different than non-treated plots. Therefore, no further ratings were taken.
5. No injury was reported to black raspberry from any tiafenacil application rate. Tiafenacil provided good control of dandelion and very low level of control for wild carrot.
6. Tiafenacil 0.022 to 0.044 has potential to be used in red raspberry as these rates caused less than 10 injuries. Tiafenacil has no activity for wild carrot. Tiafenacil provides some level of control for Canada thistle.

Michigan State University

Performance of Post Herbicides on Red and Black Raspberry for Cane Growth and Weed Control – HTRC – 2022

Trial ID:131-22-2

Protocol ID:131-22-2 Location:Holt, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code								WICA	CATH		WICA
Crop Name							RED RASP			RED RASP	
Rating Date							09 May 2022			13 May 2022	
Rating Type							Rating (%)			Rating (%)	
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weedy						0b	0d	0a	0d	0c
2	DCC-3825	70WDG		0.022	lb ai/a	PO1	10a	55ab	70a	9bcd	21b
	MSO	100SL		1%	v/v	PO1					
3	DCC-3825	70WDG		0.045	lb ai/a	PO1	10a	43ab	78a	13abc	33ab
	MSO	100SL		1%	v/v	PO1					
4	DCC-3825	70WDG		0.067	lb ai/a	PO1	10a	40b	100a	20ab	33ab
	MSO	100SL		1%	v/v	PO1					
5	Treevix	70WG		0.176	lb ai/a	PO1	10a	59a	78a	23a	40a
	MSO	100SL		1%	v/v	PO1					
6	BASF-1	3.13L		0.022	lb ai/a	PO1	11a	23c	58a	4cd	18b
LSD P=.05							1.5	16.3	60.5	12.4	15.0
Standard Deviation							1.0	10.8	40.1	8.2	10.0
CV							11.95	29.69	62.94	73.18	41.61

Pest Code							CATH		WICA	CATH
Crop Name								RED RASP		
Rating Date							13 May 2022	26 May 2022		
Rating Type							Rating (%)	Rating (%)		
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated Weedy						0b	0c	0a	0a
2	DCC-3825	70WDG		0.022	lb ai/a	PO1	75a	3c	0a	50a
	MSO	100SL		1%	v/v	PO1				
3	DCC-3825	70WDG		0.045	lb ai/a	PO1	78a	10c	3a	75a
	MSO	100SL		1%	v/v	PO1				
4	DCC-3825	70WDG		0.067	lb ai/a	PO1	100a	34b	3a	100a
	MSO	100SL		1%	v/v	PO1				
5	Treevix	70WG		0.176	lb ai/a	PO1	100a	48a	0a	75a
	MSO	100SL		1%	v/v	PO1				
6	BASF-1	3.13L		0.022	lb ai/a	PO1	61a	0c	0a	50a
LSD P=.05							48.8	10.5	4.5	71.0
Standard Deviation							32.4	7.0	3.0	47.1
CV							46.96	44.72	357.77	80.81

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
^Calculated from residual.

Performance of Post Herbicides on Red and Black Raspberry for Cane Growth and Weed Control – HTRC – 2022

Pest Code								WICA	DAND		WICA
Crop Name							B RASP			B RASP	
Rating Date							09 May 2022			13 May 2022	
Rating Type							Rating (%)			Rating (%)	
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weedy						0a	0c	0b	0a	0c
2	DCC-3825	70WDG		0.022	lb ai/a	PO1	0a	31ab	68a	1a	24a
	MSO	100SL		1%	v/v	PO1					
3	DCC-3825	70WDG		0.045	lb ai/a	PO1	0a	24b	70a	0a	16ab
	MSO	100SL		1%	v/v	PO1					
4	DCC-3825	70WDG		0.067	lb ai/a	PO1	0a	34ab	89a	1a	26a
	MSO	100SL		1%	v/v	PO1					
5	Treevix	70WG		0.176	lb ai/a	PO1	0a	40a	96a	0a	26a
	MSO	100SL		1%	v/v	PO1					
6	BASF-1	3.13L		0.022	lb ai/a	PO1	0a	10c	15b	0a	5bc
LSD P=.05							.	11.5	32.2	2.2	11.4
Standard Deviation							0.0	7.7	21.4	1.5	7.5
CV							0.0	33.09	37.97	357.77	46.44

Pest Code							DAND		WICA
Crop Name								B RASP	
Rating Date							13 May 2022	26 May 2022	
Rating Type							Rating (%)	Rating (%)	
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Non-Treated Weedy						0b	0a	0a
2	DCC-3825	70WDG		0.022	lb ai/a	PO1	80a	0a	0a
	MSO	100SL		1%	v/v	PO1			
3	DCC-3825	70WDG		0.045	lb ai/a	PO1	63a	0a	0a
	MSO	100SL		1%	v/v	PO1			
4	DCC-3825	70WDG		0.067	lb ai/a	PO1	83a	0a	0a
	MSO	100SL		1%	v/v	PO1			
5	Treevix	70WG		0.176	lb ai/a	PO1	66a	0a	0a
	MSO	100SL		1%	v/v	PO1			
6	BASF-1	3.13L		0.022	lb ai/a	PO1	6b	0a	0a
LSD P=.05							30.9	.	.
Standard Deviation							20.5	0.0	0.0
CV							41.33	0.0	0.0

Performance of Quinclorac on Grape – Year 2 – IR4 – HTRC - 2022

Project Code: 132-22-1 Location: Holt, MI
Block: 37

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Grape Variety: Concord
Planting Method: NA Planting Date: 1967
Harvest Date: 9/16/22 & 9/19/22
Plant Spacing: 7 ft; 4 vines/plot Row Spacing: 10 ft
Plot Size: 6 ft wide x 30 ft long Study Design: RCB Replications: 4

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 Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	6/16/22	11:40 AM-12:30 PM	83/73 F	Moist	WSW 5-7 mph	52%	5%	N
PO2	7/15/22	9:00-9:40 AM	76/65 F	Dry	SE 0-3 mph	32%	40%	N
FALL	9/29/22	12:20-1:00 PM	66/62 F	Moist	NW 1-2 mph	23%	50%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/16/22	Grape	5-6′	Early Fruit Set	Good
6/16/22	PEST = Perennial Sowthistle	12-30″	Vegetative	Many
6/16/22	FIBW = Field Bindweed	10-16″	Vegetative	Many
6/16/22	WICA = Wild Carrot	6-12″	Vegetative	Many
6/16/22	SFGE = Smallflower Geranium	6-18″	Flower	Many
6/16/22	CATH = Canada Thistle	6-24″	Flower	Many
6/16/22	HOWE = Horseweed	6-12″	Vegetative	Moderate
7/15/22	Grape	5-6′	Green Fruit	Good
7/15/22	FIBW	6-10″	Vegetative-Flower	Moderate
7/15/22	CATH	10-24″	Flower	Moderate
7/15/22	PEST	1-2′	Flower	Moderate
9/29/22	Grape	5-6′	All Green leaves; no sign of leaf senescence	Good
9/29/22	Smartweed	6-9″	Flowering	Moderate
9/29/22	FIBW		Veg-dying	Moderate
9/29/22	WICA	4-8″	Vegetative	Moderate
9/29/22	CATH	6-10″	Vegetative	Many
9/29/22	PEST	4-7″	Vegetative	Many
9/29/22	VICR = Virginia Creeper	7-8″	Leaf dying	Moderate

Notes and Comments
1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. On 5/17/22, plots 102, 103, 104, 105, 202, 201 were handweeded along with all untreated plots.
4. Weeds were weed wacked to 6-8″ before PO2 application.
5. One side of untreated plot 101 sprayed with treatment 4 at FALL application.
6. Last week of March, a tank mix of Solicam (3 lb/ac) and Karmex (4 lb/ac) was applied to all study area.

Performance of Quinclorac on Grape - Year 2 - IR4 - HTRC - 2022

Trial ID:132-22-1 Location:Holt, MI Trial Year:2022
Protocol ID:132-22-1 Investigator (Creator):Dr. Sushila Chaudhari
Study Director:Nicole Soldan

Pest Code								YENS	PEST	HOWE
Crop Name						GRAPE	GRAPE			
Rating Date						15Mar2022	22Jun2022	22Jun2022	22Jun2022	22Jun2022
Rating Type						PRUNING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						KG/3VINE	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG,HT	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	3.06a	0c	85a	75a	83a
	Aim	2EC		2fl oz/a		PO1,PO2,FALL					
	COC	100SL		1.25% v/v		PO1,PO2,FALL					
2	QuinStar 4L	3.8L		0.375lb ai/a		PO1,PO2	3.82a	5bc	95a	46a	95a
	COC	100SL		1.25% v/v		PO1,PO2					
3	QuinStar 4L	3.8L		0.75lb ai/a		PO1,PO2	3.51a	11ab	100a	88a	94a
	COC	100SL		1.25% v/v		PO1,PO2					
4	QuinStar 4L	3.8L		0.375lb ai/a		PO1,PO2,FALL	2.42a	14a	100a	65a	100a
	COC	100SL		1.25% v/v		PO1,PO2,FALL					
5	QuinStar 4L	3.8L		0.75lb ai/a		PO1,PO2,FALL	2.88a	14a	100a	78a	100a
	COC	100SL		1.25% v/v		PO1,PO2,FALL					
LSD P=.05							1.748	8.5	22.3	41.0	19.5
Standard Deviation							1.134	5.5	14.5	26.6	12.6
CV							36.17	62.81	15.1	37.87	13.42

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=34,39
^Calculated from residual.

Pest Code							FIBW	WICA	CATH	GRASS	
Crop Name											GRAPE
Rating Date							22Jun2022	22Jun2022	22Jun2022	22Jun2022	05Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weed Free					PO1,PO2,FALL	95a	80a	73a	93a	0c
	Aim	2EC		2fl oz/a		PO1,PO2,FALL					
	COC	100SL		1.25% v/v		PO1,PO2,FALL					
2	QuinStar 4L	3.8L		0.375lb ai/a		PO1,PO2	93a	55a	55a	93a	3c
	COC	100SL		1.25% v/v		PO1,PO2					
3	QuinStar 4L	3.8L		0.75lb ai/a		PO1,PO2	74a	69a	90a	93a	5c
	COC	100SL		1.25% v/v		PO1,PO2					
4	QuinStar 4L	3.8L		0.375lb ai/a		PO1,PO2,FALL	88a	80a	83a	78a	20b
	COC	100SL		1.25% v/v		PO1,PO2,FALL					
5	QuinStar 4L	3.8L		0.75lb ai/a		PO1,PO2,FALL	93a	83a	84a	98a	33a
	COC	100SL		1.25% v/v		PO1,PO2,FALL					
LSD P=.05							15.6	45.2	39.7	32.7	9.0
Standard Deviation							10.1	29.4	25.8	21.2	5.8
CV							11.47	40.07	33.61	23.44	48.71

Performance of Quinclorac on Grape – Year 2 – IR4 – HTRC - 2022

Pest Code						FIBW	PEST	GRASS	YENS	HOWE
Crop Name										
Rating Date						05Jul2022	05Jul2022	05Jul2022	05Jul2022	05Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS	NS	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	43b	50a	75a	85a	85a
	Aim		2EC	2fl oz/a		PO1,PO2,FALL					
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
2	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2	93a	48a	80a	100a	95a
	COC		100SL	1.25% v/v		PO1,PO2					
3	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2	88a	85a	95a	100a	100a
	COC		100SL	1.25% v/v		PO1,PO2					
4	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2,FALL	98a	85a	95a	100a	100a
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
5	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2,FALL	95a	73a	98a	100a	100a
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
LSD P=.05							18.6	42.2	29.2	20.7	20.1
Standard Deviation							12.0	27.4	19.0	13.4	13.0
CV							14.51	40.25	21.44	13.83	13.58

Pest Code						CATH	WICA		FIBW	PEST
Crop Name								GRAPE		
Rating Date						05Jul2022	05Jul2022	21Jul2022	21Jul2022	21Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS	NS	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	75a	65a	5c	98a	80a
	Aim		2EC	2fl oz/a		PO1,PO2,FALL					
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
2	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2	40a	70a	6c	100a	46b
	COC		100SL	1.25% v/v		PO1,PO2					
3	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2	78a	73a	9bc	100a	85a
	COC		100SL	1.25% v/v		PO1,PO2					
4	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2,FALL	53a	78a	16ab	100a	76a
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
5	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2,FALL	78a	95a	23a	100a	79a
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
LSD P=.05							55.4	40.4	9.3	3.4	22.7
Standard Deviation							36.0	26.3	6.0	2.2	14.8
CV							55.74	34.54	51.39	2.25	20.14

Performance of Quinclorac on Grape – Year 2 – IR4 – HTRC - 2022

Pest Code						CATH	WICA	GRASS	HOWE	
Crop Name										GRAPE
Rating Date						21Jul2022	21Jul2022	21Jul2022	21Jul2022	28Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS	NS	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	68a	80a	91a	93a	0d
	Aim		2EC	2fl oz/a		PO1,PO2,FALL					
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
2	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2	73a	83a	100a	88a	6c
	COC		100SL	1.25% v/v		PO1,PO2					
3	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2	85a	83a	93a	95a	9c
	COC		100SL	1.25% v/v		PO1,PO2					
4	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2,FALL	75a	83a	98a	100a	14b
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
5	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2,FALL	85a	95a	93a	100a	23a
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
LSD P=.05							52.5	25.5	19.1	15.8	4.2
Standard Deviation							34.0	16.6	12.4	10.3	2.7
CV							44.22	19.6	13.1	10.83	26.34

Pest Code						PEST	FIBW	CATH	WICA	
Crop Name										GRAPE
Rating Date						28Jul2022	28Jul2022	28Jul2022	28Jul2022	10Augl2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS	NS	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	100a	100a	100a	100a	0c
	Aim		2EC	2fl oz/a		PO1,PO2,FALL					
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
2	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2	75a	100a	78a	88a	8b
	COC		100SL	1.25% v/v		PO1,PO2					
3	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2	86a	100a	85a	83a	10b
	COC		100SL	1.25% v/v		PO1,PO2					
4	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2,FALL	80a	98a	74a	83a	10b
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
5	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2,FALL	88a	100a	85a	83a	15a
	COC		100SL	1.25% v/v		PO1,PO2,FALL					
LSD P=.05							29.4	3.4	37.4	20.4	3.7
Standard Deviation							19.1	2.2	24.3	13.2	2.4
CV							22.28	2.25	28.83	15.21	28.41

Performance of Quinclorac on Grape – Year 2 – IR4 – HTRC - 2022

Pest Code							FIBW	PEST	GRASS	CATH
Crop Name										
Rating Date							10Aug2022	10Aug2022	10Aug2022	10Aug2022
Rating Type							RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	63b	53a	95a	55a
	Aim		2EC	2fl oz/a		PO1,PO2,FALL				
	COC		100SL	1.25% v/v		PO1,PO2,FALL				
2	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2	100a	74a	93a	68a
	COC		100SL	1.25% v/v		PO1,PO2				
3	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2	100a	96a	90a	78a
	COC		100SL	1.25% v/v		PO1,PO2				
4	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2,FALL	100a	71a	100a	73a
	COC		100SL	1.25% v/v		PO1,PO2,FALL				
5	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2,FALL	100a	90a	100a	86a
	COC		100SL	1.25% v/v		PO1,PO2,FALL				
LSD P=.05							15.3	35.8	17.8	42.4
Standard Deviation							9.9	23.3	11.5	26.9
CV							10.72	30.29	12.09	37.46

Pest Code										
Crop Name							GRAPE	GRAPE	GRAPE	GRAPE
Rating Date							16Sep2022	16Sep2022	16Sep2022	16Sep2022
Rating Type							HARVEST	HARVEST	GREEN	GREEN
Rating Unit/Min/Max							NO./3VINE	KG/3VINE	NO./3VINE	KG/3VINE
Assessed By							NS	NS	NS	NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	669a	48.94a	2a	0.15a
	Aim		2EC	2fl oz/a		PO1,PO2,FALL				
	COC		100SL	1.25% v/v		PO1,PO2,FALL				
2	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2	652a	42.94ab	26a	1.73a
	COC		100SL	1.25% v/v		PO1,PO2				
3	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2	613a	38.37ab	31a	1.90a
	COC		100SL	1.25% v/v		PO1,PO2				
4	QuinStar 4L		3.8L	0.375lb ai/a		PO1,PO2,FALL	480ab	33.45bc	15a	1.01a
	COC		100SL	1.25% v/v		PO1,PO2,FALL				
5	QuinStar 4L		3.8L	0.75lb ai/a		PO1,PO2,FALL	341b	21.77c	7a	0.58a
	COC		100SL	1.25% v/v		PO1,PO2,FALL				
LSD P=.05							198.5	14.883	25.5	1.761
Standard Deviation							128.9	9.660	16.5	1.143
CV							23.39	26.04	103.67	106.6

The Impact of Auxin Herbicide Application Timing on Grape Vine Tolerance - SWMREC - 2022

Project Code: 132-22-2 Location: Benton Harbor, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Grape Variety: Niagara
Planting Method: NA Planting Date: 1966
Harvest Date: NA
Plant Spacing: 7′ Row Spacing: 10′
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 6 ft wide x 42 ft long (6 vines/plot)

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 Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
Early Spring	4/23/21	11:00 AM – 12:00 PM	55/46 F	Moist	SW 3-10 mph	36%	5%	N
Summer	6/15/21	1:20-1:50 PM	77/78 F	Dry	NE 1-4 mph	50%	0%	N
Fall	11/4/21	11:00 AM – 12:00 PM	50/45 F	Moist	SW 1.5 mph	57%	20%	N
Early Spring	4/26/22	12:40-1:20 PM	43/46 F	Moist	NW 9-10 mph	64%	98%	N
Summer	7/13/22	10:30-11:11 AM	76/70 F	Dry	SW 4-8 mph	59%	60%	N
Fall	11/1/22	11:30-11:50 AM	60/49 F	Damp	SW 1-4 mph	76%	0%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
4/23/21	Grape	5-6′	Early Bud	Good
6/15/21	Grape	5′	Post-Bloom	Good
6/15/21	EBNS = Eastern Black Nightshade	8-12″	Veg/Flower	Moderate-Many
6/15/21	SFGE = Smallflower Geranium	2-5″	Flower	Moderate
6/15/21	HOWE = Horseweed	3-6″	Vegetative	Moderate
6/15/21	POIV = Poison Ivy	5-8″	Vegetative	Moderate
6/15/21	HAVE = Hairy Vetch	10-12″	Flower	Few
11/4/21	Grape	5-6′	Leaf Senescence	Good
11/4/21	HOWE	1-2″	4-6 LS	Moderate
11/4/21	CEPR = Common Evening Primrose	3-5″	Vegetative	Moderate
11/4/21	Thistle spp.	2-5″	Vegetative	Few
11/4/21	HONE = Horsenettle	8-10″	Fruit	Many
11/3/21	SFGE	.5-2″	Vegetative	Moderate
4/26/22	Grape	5′	Dormant	Good
4/26/22	SFGE	1/2-1″	Vegetative	Many
4/26/22	WHCL = White Clover	1/2-1″	Vegetative	Moderate
4/26/22	Grass	2-4″	Vegetative	Moderate
4/26/22	HOWE	1-2″	Vegetative	Moderate
4/26/22	RESO = Red Sorrel	1/2-1″	Vegetative	Moderate-Many
7/13/22	Grape	5′	Green Fruit	Good
7/13/22	HOWE	2-5′	Vegetative	Many
7/13/22	HONE	8-12″	Veg/Flower	Moderate
7/13/22	RESO	8-10″	Veg/Flower	Moderate

Date	Crop or Weed	Height or	Growth	Density

The Impact of Auxin Herbicide Application Timing on Grape Vine Tolerance - SWMREC - 2022

		Diameter	Stage	
11/1/22	Grape	5-6′	Post-Harvest, Leaf Dying	Good
11/1/22	HONE	6-8″	Dead w/ Fruit	Moderate
11/1/22	HOWE	6-8″	Seeding	Moderate
11/1/22	WHCL	1-2″	Vegetative	Many
11/1/22	CRWS = Creeping Woodsorrel	1-2″	Vegetative	Many
11/1/22	RESO	2-4″	Vegetative	Many
11/1/22	MECW = Mouseear Chickweed	<1″	Vegetative	Many

Additional Weeds Observed Throughout Season

Total BL = Overall weed control of broadleaf spp.
Total WC = Overall weed control of broadleaves, sedges, and grass spp.
CRWS = Creeping Woodsorrel
QUGR = Quackgrass
ANBG = Annual Bluegrass
HABI = Hawkbit
COMW = Common Milkweed
VICR = Virginia Creeper

Notes and Comments

1. Spray applied with 2 nozzle shielded boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO_2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. In general, higher injury was reported from these herbicides when applied in summer as compared to spring or fall. Overall, less than 20% injury reported from these herbicide treatments.

Michigan State University

The Impact of Auxin Herbicide Application Timing on Grape Vine Tolerance - SWMREC - 2022

Trial ID:132-22-2

Protocol ID:132-22-2 Location:Benton Harbor, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code								TOTAL BL		HOWE	SFGE
Crop Name						GRAPE	GRAPE		GRAPE		
Rating Date						15Jun2021	22Jun2021	22Jun2021	30Jun2021	30Jun2021	30Jun2021
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						NS, CG	MH, NS	MH, NS	MH	MH	MH
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated							0a	0c	0b	0d	0e
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	0a	5a	48ab	2b	93abc	100a
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER		0a	58ab	2b	92abc	95ab
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL		0a	0c	0b	0d	0e
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	0a	0a	32b	5a	98ab	58cd
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER		2a	53ab	0b	87c	65a-d
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL		0a	0c	0b	0d	0e
8	Stinger	3L		0.125	lb ai/a	E SPRING	0a	0a	40ab	2b	100a	43d
9	Stinger	3L		0.125	lb ai/a	SUMMER		2a	40ab	7a	92abc	62bcd
10	Stinger	3L		0.125	lb ai/a	LATE FALL		0a	0c	0b	0d	0e
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	0a	0a	68a	0b	88bc	88abc
12	Loyant	0.21L		0.026	lb ai/a	SUMMER		0a	55ab	0b	93abc	83abc
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL		0a	0c	0b	0d	0e
LSD P=.05							.	4.7	28.5	3.3	10.9	35.1
Standard Deviation							0.0	2.8	16.9	2.0	6.5	20.8
CV							0.0	406.03	55.74	152.97	11.31	45.55

Pest Code							TOTAL BL	EBNS		TOTAL WC		CRWS
Crop Name									GRAPE		GRAPE	
Rating Date							30Jun2021	30Jun2021	30Jul2021	30Jul2021	20May2022	20May2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MH	MH	SC	SC	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-Treated						0c	0c	0b	0d	0a	0b
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	62ab	57ab	3b	27bc	0a	98a
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	75a	67a	12b	58a	0a	90a
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	0c	0c	0b	0d	0a	98a
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	65ab	48ab	8b	23bc	7a	90a
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	57ab	50ab	10b	42ab	3a	92a
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	0c	0c	8b	15cd	0a	95a
8	Stinger	3L		0.125	lb ai/a	E SPRING	46b	40b	7b	27bc	0a	97a
9	Stinger	3L		0.125	lb ai/a	SUMMER	59ab	58ab	27a	42ab	0a	98a
10	Stinger	3L		0.125	lb ai/a	LATE FALL	0c	0c	0b	0d	0a	98a
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	73a	62ab	0b	30bc	0a	100a
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	72a	70a	2b	41ab	0a	97a
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	0c	0c	0b	0d	0a	98a
LSD P=.05							23.7	24.6	12.4	22.4	5.8	10.1
Standard Deviation							14.0	14.6	7.3	13.3	3.5	6.0
CV							35.89	41.95	124.61	56.78	449.69	6.78

The Impact of Auxin Herbicide Application Timing on Grape Vine Tolerance - SWMREC - 2022

Pest Code							QUGR	SFGE	ANBG	HABI	HOWE
Crop Name											
Rating Date							20May2022	20May2022	20May2022	20May2022	20May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0c	0d	0e	0d	0d
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	63ab	97a	48abc	97abc	100a
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	72ab	43bcd	48abc	93bc	75abc
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	88a	75ab	83a	100a	83abc
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	75ab	63abc	35b-e	98ab	97a
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	33bc	25cd	55abc	92c	48c
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	83a	7d	32cde	97abc	88ab
8	Stinger	3L		0.125	lb ai/a	E SPRING	72ab	32bcd	68ab	100a	100a
9	Stinger	3L		0.125	lb ai/a	SUMMER	93a	8d	45bcd	98ab	57bc
10	Stinger	3L		0.125	lb ai/a	LATE FALL	95a	37bcd	12de	97abc	82abc
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	87a	100a	38bcd	98ab	100a
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	93a	70abc	30cde	100a	65abc
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	88a	97a	38bcd	100a	97a
LSD P=.05							44.8	45.1	35.6	5.2	39.7
Standard Deviation							26.6	26.7	21.1	3.1	23.6
CV							36.64	53.2	51.5	3.44	30.89

Pest Code							RESO	COMW	VICR		CRWS
Crop Name										GRAPE	
Rating Date							20May2022	20May2022	20May2022	26May2022	26May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0a	0c	0b	0a	33a
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	62a	100a	100a	0a	98a
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	25a	100a	77a	0a	93a
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	67a	100a	63a	0a	93a
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	37a	93b	87a	3a	98a
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	65a	100a	100a	2a	65a
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	67a	98ab	95a	0a	68a
8	Stinger	3L		0.125	lb ai/a	E SPRING	50a	100a	100a	0a	97a
9	Stinger	3L		0.125	lb ai/a	SUMMER	55a	100a	67a	0a	100a
10	Stinger	3L		0.125	lb ai/a	LATE FALL	28a	100a	93a	0a	100a
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	38a	98ab	100a	0a	100a
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	38a	100a	100a	0a	98a
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	30a	100a	100a	0a	100a
LSD P=.05							58.3	5.7	43.8	2.9	45.7
Standard Deviation							34.6	3.4	26.0	1.7	27.1
CV							80.03	3.68	31.26	449.69	30.81

The Impact of Auxin Herbicide Application Timing on Grape Vine Tolerance - SWMREC - 2022

Pest Code							QUGR	SFGE	HABI	HOWE	RESO
Crop Name											
Rating Date							26May2022	26May2022	26May2022	26May2022	26May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0c	0d	0b	0d	0e
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	63b	100a	98a	97a	70a-d
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	85ab	82ab	97a	78ab	33de
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	90a	88a	100a	82ab	82ab
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	93a	67abc	100a	97a	35cde
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	85ab	70abc	97a	70bc	77abc
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	92a	8d	97a	88ab	93a
8	Stinger	3L		0.125	lb ai/a	E SPRING	88ab	33cd	100a	97a	73a-d
9	Stinger	3L		0.125	lb ai/a	SUMMER	93a	58abc	100a	50c	72a-d
10	Stinger	3L		0.125	lb ai/a	LATE FALL	97a	67abc	100a	87ab	50bcd
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	88ab	100a	98a	98a	77abc
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	95a	38bcd	100a	78ab	70a-d
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	93a	100a	100a	93ab	65a-d
LSD P=.05							25.3	46.0	4.2	26.4	42.8
Standard Deviation							15.0	27.3	2.5	15.7	25.4
CV							18.36	43.68	2.72	20.04	41.48

Pest Code							VICR	WHCL	ANBG		HOWE	RESO
Crop Name										GRAPE		
Rating Date							26May2022	26May2022	26May2022	23Jun2022	23Jun2022	23Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-Treated						0b	0d	0d	0a	0e	0a
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	100a	93abc	67ab	0a	97ab	65a
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	93a	82c	75ab	0a	58cd	50a
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	67a	90abc	83a	0a	50cd	80a
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	90a	97ab	90a	7a	100a	33a
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	100a	93abc	88a	0a	43cd	67a
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	93a	88abc	60ab	0a	72abc	90a
8	Stinger	3L		0.125	lb ai/a	E SPRING	100a	98ab	88a	0a	100a	50a
9	Stinger	3L		0.125	lb ai/a	SUMMER	73a	100a	65ab	0a	30de	82a
10	Stinger	3L		0.125	lb ai/a	LATE FALL	95a	88abc	15cd	0a	60bcd	53a
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	100a	90abc	55ab	0a	100a	63a
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	100a	88abc	43bc	0a	73abc	50a
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	100a	87bc	58ab	0a	73abc	45a
LSD P=.05							36.9	12.2	38.2	5.4	37.9	49.8
Standard Deviation							21.9	7.3	22.7	3.2	22.5	29.5
CV							25.6	8.62	37.4	624.5	34.12	52.73

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Pest Code							HONE	SFGE	VICR		
Crop Name										GRAPE	GRAPE SUCKERS
Rating Date							23Jun2022	23Jun2022	23Jun2022	28Jul2022	28Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0b	0b	0c	0a	0c
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	63a	97a	100a	0a	0c
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	80a	92a	100a	0a	73a
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	82a	90a	67b	0a	0c
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	83a	70a	97a	0a	0c
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	72a	60a	100a	0a	3c
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	78a	72a	97a	0a	0c
8	Stinger	3L		0.125	lb ai/a	E SPRING	55a	63a	97a	0a	0c
9	Stinger	3L		0.125	lb ai/a	SUMMER	62a	82a	92ab	2a	17b
10	Stinger	3L		0.125	lb ai/a	LATE FALL	63a	92a	100a	0a	0c
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	55a	100a	100a	0a	0c
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	75a	73a	100a	5a	77a
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	57a	98a	100a	0a	0c
LSD P=.05							29.3	45.0	28.5	4.2	10.3
Standard Deviation							17.4	26.7	16.9	2.5	6.1
CV							27.39	35.11	19.15	481.21	46.76

Pest Code							HOWE	HONE	POIV	TOTAL BL	RESO	
Crop Name												GRAPE
Rating Date							28Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022	09Aug2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-Treated						0d	0d	0b	0e	0c	0a
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	0d	0d	0b	0e	0c	2a
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	72a	65a	0b	68a	92a	2a
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	0d	0d	0b	0e	0c	5a
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	0d	0d	0b	0e	0c	3a
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	22c	5cd	0b	17d	12b	3a
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	0d	0d	0b	0e	0c	3a
8	Stinger	3L		0.125	lb ai/a	E SPRING	0d	0d	0b	0e	0c	2a
9	Stinger	3L		0.125	lb ai/a	SUMMER	48b	13c	0b	32c	9b	8a
10	Stinger	3L		0.125	lb ai/a	LATE FALL	0d	0d	0b	0e	0c	5a
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	0d	0d	0b	0e	0c	0a
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	72a	30b	47a	57b	7bc	3a
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	0d	0d	0b	0e	0c	10a
LSD P=.05							15.3	11.1	13.5	9.5	8.0	10.8
Standard Deviation							9.1	6.6	7.8	5.6	4.7	6.4
CV							55.31	75.87	201.02	42.35	51.64	178.54

The Impact of Auxin Herbicide Application Timing on Grape Vine Tolerance - SWMREC - 2022

Pest Code							HOWE	HONE	RESO	CEPR	COMW
Crop Name											
Rating Date							09Aug2022	09Aug2022	09Aug2022	09Aug2022	09Aug2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0e	0e	0a	0a	0
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	28cde	20cde	28a		
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	70ab	60a	68a		
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	10de	48abc	65a		
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	75a	20cde	13a	55a	
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	22cde	22cde	35a	10a	
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	18cde	42a-d	58a	58a	85
8	Stinger	3L		0.125	lb ai/a	E SPRING	80a	25b-e	57a	30a	
9	Stinger	3L		0.125	lb ai/a	SUMMER	63ab	23cde	90a	10a	
10	Stinger	3L		0.125	lb ai/a	LATE FALL	38bcd	28b-e	32a	13a	
11	Loyant	0.21L		0.026	lb ai/a	E SPRING		18de	63a		
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	50abc	54ab	73a	80a	80
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	0e	20cde	48a	30a	
LSD P=.05							33.8	29.5	51.2	64.8	.
Standard Deviation							19.5	17.5	30.1	28.6	.
CV							51.63	59.62	61.96	90.3	.

Pest Code							TOTAL WC		POIV	HONE	TOTAL BL
Crop Name								GRAPE			
Rating Date							09Aug2022	14Sep2022	14Sep2022	14Sep2022	14Sep2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated						0c	0b	0c	0b	0c
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	27b	0b	0c	0b	0c
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	52a	0b	65a	67a	60a
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	20bc	0b	0c	0b	0c
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	17bc	0b	0c	0b	0c
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	33ab	5b	0c	10b	23b
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	18bc	0b	0c	0b	0c
8	Stinger	3L		0.125	lb ai/a	E SPRING	30ab	7b	0c	23b	23b
9	Stinger	3L		0.125	lb ai/a	SUMMER	37ab	27a		15b	35b
10	Stinger	3L		0.125	lb ai/a	LATE FALL	18bc	0b	0c	0b	0c
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	22bc	2b	0c	0b	0c
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	30ab	0b	28b	63a	63a
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	18bc	0b	0c	0b	0c
LSD P=.05							21.9	9.9	15.6	24.9	21.6
Standard Deviation							13.0	5.9	9.0	14.8	12.8
CV							52.47	191.66	117.16	107.57	81.39

The Impact of Auxin Herbicide Application Timing on Grape Vine Tolerance - SWMREC - 2022

Pest Code							HOWE
Crop Name							
Rating Date							14Sep2022
Rating Type							RATING
Rating Unit/Min/Max							%, 0, 100
Assessed By							MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	
1	Non-Treated						0d
2	Embed Extra	3.8L		1.9	lb ai/a	E SPRING	0d
3	Embed Extra	3.8L		1.9	lb ai/a	SUMMER	90a
4	Embed Extra	3.8L		1.9	lb ai/a	LATE FALL	0d
5	QuinStar 4L	3.8L		0.25	lb ai/a	E SPRING	0d
6	QuinStar 4L	3.8L		0.25	lb ai/a	SUMMER	52bc
7	QuinStar 4L	3.8L		0.25	lb ai/a	LATE FALL	0d
8	Stinger	3L		0.125	lb ai/a	E SPRING	27cd
9	Stinger	3L		0.125	lb ai/a	SUMMER	70ab
10	Stinger	3L		0.125	lb ai/a	LATE FALL	0d
11	Loyant	0.21L		0.026	lb ai/a	E SPRING	0d
12	Loyant	0.21L		0.026	lb ai/a	SUMMER	87a
13	Loyant	0.21L		0.026	lb ai/a	LATE FALL	0d
LSD P=.05							31.5
Standard Deviation							18.7
CV							74.66

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Due to missing data, larger LSD values (col. 49: >=. and <=0.0) are used for mean comparisons of treatment pairs with missing data.
Missing data estimates are included in columns:Yates=43,46; Average=41,45,47,48,52
Could not calculate LSD (% mean diff) for columns 1,49 because error mean square = 0.
^Calculated from residual.

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Project Code: 132-22-3 Location: Benton Harbor, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Grape Variety: Niagara
Planting Method: NA Planting Date: 1996
Harvest Date: NA
Plant Spacing: 7′; 6 vines/plot Row Spacing: 10′
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 5.4 ft wide x 42 ft long

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 Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	6/9/22	11:45-1:25 PM	73/67 F	Moist	SW 1-2 mph	50%	40%	N
PO2	7/7/22	10:45 AM-12:30 PM	88/76 F	Dry	SW 1-2 mph	53%	60%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/9/22	Grape	5′	Vegetative	Good
6/9/22	HOWE = Horseweed	6-8″	Vegetative	Many
6/9/22	SFGE = Small Flower Geranium	3-4″	Vegetative	Many
6/9/22	WHCL = White Clover	3-4″	Veg-Flower	Many
6/9/22	RESO = Red Sorrel	8-12″	Flower	Many
6/9/22	Grasses = Overall grass spp.	8-14″	Vegetative	Many
7/7/22	Grape	5′	Green Fruit	Good
7/7/22	HOWE	4-18″	Vegetative	Many
7/7/22	RESO	4-12″	Fower	Many
7/7/22	HONE = Horsenettle	4-10″	Veg-Flower	Many

Additional Weeds Observed Throughout Season

FLDA = False Dandelion

Notes and Comments

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Overall, very low level of injury reported in grapes (mainly from the spray drift on leaves) from all the herbicides evaluated. Tiafenacil provided higher level of weed and grape sucker control when applied as tank mix with Rely as compared to Aim. Homeplate provided very low level of weed and sucker control regardless of application rate. Tiafenacil rates 0.044 and 0.066 provided similar level of weed and sucker control as Rely 1.03 lb ai/ac which were significantly higher than Aim 0.031 lb ai/ac. Highest level of sucker control was achieved with paraquat 1 lb ai/ac.

Michigan State University

Performance of Post Herbicides on Grape for Sucker and Weed Control - SWMREC - 2022

Trial ID:132-22-3 Location:Benton Harbor, MI Trial Year:2022

Protocol ID:132-22-3 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Pest Code								HOWE	HONE	SFGE
Crop Name						GRAPE	GRAPE SUCKERS			
Rating Date						15Jun2022	15Jun2022	15Jun2022	15Jun2022	15Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated						0a	0g	0h	0f	0e
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	0a	45de	58de	59bc	49cd
	MSO	100SL		1	% v/v	PO1,PO2					
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	0a	58bcd	80bc	64bc	71bc
	MSO	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	0a	64bcd	68cd	61bc	78ab
	MSO	100SL		1	% v/v	PO1,PO2					
5	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2	3a	54cd	90ab	68abc	100a
	MSO	100SL		1	% v/v	PO1,PO2					
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	0a	73abc	96a	88a	100a
	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2					
	MSO	100SL		1	% v/v	PO1,PO2					
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	0a	51d	15gh	24e	42d
	NIS	100SL		0.25	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	0a	78ab	58de	55bcd	50cd
	Aim	2EC		0.031	lb ai/a	PO1,PO2					
	MSO	100SL		1	lb ai/a	PO1,PO2					
9	Homeplate	100L		6	% v/v	PO1,PO2	0a	23f	19g	35de	37d
10	Homeplate	100L		10	% v/v	PO1,PO2	0a	30ef	38f	49cd	58bcd
11	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	0a	88a	48ef	70ab	100a
	COC	100SL		1	% v/v	PO1,PO2					
LSD P=.05							2.2	21.0	15.7	20.9	27.1
Standard Deviation							1.5	14.5	10.9	14.5	18.5
CV							663.33	28.48	21.03	27.93	29.68

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=3,20,42; Average=5,6,7,18
Could not calculate LSD (% mean diff) for columns 10 because error mean square = 0.
^Calculated from residual.

Performance of Post Herbicides on Grape for Sucker and Weed Control - SWMREC - 2022

Pest Code							RESO	FADA	TOTAL BL	GRASSES	
Crop Name											GRAPE
Rating Date							15Jun2022	15Jun2022	15Jun2022	15Jun2022	23Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	CG, NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated						0d	0c	0f	0c	0a
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	25cd	80a	51bcd	31b	0a
	MSO	100SL		1	% v/v	PO1,PO2					
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	43bc	90a	64abc	34b	0a
	MSO	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	55abc	50b	61abc	16bc	0a
	MSO	100SL		1	% v/v	PO1,PO2					
5	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2	64ab		71ab	71a	0a
	MSO	100SL		1	% v/v	PO1,PO2					
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	50bc	90a	81a	71a	0a
	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2					
	MSO	100SL		1	% v/v	PO1,PO2					
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	55abc	10c	33de	0c	0a
	NIS	100SL		0.25	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	40bc	80a	51bcd	15bc	0a
	Aim	2EC		0.031	lb ai/a	PO1,PO2					
	MSO	100SL		1	lb ai/a	PO1,PO2					
9	Homeplate	100L		6	% v/v	PO1,PO2	46bc	5c	28e	8c	0a
10	Homeplate	100L		10	% v/v	PO1,PO2	66ab	0c	44cde	13bc	0a
11	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	87a	10c	73a	80a	0a
	COC	100SL		1	% v/v	PO1,PO2					
LSD P=.05							35.0	19.8	20.1	22.5	.
Standard Deviation							23.7	10.1	13.9	15.6	0.0
CV							49.14	24.25	27.54	50.55	0.0

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
Pest Code								HOWE	HONE	RESO	GRASSES
Crop Name							GRAPE SUCKERS				
Rating Date							23Jun2022	23Jun2022	23Jun2022	23Jun2022	23Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG, NS	CG, NS	CG, NS	CG, NS	CG, NS
1	Untreated						0e	0f	0d	0c	0d
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	23de	64c	60ab	70ab	33bcd
	MSO	100SL		1%	v/v	PO1,PO2					
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	50c	63c	65ab	83ab	40bc
	MSO	100SL		1%	v/v	PO1,PO2					
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	58abc	68bc	51abc	61ab	43bc
	MSO	100SL		1%	v/v	PO1,PO2					
5	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2	53bc	98a	76a	95ab	88a
	MSO	100SL		1%	v/v	PO1,PO2					
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	78ab	95ab	78a	95ab	88a
	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2					
	MSO	100SL		1%	v/v	PO1,PO2					
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	43cd	19ef	46bc	50b	35bcd
	NIS	100SL		0.25%	v/v	PO1,PO2					
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	50c	56cd	60ab	70ab	40bc
	Aim	2EC		0.031	lb ai/a	PO1,PO2					
	MSO	100SL		1	lb ai/a	PO1,PO2					
9	Homeplate	100L		6%	v/v	PO1,PO2	35cd	13f	55abc	51b	63ab
10	Homeplate	100L		10%	v/v	PO1,PO2	38cd	29def	38bc	53b	23cd
11	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	81a	43cde	30c	99a	89a
	COC	100SL		1%	v/v	PO1,PO2					
LSD P=.05							26.8	29.3	29.3	45.4	37.4
Standard Deviation							18.6	20.3	20.3	31.4	25.9
CV							40.37	41.02	39.91	47.63	52.89

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Pest Code							HOWE	RESO	HONE	SFGE
Crop Name						GRAPE SUCKERS				
Rating Date						30Jun2022	30Jun2022	30Jun2022	30Jun2022	30Jun2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated						0d	0d	0d	0f	0c
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	54bc	23bcd	58c	14def	93ab
	MSO	100SL		1%	v/v	PO1,PO2					
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	49c	40b	58c	21bcd	89ab
	MSO	100SL		1%	v/v	PO1,PO2					
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	50c	38b	60bc	19cde	83b
	MSO	100SL		1%	v/v	PO1,PO2					
5	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2	50c	94a	98a	55a	100a
	MSO	100SL		1%	v/v	PO1,PO2					
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	71ab	98a	98a	35b	100a
	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2					
	MSO	100SL		1%	v/v	PO1,PO2					
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	11d	6cd	13d	10def	83b
	NIS	100SL		0.25%	v/v	PO1,PO2					
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	66bc	34b	58c	30bc	85b
	Aim	2EC		0.031	lb ai/a	PO1,PO2					
	MSO	100SL		1	lb ai/a	PO1,PO2					
9	Homeplate	100L		6%	v/v	PO1,PO2	5d	5cd	20d	9def	92ab
10	Homeplate	100L		10%	v/v	PO1,PO2	5d	5cd	34cd	4ef	89ab
11	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	88a	26bc	95ab	20bcd	100a
	COC	100SL		1%	v/v	PO1,PO2					
LSD P=.05							19.5	22.8	35.5	15.5	13.3
Standard Deviation							13.5	15.8	24.1	10.8	9.1
CV							33.16	47.35	44.81	54.7	10.98

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Pest Code								HOWE	HONE	RESO
Crop Name						GRAPE	GRAPE SUCKERS			
Rating Date						17Jul2022	17Jul2022	17Jul2022	17Jul2022	17Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG, RM	CG, RM	CG, RM	CG, RM	CG, RM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated						0d	0e	0d	0d	0c
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	4cd	55cd	84ab	60c	89ab
	MSO	100SL		1	% v/v	PO1,PO2					
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	6abc	78ab	89ab	70abc	100a
	MSO	100SL		1	% v/v	PO1,PO2					
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	9ab	70bc	93ab	66bc	100a
	MSO	100SL		1	% v/v	PO1,PO2					
5	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2	6abc	86ab	100a	100a	100a
	MSO	100SL		1	% v/v	PO1,PO2					
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	10a	88ab	100a	100a	100a
	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2					
	MSO	100SL		1	% v/v	PO1,PO2					
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	3cd	43d	19cd	25d	66ab
	NIS	100SL		0.25	% v/v	PO1,PO2					
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	3cd	88ab	80ab	58c	80ab
	Aim	2EC		0.031	lb ai/a	PO1,PO2					
	MSO	100SL		1	lb ai/a	PO1,PO2					
9	Homeplate	100L		6	% v/v	PO1,PO2	5bc	41d	21cd	65bc	56b
10	Homeplate	100L		10	% v/v	PO1,PO2	5bc	44d	39c	63bc	75ab
11	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	5bc	90a	74b	93ab	100a
	COC	100SL		1	% v/v	PO1,PO2					
LSD P=.05							4.5	19.5	22.8	31.7	36.5
Standard Deviation							3.1	13.5	15.8	22.0	25.2
CV							62.04	21.82	24.93	34.61	32.06

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Pest Code							GRASSES			RESO	HOWE
Crop Name								GRAPE	GRAPE SUCKER		
Rating Date							17Jul2022	19Jul2022	19Jul2022	19Jul2022	19Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG, RM	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated						0e	0d	0d	0c	0e
2	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	61b	8bc	80ab	75ab	63bc
	MSO	100	SL	1	% v/v	PO1,PO2					
3	DCC-3825	70	WDG	0.044	lb ai/a	PO1,PO2	69ab	6bc	85ab	91a	80ab
	MSO	100	SL	1	% v/v	PO1,PO2					
4	DCC-3825	70	WDG	0.066	lb ai/a	PO1,PO2	60b	6bc	81ab	91a	89ab
	MSO	100	SL	1	% v/v	PO1,PO2					
5	Rely 280	2.34	L	1.030	lb ai/a	PO1,PO2	98a	6bc	90ab	100a	100a
	MSO	100	SL	1	% v/v	PO1,PO2					
6	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	100a	14a	76b	100a	100a
	Rely 280	2.34	L	1.030	lb ai/a	PO1,PO2					
	MSO	100	SL	1	% v/v	PO1,PO2					
7	Aim	2	EC	0.031	lb ai/a	PO1,PO2	41bcd	4cd	40c	26c	20de
	NIS	100	SL	0.25	% v/v	PO1,PO2					
8	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	26cde	4cd	53c	75ab	73ab
	Aim	2	EC	0.031	lb ai/a	PO1,PO2					
	MSO	100	SL	1	lb ai/a	PO1,PO2					
9	Homeplate	100	L	6	% v/v	PO1,PO2	55bc	5c	39c	38bc	26de
10	Homeplate	100	L	10	% v/v	PO1,PO2	18de	5c	30c	31c	33cd
11	Gramoxone 3SL	3	SL	1	lb ai/a	PO1,PO2	98a	10ab	100a	100a	64bc
	COC	100	SL	1	% v/v	PO1,PO2					
LSD P=.05							32.1	4.0	23.2	38.6	32.0
Standard Deviation							22.2	2.8	16.1	26.7	22.2
CV							39.09	45.19	26.28	40.42	37.75

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Pest Code							HONE	GRASSES		HOWE	RESO	GRASSES
Crop Name									GRAPE SUCKER			
Rating Date							19Jul2022	19Jul2022	27Jul2022	27Jul2022	27Jul2022	27Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	SC	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated						0f	0d	3e	0d	0f	0d
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	43de	35bc	44c	64b	49bc	53bc
	MSO	100SL		1%	v/v	PO1,PO2						
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	64cd	41bc	69b	63b	55b	59b
	MSO	100SL		1%	v/v	PO1,PO2						
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	83abc	18bcd	69b	68b	58b	41c
	MSO	100SL		1%	v/v	PO1,PO2						
5	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2	98ab	100a	93a	86a	88a	84a
	MSO	100SL		1%	v/v	PO1,PO2						
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	100a	95a	95a	93a	91a	89a
	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2						
	MSO	100SL		1%	v/v	PO1,PO2						
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	19ef	46b	24d	11d	16e	0d
	NIS	100SL		0.25%	v/v	PO1,PO2						
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	69bcd	31bc	49c	40c	39cd	40c
	Aim	2EC		0.031	lb ai/a	PO1,PO2						
	MSO	100SL		1	lb ai/a	PO1,PO2						
9	Homeplate	100L		6%	v/v	PO1,PO2	50d	45b	13de	3d	3f	3d
10	Homeplate	100L		10%	v/v	PO1,PO2	41de	11cd	10de	4d	4f	4d
11	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	81abc	89a	74b	33c	34d	41c
	COC	100SL		1%	v/v	PO1,PO2						
LSD P=.05							30.0	30.8	16.2	15.6	12.4	16.7
Standard Deviation							20.8	21.4	11.2	10.8	8.6	11.6
CV							35.39	45.96	22.79	25.68	21.77	30.85

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Pest Code						TOTAL WC	HONE			HOWE
Crop Name								GRAPE	GRAPE SUCKERS	
Rating Date						27Jul2022	27Jul2022	09Aug2022	09Aug2022	09Aug2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						SC	SC	CG, MHM, NS	CG, MHM, NS	CG, MHM, NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated						0e	0d	0d	0d	0d
2	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	54bc	48bc	5bc	51b	29bcd
	MSO	100SL		1%	v/v	PO1,PO2					
3	DCC-3825	70WDG		0.044	lb ai/a	PO1,PO2	69b	53b	9ab	61b	35bc
	MSO	100SL		1%	v/v	PO1,PO2					
4	DCC-3825	70WDG		0.066	lb ai/a	PO1,PO2	69b	60b	6bc	61b	51b
	MSO	100SL		1%	v/v	PO1,PO2					
5	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2	89a	61b	9ab	74a	100a
	MSO	100SL		1%	v/v	PO1,PO2					
6	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	94a	86a	11a	76a	99a
	Rely 280	2.34L		1.030	lb ai/a	PO1,PO2					
	MSO	100SL		1%	v/v	PO1,PO2					
7	Aim	2EC		0.031	lb ai/a	PO1,PO2	24d	14d	5bc	19c	18cd
	NIS	100SL		0.25%	v/v	PO1,PO2					
8	DCC-3825	70WDG		0.022	lb ai/a	PO1,PO2	51c	35c	6bc	61b	24bcd
	Aim	2EC		0.031	lb ai/a	PO1,PO2					
	MSO	100SL		1	lb ai/a	PO1,PO2					
9	Homeplate	100L		6%	v/v	PO1,PO2	3e	3d	5bc	21c	15cd
10	Homeplate	100L		10%	v/v	PO1,PO2	3e	3d	4cd	18c	8cd
11	Gramoxone 3SL	3SL		1	lb ai/a	PO1,PO2	45c	34c	9ab	79a	53b
	COC	100SL		1%	v/v	PO1,PO2					
LSD P=.05							16.6	15.4	4.9	12.5	30.1
Standard Deviation							11.5	10.6	3.4	8.6	20.8
CV							25.31	29.66	53.76	18.21	53.22

Performance of Post Herbicides on Grape for Sucker and Weed Control – SWMREC - 2022

Pest Code							HONE	GRASSES	TOTAL BL
Crop Name									
Rating Date							09Aug2022	09Aug2022	09Aug2022
Rating Type							RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG, MHM, NS	CG, MHM, NS	CG, MHM, NS
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated						0c	0f	0d
2	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	8c	29b-e	15bcd
	MSO	100	SL	1	% v/v	PO1,PO2			
3	DCC-3825	70	WDG	0.044	lb ai/a	PO1,PO2	10c	45a-d	26b
	MSO	100	SL	1	% v/v	PO1,PO2			
4	DCC-3825	70	WDG	0.066	lb ai/a	PO1,PO2	13c	8ef	29b
	MSO	100	SL	1	% v/v	PO1,PO2			
5	Rely 280	2.34	L	1.030	lb ai/a	PO1,PO2	49a	51ab	60a
	MSO	100	SL	1	% v/v	PO1,PO2			
6	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	34ab	58a	61a
	Rely 280	2.34	L	1.030	lb ai/a	PO1,PO2			
	MSO	100	SL	1	% v/v	PO1,PO2			
7	Aim	2	EC	0.031	lb ai/a	PO1,PO2	0c	25c-f	3cd
	NIS	100	SL	0.25	% v/v	PO1,PO2			
8	DCC-3825	70	WDG	0.022	lb ai/a	PO1,PO2	16bc	25c-f	20bcd
	Aim	2	EC	0.031	lb ai/a	PO1,PO2			
	MSO	100	SL	1	lb ai/a	PO1,PO2			
9	Homeplate	100	L	6	% v/v	PO1,PO2	10c	20def	8bcd
10	Homeplate	100	L	10	% v/v	PO1,PO2	4c	20def	3cd
11	Gramoxone 3SL	3	SL	1	lb ai/a	PO1,PO2	10c	48abc	24bc
	COC	100	SL	1	% v/v	PO1,PO2			
LSD P=.05							17.8	26.2	23.3
Standard Deviation							12.3	18.1	16.1
CV							88.92	60.89	71.63

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in Grapes – HTRC - 2022

Project Code: 132-22-4 Location: Holt, MI
Block: 37/38

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Grape Variety: Concord
Planting Method: Transplanted Planting Date: 1967
Harvest Date: NA
Plant Spacing: 8 ft Row Spacing: 10 ft
Plot Size: 5.3 ft wide x 52 ft long Study Design: RCB Replications: 3

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 Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
Spring	5/11/22	2:30-4:00 PM	83/64 F	Dry	NE 0-2 mph	60%	90%	N
Summer Trt 2-5	7/6/22	3:30-4:30 PM	78/75 F	Moist	SE 1-6 mph	60%	90%	N
Summer Trt 6-7	7/12/22	3:30-4:00 PM	79/80 F	Dry	SW 2-12 mph	50%	75%	N
Fall	10/10/22	2:00-3:15 PM	71/56 F	Dry	NW 0-2 mph	33%	2%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/11/22	Grape	5′	Leaf bud break	Good
5/11/22	DAND = Dandelion	3-5″	Flower	Many
5/11/22	WHCL = White Clover	1-3″	Vegetative	Many
5/11/22	ANBG = Annual Bluegrass	2-4″	Vegetative	Moderate
5/11/22	HOWE = Horseweed	3-5″	Vegetative	Many
5/11/22	WICA = Wild Carrot	2-4″	Vegetative	Moderate
5/11/22	HABC = Hairy Bittercress	3-5″	Flower	Many
5/11/22	PEST = Perennial Sowthistle	2-4″	Vegetative	Moderate
5/11/22	PRKW = Prostrate Knotweed	1-2″	Vegetative	Moderate
7/6/22	Grape	5-6″	Green Fruit	Good
7/6/22	HOWE	6″	Vegetative	Moderate
10/10/22	Grape (start showing leaf senescence due to fall)	5-6′	Post Harvest	Good
10/10/22	DAND	8-10″ Dia	Vegetative	Moderate
10/10/22	HOWE	10-12″	Seeding	Many
10/10/22	FIBW = Field Bindweed	10-12″	Vegetative	Moderate
10/10/22	WICA	10-15″	Seeding	Moderate
10/10/22	GORO = Goldenrod	8-12″	Flowering	Moderate
10/10/22	PEST	8-12″	Flowering	Moderate

Additional Weeds Observed Throughout Season

ANFB = Annual Fleabane
COGR = Common Groundsel
WHCL = White Clover
CUDO = Curly Dock
Grasses = Overall control of grass spp.
Total BL = Overall control of broadleaf spp.
Total WC = Overall control of broadleaves, sedges, and grass spp.
CATH = Canada Thistle

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in Grapes – HTRC - 2022

Notes and Comments

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer for treatments 2-4.

2. Spray applied with 4 nozzle vision guided sprayer attached to an ATV for treatments 5-7. TeeJet TP 40-02, 18.13 gpa, 40.61 PSI, 4.4 mph, CO2 vision guided sprayer. Each nozzle covers 25 cm area.

3. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.

Trt No.*	Treatment Name	Form Conc	Form Type	Rate (lb ai/a)	Appl Timing
1	Non-Treated				
2#	Alion + Gramoxone	1.67 + 2	SC + SL	0.065 + 1	SPRING
	Mission + Rely 280	25 + 2.34	WG + L	0.033+ 0.88	SUMMER
	Prowl H20 + Matrix + Aim	3.8 + 25 + 2	CS + SG + EC	4.5	FALL
3#	Chateau SW + Prowl H20	51 + 3.8	WDG + CS	0.383 + 4.5	SPRING
	Gramoxone 2SL	2	SL	1	SPRING
	Zeus + Aim + Venue	4 + 2 + 0.177	F + EC + SC	0.375+ 0.031 + 0.004	SUMMER
	Matrix + Aim + GoalTender	25 + 2 +4	SG + EC + SC	0.063 + 0.031 + 1.5	FALL
4#	Gramoxone 2SL	2	SL	1	SPRING
	GoalTender	4	SC	1.5	SPRING
	Matrix	25	SG	0.063	SUMMER
	Zeus	4	F	0.375	SUMMER
	Aim	2	EC	0.031	SUMMER
	Karmex	80	DF	4	FALL
	Rely 280	2.34	L	0.88	FALL
	Surflan A.S.	4	L	3	FALL
5**	Alion	1.67	SC	0.065	SPRING
	Gramoxone 2SL	2	SL	1	SPRING
	Mission	25	WG	0.033	SUMMER
	Rely 280	2.34	L	0.88	SUMMER
	Prowl H20	3.8	CS	4.5	FALL
	Matrix	25	SG	0.063	FALL
	Aim	2	EC	0.031	FALL
6**	Chateau SW	51	WDG	0.383	SPRING
	Prowl H20	3.8	CS	4.5	SPRING
	Gramoxone 2SL	2	SL	1	SPRING
	Zeus	4	F	0.375	SUMMER
	Aim	2	EC	0.031	SUMMER
	Venue	0.177	SC	0.004	SUMMER
	Matrix	25	SG	0.063	FALL
	Aim	2	EC	0.031	FALL
	GoalTender	4	SC	1.5	FALL
7**	Gramoxone 2SL	2	SL	1	SPRING
	GoalTender	4	SC	1.5	SPRING
	Matrix	25	SG	0.063	SUMMER
	Zeus	4	F	0.375	SUMMER
	Aim	2	EC	0.031	SUMMER
	Karmex	80	DF	4	FALL
	Rely 280	2.34	L	0.88	FALL
	Surflan A.S.	4	L	3	FALL

* NIS at 0.25% v/v was included in all the treatments at each application timings.

\# Treatments 2, 3, and 4 applied using CO2 Backpack Sprayer.

** Treatments 4, 5, and 6 applied using Vision Guided Sprayer.

Michigan State University

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in Grapes - HTRC - 2022

Trial ID:132-22-4

Protocol ID:132-22-4 Location:Holt, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code		DAND	WICA	ANFB	HOWE	GORO	COGR	GRASSES
Crop Name	GRAPE							
Crop Variety								
Rating Date	18May2022	18May2022	18May2022	18May2022	18May2022	18May2022	18May2022	18May2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0a	0b	0b	0b	0b	0b	0b	0c
2	0a	87a	88a	97a	100a	100a	100a	87b
3	0a	98a	98a	100a	100a	100a	100a	90ab
4	0a	88a	88a	100a	98a	100a	100a	93ab
5	0a	100a	95a	98a	100a	100a	100a	98a
6	0a	100a	97a	98a	100a	70a	100a	97a
7	0a	72a	97a	100a	100a	100a	100a	95ab
LSD P=.05	.	39.5	11.8	5.1	1.9	34.9	.	9.7
Standard Deviation	0.0	22.2	6.7	2.9	1.1	19.6	0.0	5.5
CV	0.0	28.52	8.27	3.36	1.28	24.12	0.0	6.84

Pest Code	WHCL	CUDO		DAND	WICA	ANFB	HOWE	GORO
Crop Name			GRAPE					
Crop Variety								
Rating Date	18May2022	18May2022	25May2022	25May2022	25May2022	25May2022	25May2022	25May2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0c	0b	0a	0b	0c	0b	0b	0b
2	77b	93a	2a	98a	97ab	98a	100a	98a
3	92a	90a	2a	100a	98ab	100a	100a	100a
4	100a	95a	5a	100a	93b	98a	100a	100a
5	92a	92a	2a	100a	97ab	100a	100a	100a
6	90a	98a	2a	100a	97ab	100a	100a	100a
7	95a	93a	3a	100a	100a	100a	100a	100a
LSD P=.05	12.6	12.2	5.4	1.9	6.3	2.9	.	1.9
Standard Deviation	7.1	6.9	3.1	1.1	3.6	1.6	0.0	1.1
CV	9.08	8.55	142.51	1.28	4.29	1.88	0.0	1.28

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Due to missing data, larger LSD values (col. 39: >=. and <=0.0) are used for mean comparisons of treatment pairs with missing data.
Missing data estimates are included in columns:Yates=38,42,61; Average=40,41,60,62,63,65
Could not calculate LSD (% mean diff) for columns 1,7,15,17,21,25,29,36,39,68,69,70,71 because error mean square = 0.
^Calculated from residual.

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in Grapes – HTRC - 2022

Pest Code	COGR	GRASSES	WHCL	CUDO		WICA	ANFB	HOWE
Crop Name					GRAPE			
Crop Variety								
Rating Date	25May2022	25May2022	25May2022	25May2022	06Jun2022	06Jun2022	06Jun2022	06Jun2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0b	0b	0c	0b	0a	0c	0b	0b
2	100a	98a	80b	95a	0a	97ab	90a	97a
3	100a	97a	97a	93a	0a	100a	97a	100a
4	100a	98a	100a	97a	0a	90b	95a	97a
5	100a	100a	95a	97a	0a	95ab	95a	97a
6	100a	98a	97a	100a	0a	97ab	98a	100a
7	100a	98a	100a	95a	0a	100a	97a	100a
LSD P=.05	.	4.5	8.4	8.1	.	7.6	12.9	6.7
Standard Deviation	0.0	2.5	4.7	4.5	0.0	4.2	7.3	3.8
CV	0.0	2.99	5.81	5.51	0.0	5.14	8.9	4.48

Pest Code	DAND	GRASSES	WHCL	CUDO	COGR		HOWE	WICA
Crop Name						GRAPE		
Crop Variety								
Rating Date	06Jun2022	06Jun2022	06Jun2022	06Jun2022	06Jun2022	27Jun2022	27Jun2022	27Jun2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0b	0b	0c	0c	0b	0a	0b	0c
2	100a	92a	58b	90ab	100a	3a	93a	88a
3	100a	92a	87ab	87b	100a	3a	95a	88a
4	100a	97a	93ab	93ab	100a	5a	92a	58b
5	100a	98a	92ab	97ab	100a	5a	97a	97a
6	100a	97a	95a	100a	100a	3a	100a	100a
7	100a	97a	97a	93ab	100a	3a	100a	100a
LSD P=.05	.	8.9	35.5	13.2	.	10.3	14.4	30.0
Standard Deviation	0.0	5.0	19.9	7.4	0.0	5.8	8.1	16.9
CV	0.0	6.1	26.76	9.27	0.0	173.21	9.81	22.19

Pest Code	ANFB	PEST	GRASSES			WICA	HOWE
Crop Name				GRAPE	GRAPE SUCKERS		
Crop Variety					& LOW HANGING VINES		
Rating Date	27Jun2022	27Jun2022	27Jun2022	12Jul2022	12Jul2022	12Jul2022	12Jul2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	MHM	MHM	MHM	MHM
Trt No.							
1	0b	0c	0b	0a	0a	0b	0
2	85a	100a	97a	0a	18a	58a	85
3	95a	92a	88a	0a	28a	40a	
4	92a	58b	88a	0a	25a	42a	
5	93a	95a	100a	0a	38a	49a	40
6	95a	100a	87a				
7	100a	97a	97a				
LSD P=.05	18.4	33.3	20.9	.	29.5	24.3	.
Standard Deviation	10.3	18.7	11.8	0.0	15.7	12.6	.
CV	12.93	24.19	14.79	0.0	71.15	33.29	.

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in Grapes – HTRC - 2022

Pest Code	PEST	FIBW	GRASSES	TOTAL BL	WHCL		HOWE	WICA	PEST
Crop Name						GRAPE			
Crop Variety									
Rating Date	12Jul2022	12Jul2022	12Jul2022	12Jul2022	12Jul2022	21Jul2022	21Jul2022	21Jul2022	21Jul2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	MHM	MHM	MHM	MHM	MHM	CG	CG	CG	CG
Trt No.									
1	0a	0c	0b	0c	0c	0a	0c	0c	0c
2	50a	85b	75a	82a	87a	3a	100a	100a	100a
3	30a	100a	0b	53b	18b	3a	100a	85ab	42b
4	38a	100a	0b	48b	17b	2a	87b	77b	83a
5		95a	60a	80a	78a	3a	100a	100a	100a
6						3a	100a	100a	100a
7						5a	100a	100a	97a
LSD P=.05	47.5	9.5	47.2	23.0	12.1	4.5	8.5	17.8	37.2
Standard Deviation	13.5	3.7	24.4	12.2	6.4	2.5	4.8	10.0	20.9
CV	46.03	4.8	90.51	23.22	16.03	88.19	5.67	12.46	28.02

Pest Code	FIBW	WHCL	GRASSES		HOWE	WICA	PEST	FIBW	GRASSES
Crop Name				GRAPE					
Crop Variety									
Rating Date	21Jul2022	21Jul2022	21Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.									
1	0b	0b	0c	0a	0c	0c	0c	0c	0b
2	97a	100a	98a	0a	100a	100a	97ab	70b	100a
3	100a	80a	80b	2a	100a	78b	60b	100a	60a
4	100a	78a	90ab	2a	82b	87b	68ab	97a	93a
5	98a	100a	100a	2a	100a	100a	93ab	72b	100a
6	100a	78a	90ab	2a	100a	100a	100a	100a	70a
7	100a	97a	93ab	0a	100a	100a	100a	100a	93a
LSD P=.05	4.5	25.5	15.2	4.1	11.8	13.1	38.9	14.6	44.8
Standard Deviation	2.5	14.3	8.6	2.3	6.6	7.3	21.9	8.2	25.2
CV	2.96	18.83	10.87	243.03	7.99	9.1	29.56	10.68	34.12

Pest Code	TOTAL WC		HOWE	WICA	PEST	FIBW	GRASSES	CATH
Crop Name		GRAPE						
Crop Variety								
Rating Date	28Jul2022	10Aug2022	10Aug2022	10Aug2022	10Aug2022	10Aug2022	10Aug2022	10Aug2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0d	0a	0b	0b	0a	0b	0b	0b
2	73a	8a				70a	93a	63a
3	33c	12a		67a	53a	85a	75a	68a
4	43bc	7a	70a	91a	55a	80a	72a	
5	80a	5a			90a	80a	97a	85a
6	63ab	5a				75a	78a	
7	85a	7a	88a			90a	97a	90a
LSD P=.05	23.3	9.9	29.9	34.9	56.7	42.6	28.8	29.1
Standard Deviation	13.1	5.6	2.9	13.4	16.2	21.3	16.2	11.2
CV	24.18	89.87	5.5	25.59	32.72	31.1	22.15	18.39

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in Grapes – HTRC - 2022

Pest Code	TOTAL BL				
Crop Name		TOTAL WEEDS	REMAINING MIXTURE	REMAINING MIXTURE	REMAINING MIXTURE
Crop Variety			AFTER APPLICATION	AFTER APPLICATION	AFTER APPLICATION
Rating Date	10Aug2022	20Oct2022	11May2022	06Jul2022	10Oct2022
Rating Type	RATING	WEED COVER			
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	ML, 0, 3785	ML, 0, 3785	ML, 0, 3785
Assessed By	CG	MHM	NS	HT, CG	SC
Trt No.					
1	0d	100a	.	.	.
2	58bc	23cd	2110	1965	2085
3	40c	65b	2130	2045	1480
4	45c	28cd	2230	2745	2200
5	85a	12d	1490	1770	1770
6	80ab	38c	1450	1250	1390
7	85a	13cd	1490	1320	1890
LSD P=.05	24.6	25.3	.	.	.
Standard Deviation	13.8	14.2	.	.	.
CV	24.64	35.6	.	.	.

Pest Code	
Crop Name	TOTAL REMAINING
Crop Variety	MIXTURE
Rating Date	10Oct2022
Rating Type	
Rating Unit/Min/Max	ML, 0, 11355
Assessed By	
Trt No.	
1	.
2	6160
3	5655
4	7175
5	5030
6	4090
7	4700
LSD P=.05	.
Standard Deviation	.
CV	.

Pome (Apple) Fruit Tolerance to High Rates on DCC-3825 - CRC - 2022

Project Code: 128-22-1 Location: Clarksville, MI
Block: Tier 2

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Apple Variety: Schlet Spur & Red Delicious on M26 Rootstock
Planting Method: Saplings Planting Date: 2007
Harvest Date: NA
Plant Spacing: 6′ Row Spacing: 15′
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 11 ft wide x 30 ft long

Soil Type: Lapeer Sandy Loam OM: 2.4% pH: 6.8
Sand: 43.1% Silt: 33.4% Clay: 23.5% CEC: 7.8

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
POST	5/24/22	2:45-3:50 PM	63/55 F	Moist	E 3-8 mph	32%	70%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/24/22	Apple	9-11′	Post Bloom	Good
5/24/22	WICA = Wild Carrot	4-6″	Vegetative	Many
5/24/22	WHCL = White Clover	2-3″	Vegetative	Many
5/24/22	DAND = Dandelion	2-7″	Veg & Flower	Many

Additional Weeds Observed Throughout Season

CUDO = Curly Dock
BLPL = Broadleaf Plantain
BLDO = Broadleaf Dock
VICR = Virginia Creeper
BLME = Black Medic
Total WC = Overall control of broadleaved, sedges, and grass spp
Grasses = Overall control of grass spp

Notes and Comments

1. Spray applied with 4 nozzle boom. FF80015, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Maintenance application of glyphosate (1.5 qt/ac) + Surflan (3 qt/ac) + GoalTender (1.5 qt/ac) applied on 4/12/2022.

Michigan State University

Pome (Apple) Fruit Tolerance to High Rates on DCC-3825 - CRC - 2022

Trial ID:128-22-1 Location:Clarksville, MI Trial Year:2022

Protocol ID:128-22-1 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Pest Code								DAND	WICA	WHCL	GRASSES
Crop Name							APPLE				
Rating Date							31May2022	31May2022	31May2022	31May2022	31May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100
Assessed By							CG, RM	CG, RM	CG, RM	CG, RM	CG, RM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated						0	0	0	0	0
2	DCC-3825	70WDG		0.033	lb ai/a	POST	10	95	89	100	94
	MSO	100SL		1%	v/v	POST					
3	DCC-3825	70WDG		0.066	lb ai/a	POST	9	99	91	100	93
	MSO	100SL		1%	v/v	POST					
4	DCC-3825	70WDG		0.131	lb ai/a	POST	10	98	93	100	95
	MSO	100SL		1%	v/v	POST					
5	Treevix	70WG		0.044	lb ai/a	POST	5	93	96	95	93
	MSO	100SL		1%	v/v	POST					
6	SL-573	3.33SC		0.036	lb ai/a	POST	1	69	99	89	94
	MSO	100SL		1%	v/v	POST					
7	DCC-3825	70WDG		0.033	lb ai/a	POST	5	94	100	99	96
	SL-573	3.33SC		0.036	lb ai/a	POST					
	MSO	100SL		1%	v/v	POST					
8	Loyant	0.21L		0.018	lb ai/a	POST	0	99	100	91	90
	Embed	3.8L		0.950	lb ai/a	POST					
LSD P=.05							6.9	20.5	10.2	4.5	6.9
Standard Deviation							4.7	14.0	7.0	3.1	4.7
CV							93.22	17.33	8.33	3.64	5.77

Pest Code							CUDO	BLDO		WICA
Crop Name									APPLE	
Rating Date							31May2022	31May2022	10Jun2022	10Jun2022
Rating Type							RATING	RATING	RATING	RATING
Rating Unit/Min/Max							0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100
Assessed By							CG, RM	CG, RM	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated						0	0	0	0
2	DCC-3825	70WDG		0.033	lb ai/a	POST	99	100	9	91
	MSO	100SL		1%	v/v	POST				
3	DCC-3825	70WDG		0.066	lb ai/a	POST	99	98	5	91
	MSO	100SL		1%	v/v	POST				
4	DCC-3825	70WDG		0.131	lb ai/a	POST	100	100	6	93
	MSO	100SL		1%	v/v	POST				
5	Treevix	70WG		0.044	lb ai/a	POST	99	100	1	93
	MSO	100SL		1%	v/v	POST				
6	SL-573	3.33SC		0.036	lb ai/a	POST	95	78	0	98
	MSO	100SL		1%	v/v	POST				
7	DCC-3825	70WDG		0.033	lb ai/a	POST	100	100	5	98
	SL-573	3.33SC		0.036	lb ai/a	POST				
	MSO	100SL		1%	v/v	POST				
8	Loyant	0.21L		0.018	lb ai/a	POST	99	100	0	100
	Embed	3.8L		0.950	lb ai/a	POST				
LSD P=.05							3.8	23.6	7.2	10.2
Standard Deviation							2.6	16.0	4.9	6.9
CV							3.03	18.99	150.21	8.35

Pome (Apple) Fruit Tolerance to High Rates on DCC-3825 - CRC - 2022

Pest Code							DAND	WHCL	CUDO	GRASSES	
Crop Name											APPLE
Rating Date							10Jun2022	10Jun2022	10Jun2022	10Jun2022	15Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated						0	0	0	0	0
2	DCC-3825	70WDG		0.033	lb ai/a	POST	76	99	99	96	3
	MSO	100SL		1%	v/v	POST					
3	DCC-3825	70WDG		0.066	lb ai/a	POST	90	99	95	95	3
	MSO	100SL		1%	v/v	POST					
4	DCC-3825	70WDG		0.131	lb ai/a	POST	88	99	98	95	3
	MSO	100SL		1%	v/v	POST					
5	Treevix	70WG		0.044	lb ai/a	POST	81	91	100	95	0
	MSO	100SL		1%	v/v	POST					
6	SL-573	3.33SC		0.036	lb ai/a	POST	69	86	98	94	0
	MSO	100SL		1%	v/v	POST					
7	DCC-3825	70WDG		0.033	lb ai/a	POST	83	98	100	96	3
	SL-573	3.33SC		0.036	lb ai/a	POST					
	MSO	100SL		1%	v/v	POST					
8	Loyant	0.21L		0.018	lb ai/a	POST	100	89	100	88	0
	Embed	3.8L		0.950	lb ai/a	POST					
LSD P=.05							20.4	8.0	5.2	5.5	2.7
Standard Deviation							13.8	5.5	3.5	3.7	1.8
CV							18.89	6.61	4.09	4.52	144.75

Pest Code							WICA	DAND	WHCL	GRASSES	
Crop Name											APPLE
Rating Date							15Jun2022	15Jun2022	15Jun2022	15Jun2022	05Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated						0	0	0	0	0
2	DCC-3825	70WDG		0.033	lb ai/a	POST	94	91	99	98	0
	MSO	100SL		1%	v/v	POST					
3	DCC-3825	70WDG		0.066	lb ai/a	POST	93	93	99	95	0
	MSO	100SL		1%	v/v	POST					
4	DCC-3825	70WDG		0.131	lb ai/a	POST	91	93	99	94	0
	MSO	100SL		1%	v/v	POST					
5	Treevix	70WG		0.044	lb ai/a	POST	95	86	94	94	0
	MSO	100SL		1%	v/v	POST					
6	SL-573	3.33SC		0.036	lb ai/a	POST	98	66	89	98	0
	MSO	100SL		1%	v/v	POST					
7	DCC-3825	70WDG		0.033	lb ai/a	POST	96	86	100	95	0
	SL-573	3.33SC		0.036	lb ai/a	POST					
	MSO	100SL		1%	v/v	POST					
8	Loyant	0.21L		0.018	lb ai/a	POST	100	98	90	91	0
	Embed	3.8L		0.950	lb ai/a	POST					
LSD P=.05							9.9	24.6	5.7	3.7	.
Standard Deviation							6.7	16.8	3.9	2.5	0.0
CV							8.09	21.89	4.64	3.06	0.0

Pome (Apple) Fruit Tolerance to High Rates on DCC-3825 - CRC - 2022

Pest Code							WICA	DAND	GRASSES	VICR		TOTAL WC
Crop Name											APPLE	
Rating Date							05Jul2022	05Jul2022	05Jul2022	05Jul2022	14Jul2022	14Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	0-100, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated						0	0	0	0	0	0
2	DCC-3825	70WDG		0.033	lb ai/a	POST	89	78	95	98	0	65
	MSO	100SL		1%	v/v	POST						
3	DCC-3825	70WDG		0.066	lb ai/a	POST	76	80	91	100	0	69
	MSO	100SL		1%	v/v	POST						
4	DCC-3825	70WDG		0.131	lb ai/a	POST	80	83	93	59	0	70
	MSO	100SL		1%	v/v	POST						
5	Treevix	70WG		0.044	lb ai/a	POST	93	69	90	100	0	67
	MSO	100SL		1%	v/v	POST						
6	SL-573	3.33SC		0.036	lb ai/a	POST	100	48	90	95	0	65
	MSO	100SL		1%	v/v	POST						
7	DCC-3825	70WDG		0.033	lb ai/a	POST	93	50	94	69	0	77
	SL-573	3.33SC		0.036	lb ai/a	POST						
	MSO	100SL		1%	v/v	POST						
8	Loyant	0.21L		0.018	lb ai/a	POST	100	98	83	100	0	89
	Embed	3.8L		0.950	lb ai/a	POST						
LSD P=.05							27.7	25.0	11.1	35.1	.	20.7
Standard Deviation							18.9	17.0	7.6	23.9	0.0	14.1
CV							23.94	26.99	9.55	30.84	0.0	22.47

Pest Code								TOTAL WC	WICA	DAND	WHCL	BLME
Crop Name							APPLE					
Rating Date							14Jul2022	14Jul2022	14Jul2022	14Jul2022	14Jul2022	14Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							SC	SC	SC	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated						0	0	0	0	0	0
2	DCC-3825	70WDG		0.033	lb ai/a	POST	0	65	0	70	64	59
	MSO	100SL		1%	v/v	POST						
3	DCC-3825	70WDG		0.066	lb ai/a	POST	0	69	0	81	71	58
	MSO	100SL		1%	v/v	POST						
4	DCC-3825	70WDG		0.131	lb ai/a	POST	0	70	0	74	75	60
	MSO	100SL		1%	v/v	POST						
5	Treevix	70WG		0.044	lb ai/a	POST	0	67	36	69	56	68
	MSO	100SL		1%	v/v	POST						
6	SL-573	3.33SC		0.036	lb ai/a	POST	0	65	70	72	58	51
	MSO	100SL		1%	v/v	POST						
7	DCC-3825	70WDG		0.033	lb ai/a	POST	0	77	.	81	75	51
	SL-573	3.33SC		0.036	lb ai/a	POST						
	MSO	100SL		1%	v/v	POST						
8	Loyant	0.21L		0.018	lb ai/a	POST	0	89	.	91	23	80
	Embed	3.8L		0.950	lb ai/a	POST						
LSD P=.05							.	20.7	20.5	15.1	14.5	20.4
Standard Deviation							0.0	14.1	9.0	10.3	9.9	13.8
CV							0.0	22.47	51.36	15.26	18.72	25.98

Efficacy of Crop Tolerance of SL-573 in Tree Nuts and Pome Fruit (Apple) - HTRC - 2022

Project Code: 128-22-5 | Location: Holt, MI
Block: 160

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Apple | Variety: Auvil Early Fuji, Pacific Gala, Honeycrisp, LuckyJon, Spartan
Planting Method: Sapling | Planting Date: 2006
Harvest Date: NA
Plant Spacing: 12 ft | Row Spacing: 18 ft
Tillage Type: NA | Study Design: RCB | Replications: 4
Plot Size: 11 ft wide x 50 ft long (4 trees/plot)

Soil Type: Marlette Fine Sandy Loam | OM: 2.4% | pH: 6.8
Sand: 45.2% | Silt: 27.6% | Clay: 27.2% | CEC: 8.4

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
POST	6/17/22	10:15-11:00 AM	75/NA F	Damp	NE 4-6 mph	45%	0%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/17/22	Apple	7-8 ft	Vegetative	Good
	Horseweed	10-12″	veg	few
	Wild carrot	4 to 8″	veg	moderate
	Field bindweed	2 to 10″	veg	moderate

Additional Weeds Observed Throughout Season

HOWE = Horseweed
WICA = Wild Carrot
FIBW = Field Bindweed
Grass = Overall control of grass spp.
Total WC = Overall control of broadleaves, sedges, and grass spp

Notes and Comments

1. Spray applied with 4 nozzle boom. FF110015, 15 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. No other herbicide maintenance applications were made in spring 2022.
4. Some injury symptoms (distorted leaves, yellowing, and some necrosis) were reported on the suckers, but these symptoms were also reported on non-treated control plots as well. Therefore, it concluded that this injury could be a plant response from other biotic or abiotic factors rather than herbicide. Overall, no negative impact was reported from any herbicide treatments on apples.
5. Injury symptoms on weeds were reported as chlorosis or whitening of leaves followed by necrosis.

Michigan State University

Efficacy of Crop Tolerance of SL-573 in Tree Nuts and Pome Fruit (Apple) - HTRC - 2022

Trial ID:128-22-5 Location:Holt, MI Trial Year:2022

Protocol ID:128-22-5 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Pest Code								HOWE	WICA	GRASS	FIBW	
Crop Name							APPLE					APPLE
Rating Date							27Jun2022	27Jun2022	27Jun2022	27Jun2022	27Jun2022	15Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated						0a	0c	0c	0b	0c	0a
2	SL-573	3.33SC		0.027	lb ai/a	POST	0a	100a	78a	95a	69b	0a
	MSO	100SL		0.5	% v/v	POST						
3	SL-573	3.33SC		0.036	lb ai/a	POST	0a	94ab	55b	85a	78ab	0a
	MSO	100SL		0.5	% v/v	POST						
4	SL-573	3.33SC		0.053	lb ai/a	POST	0a	88b	79a	90a	66b	0a
	MSO	100SL		0.5	% v/v	POST						
5	SL-573	3.33SC		0.071	lb ai/a	POST	0a	100a	88a	93a	88ab	0a
	MSO	100SL		0.5	% v/v	POST						
6	SL-573	3.33SC		0.027	lb ai/a	POST	1a	98ab	93a	95a	94a	0a
	Rely 280	2.34L		0.508	lb ai/a	POST						
	MSO	100SL		0.5	% v/v	POST						
7	SL-573	3.33SC		0.036	lb ai/a	POST	1a	100a	95a	90a	96a	0a
	Rely 280	2.34L		0.508	lb ai/a	POST						
	MSO	100SL		0.5	% v/v	POST						
LSD P=.05							2.0	11.3	21.4	14.5	23.8	.
Standard Deviation							1.4	7.6	14.4	9.7	16.1	0.0
CV							384.42	9.21	20.77	12.45	22.93	0.0

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 6,12 because error mean square = 0.
^Calculated from residual.

Efficacy of Crop Tolerance of SL-573 in Tree Nuts and Pome Fruit (Apple) - HTRC - 2022

Pest Code								TOTAL WC	FIBW	HOWE	WICA	APPLE
Crop Name							APPLE SUCKERS					
Rating Date							15Jul2022	15Jul2022	15Jul2022	15Jul2022	15Jul2022	12Aug2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							SC	SC	SC	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Untreated						33a	45a	33c	29c	23c	0a
2	SL-573	3.33SC		0.027lb ai/a		POST	30a	61a	45bc	40c	43bc	0a
	MSO	100SL		0.5% v/v		POST						
3	SL-573	3.33SC		0.036lb ai/a		POST	35a	70a	70ab	50bc	50ab	0a
	MSO	100SL		0.5% v/v		POST						
4	SL-573	3.33SC		0.053lb ai/a		POST	44a	78a	68ab	49bc	59ab	0a
	MSO	100SL		0.5% v/v		POST						
5	SL-573	3.33SC		0.071lb ai/a		POST	40a	90a	80a	66ab	68a	0a
	MSO	100SL		0.5% v/v		POST						
6	SL-573	3.33SC		0.027lb ai/a		POST	50a	86a	75a	70ab	69a	0a
	Rely 280	2.34L		0.508lb ai/a		POST						
	MSO	100SL		0.5% v/v		POST						
7	SL-573	3.33SC		0.036lb ai/a		POST	49a	93a	88a	78a	73a	0a
	Rely 280	2.34L		0.508lb ai/a		POST						
	MSO	100SL		0.5% v/v		POST						
LSD P=.05							17.1	31.8	27.3	24.5	24.0	.
Standard Deviation							11.5	21.4	18.4	16.5	16.2	0.0
CV							28.77	28.69	28.17	30.32	29.66	0.0

Pest Code								TOTAL WC	FIBW	HOWE	WICA
Crop Name							APPLE SUCKERS				
Rating Date							12Aug2022	12Aug2022	12Aug2022	12Aug2022	12Aug2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							SC	SC	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated						20a	40c	28c	26a	14d
2	SL-573	3.33SC		0.027lb ai/a		POST	21a	54bc	38bc	46a	28cd
	MSO	100SL		0.5% v/v		POST					
3	SL-573	3.33SC		0.036lb ai/a		POST	24a	61abc	56ab	36a	31bcd
	MSO	100SL		0.5% v/v		POST					
4	SL-573	3.33SC		0.053lb ai/a		POST	24a	71ab	56ab	43a	46abc
	MSO	100SL		0.5% v/v		POST					
5	SL-573	3.33SC		0.071lb ai/a		POST	23a	82ab	70a	55a	53a
	MSO	100SL		0.5% v/v		POST					
6	SL-573	3.33SC		0.027lb ai/a		POST	25a	78ab	60ab	64a	49ab
	Rely 280	2.34L		0.508lb ai/a		POST					
	MSO	100SL		0.5% v/v		POST					
7	SL-573	3.33SC		0.036lb ai/a		POST	30a	86a	75a	65a	58a
	Rely 280	2.34L		0.508lb ai/a		POST					
	MSO	100SL		0.5% v/v		POST					
LSD P=.05							10.2	29.6	28.0	31.7	19.5
Standard Deviation							6.9	19.9	18.8	21.3	13.1
CV							28.99	29.49	34.46	44.56	33.1

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Project Code: 128-22-6 | Location: Holt, MI
Block: 154 & 160

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Apple | Variety: Auvil Early Fruit, Pacific Gala, Honeycrisp, LuckyJon, Spartan
Planting Method: Saplings | Planting Date: 2006
Harvest Date: NA
Plant Spacing: 12 ft | Row Spacing: 18 ft
Tillage Type: NA | Study Design: RCB | Replications: 3
Plot Size: 11 ft wide x 50 ft long (4 trees/plot)

Soil Type: Marlette Fine Sandy Loam | OM: 2.4% | pH: 6.8
Sand: 45.2% | Silt: 27.6% | Clay: 27.2% | CEC: 8.4

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
Early Spring	5/4/22	11:00 AM - 12:00 PM	48/50 F	Saturated	NE 1-4 mph	86%	100%	N
Late Spring	5/24/22	11:50 AM - 12:40 PM	62/57 F	Moist	0-3 mph	32%	5%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/4/22	Apple	6-7′	Budding	Good
5/4/22	WICA = Wild Carrot	2-3″ dia	Vegetative	Few
5/4/22	COCW = Common Chickweed	1″	Vegetative	Few
5/24/22	Apple	7-8′	Post-Bloom	Good
5/24/22	HOWE = Horseweed	4-5″	Vegetative	Few
5/24/22	COCW	6-12″ dia	Flower	Moderate
5/24/22	WICA	4-5″	Vegetative	Few
5/24/22	ANBG = Annual Bluegrass	2-3″	Flower	Few

Additional Weeds Observed Throughout Season

PRKW = Prostrate Knotweed
GRASS = Overall control of grass spp.
TOTAL BL = Overall control of broadleaf spp.

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 0-100; 0 = no injury, 100 = complete kill.
3. No other herbicide maintenance applications were made in spring 2022.
4. Very few weeds in plots at time of early spring application.
5. At first rating (7 days after application), all the plots had similar level of control which was more than 95% (therefore, it is not included in the report).
6. Overall, weed control was reported better from spring application as compared to early spring application. No crop injury was reported from either application timings from any treatments.

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Trial ID:128-22-6

Protocol ID:128-22-6 Location:Holt, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code							HOWE	WICA	PRKW		WICA
Crop Name						APPLE				APPLE	
Rating Date						20May2022	20May2022	20May2022	20May2022	31May2022	31May2022
Rating Type						RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated					E SPRING	0a	0c	0c	0c	0a	0d
2	BAS 100102H	1.72SC		0.901	lb ai/a	E SPRING	2a	100a	100a	100a	0a	90abc
	Bronc (AMS)	38L		1%	v/v	E SPRING						
3	BAS 100102H	1.72SC		1.048	lb ai/a	E SPRING	0a	100a	100a	100a	0a	87bc
	Bronc (AMS)	38L		1%	v/v	E SPRING						
4	BAS 100102H	1.72SC		1.316	lb ai/a	E SPRING	0a	100a	97a	100a	0a	92abc
	Bronc (AMS)	38L		1%	v/v	E SPRING						
5	BAS 100102H	1.72SC		1.541	lb ai/a	E SPRING	0a	100a	97a	100a	0a	93abc
	Bronc (AMS)	38L		1%	v/v	E SPRING						
6	Rely 280	2.34L		1.029	lb ai/a	E SPRING	0a	67b	67b	67b	3a	100a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
7	Cheetah	2.34SL		1.023	lb ai/a	E SPRING	0a	100a	97a	100a	0a	83c
	Bronc (AMS)	38L		1%	v/v	E SPRING						
8	Non-Treated					SPRING	0a	0c	0c	0c	0a	0d
9	BAS 100102H	1.72SC		0.901	lb ai/a	SPRING	0a	0c	0c	0c	2a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING						
10	BAS 100102H	1.72SC		1.048	lb ai/a	SPRING	0a	0c	0c	0c	5a	93abc
	Bronc (AMS)	38L		1%	v/v	SPRING						
11	BAS 100102H	1.72SC		1.316	lb ai/a	SPRING	0a	0c	0c	0c	3a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING						
12	BAS 100102H	1.72SC		1.541	lb ai/a	SPRING	0a	0c	0c	0c	2a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING						
13	Rely 280	2.34L		1.285	lb ai/a	SPRING	0a	0c	0c	0c	5a	95ab
	Bronc (AMS)	38L		1%	v/v	SPRING						
14	Cheetah	2.34SL		1.276	lb ai/a	SPRING	0a	0c	0c	0c	2a	88bc
	Bronc (AMS)	38L		1%	v/v	SPRING						
LSD P=.05							1.3	25.9	26.6	25.9	5.0	10.6
Standard Deviation							0.8	15.4	15.8	15.4	3.0	6.3
CV							648.07	38.12	39.82	38.12	191.58	7.9

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 8,11,22,26 because error mean square = 0.
^Calculated from residual.

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Pest Code							COCW	HOWE	ANBG		HOWE
Crop Name										APPLE SUCKER	
Rating Date							31May2022	31May2022	31May2022	08Jun2022	08Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated					E SPRING	0b	0b	0c	0b	0b
2	BAS 100102H	1.72SC		0.901	lb ai/a	E SPRING	93a	100a	90ab	0b	100a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
3	BAS 100102H	1.72SC		1.048	lb ai/a	E SPRING	100a	100a	100a	0b	100a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
4	BAS 100102H	1.72SC		1.316	lb ai/a	E SPRING	100a	100a	88b	2b	100a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
5	BAS 100102H	1.72SC		1.541	lb ai/a	E SPRING	97a	100a	100a	0b	100a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
6	Rely 280	2.34L		1.029	lb ai/a	E SPRING	100a	100a	100a	13b	100a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
7	Cheetah	2.34SL		1.023	lb ai/a	E SPRING	100a	100a	100a	3b	100a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
8	Non-Treated					SPRING	0b	0b	0c	0b	0b
9	BAS 100102H	1.72SC		0.901	lb ai/a	SPRING	93a	100a	97ab	60a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING					
10	BAS 100102H	1.72SC		1.048	lb ai/a	SPRING	95a	100a	97ab	62a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING					
11	BAS 100102H	1.72SC		1.316	lb ai/a	SPRING	97a	100a	97ab	73a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING					
12	BAS 100102H	1.72SC		1.541	lb ai/a	SPRING	100a	100a	93ab	57a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING					
13	Rely 280	2.34L		1.285	lb ai/a	SPRING	100a	100a	100a	72a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING					
14	Cheetah	2.34SL		1.276	lb ai/a	SPRING	100a	100a	100a	50a	100a
	Bronc (AMS)	38L		1%	v/v	SPRING					
LSD P=.05							8.7	.	10.3	28.6	.
Standard Deviation							5.2	0.0	6.1	17.0	0.0
CV							6.21	0.0	7.38	60.93	0.0

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Pest Code							WICA	PRKW	GRASS		
Crop Name										APPLE	APPLE SUCKER
Rating Date							08Jun2022	08Jun2022	08Jun2022	16Jun2022	16Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated					E SPRING	0c	0b	0d	0a	0a
2	BAS 100102H	1.72SC		0.901	lb ai/a	E SPRING	92ab	97a	62c	0a	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
3	BAS 100102H	1.72SC		1.048	lb ai/a	E SPRING	97ab	100a	95a	0a	2a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
4	BAS 100102H	1.72SC		1.316	lb ai/a	E SPRING	92ab	90a	67bc	0a	2a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
5	BAS 100102H	1.72SC		1.541	lb ai/a	E SPRING	97ab	100a	93a	0a	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
6	Rely 280	2.34L		1.029	lb ai/a	E SPRING	100a	100a	100a	3a	5a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
7	Cheetah	2.34SL		1.023	lb ai/a	E SPRING	88b	90a	82abc	0a	2a
	Bronc (AMS)	38L		1%	v/v	E SPRING					
8	Non-Treated					SPRING	0c	0b	0d	0a	0a
9	BAS 100102H	1.72SC		0.901	lb ai/a	SPRING	97ab	100a	100a	2a	3a
	Bronc (AMS)	38L		1%	v/v	SPRING					
10	BAS 100102H	1.72SC		1.048	lb ai/a	SPRING	100a	100a	82abc	0a	3a
	Bronc (AMS)	38L		1%	v/v	SPRING					
11	BAS 100102H	1.72SC		1.316	lb ai/a	SPRING	100a	100a	95a	3a	7a
	Bronc (AMS)	38L		1%	v/v	SPRING					
12	BAS 100102H	1.72SC		1.541	lb ai/a	SPRING	100a	100a	92ab	2a	3a
	Bronc (AMS)	38L		1%	v/v	SPRING					
13	Rely 280	2.34L		1.285	lb ai/a	SPRING	100a	100a	100a	1a	7a
	Bronc (AMS)	38L		1%	v/v	SPRING					
14	Cheetah	2.34SL		1.276	lb ai/a	SPRING	97ab	100a	95a	2a	0a
	Bronc (AMS)	38L		1%	v/v	SPRING					
LSD P=.05							9.3	11.0	25.1	3.8	6.5
Standard Deviation							5.5	6.6	15.0	2.3	3.9
CV							6.68	7.81	19.75	258.75	159.11

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Pest Code							HOWE	WICA	COCW	GRASS	TOTAL BL	
Crop Name												APPLE
Rating Date							16Jun2022	16Jun2022	16Jun2022	16Jun2022	16Jun2022	27Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-Treated					E SPRING	0c	0d	0c	0d	0c	0a
2	BAS 100102H	1.72SC		0.901	lb ai/a	E SPRING	100a	92abc	100a	70bc	92ab	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
3	BAS 100102H	1.72SC		1.048	lb ai/a	E SPRING	100a	90abc	100a	93a	95ab	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
4	BAS 100102H	1.72SC		1.316	lb ai/a	E SPRING	100a	88bc	100a	75abc	88b	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
5	BAS 100102H	1.72SC		1.541	lb ai/a	E SPRING	100a	93abc	97ab	90ab	95ab	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
6	Rely 280	2.34L		1.029	lb ai/a	E SPRING	100a	97ab	100a	77abc	93ab	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
7	Cheetah	2.34SL		1.023	lb ai/a	E SPRING	95b	85c	93b	57c	92ab	0a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
8	Non-Treated					SPRING	0c	0d	0c	0d	0c	0a
9	BAS 100102H	1.72SC		0.901	lb ai/a	SPRING	100a	90abc	100a	93a	92ab	0a
	Bronc (AMS)	38L		1%	v/v	SPRING						
10	BAS 100102H	1.72SC		1.048	lb ai/a	SPRING	100a	98ab	100a	92ab	95ab	0a
	Bronc (AMS)	38L		1%	v/v	SPRING						
11	BAS 100102H	1.72SC		1.316	lb ai/a	SPRING	100a	100a	97ab	97a	97ab	0a
	Bronc (AMS)	38L		1%	v/v	SPRING						
12	BAS 100102H	1.72SC		1.541	lb ai/a	SPRING	100a	98ab	100a	95a	98a	0a
	Bronc (AMS)	38L		1%	v/v	SPRING						
13	Rely 280	2.34L		1.285	lb ai/a	SPRING	100a	97ab	100a	88ab	95ab	0a
	Bronc (AMS)	38L		1%	v/v	SPRING						
14	Cheetah	2.34SL		1.276	lb ai/a	SPRING	100a	92abc	100a	93a	95ab	0a
	Bronc (AMS)	38L		1%	v/v	SPRING						
LSD P=.05							3.9	10.3	4.6	23.0	9.7	.
Standard Deviation							2.3	6.1	2.7	13.7	5.8	0.0
CV							2.71	7.67	3.23	18.84	7.15	0.0

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Pest Code							HOWE	WICA	GRASS		TOTAL WC	GRASS
Crop Name										APPLE		
Rating Date							27Jun2022	27Jun2022	27Jun2022	14Jul2022	14Jul2022	14Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing						
1	Non-Treated					E SPRING	0c	0d	0d	0a	0d	0e
2	BAS 100102H	1.72SC		0.901	lb ai/a	E SPRING	82b	88ab	33bcd	0a	78ab	78abc
	Bronc (AMS)	38L		1%	v/v	E SPRING						
3	BAS 100102H	1.72SC		1.048	lb ai/a	E SPRING	100a	87ab	97a	0a	92a	90a
	Bronc (AMS)	38L		1%	v/v	E SPRING						
4	BAS 100102H	1.72SC		1.316	lb ai/a	E SPRING	93a	87ab	58abc	0a	76ab	77abc
	Bronc (AMS)	38L		1%	v/v	E SPRING						
5	BAS 100102H	1.72SC		1.541	lb ai/a	E SPRING	97a	90ab	75ab	0a	82ab	82ab
	Bronc (AMS)	38L		1%	v/v	E SPRING						
6	Rely 280	2.34L		1.029	lb ai/a	E SPRING	100a	93ab	62abc	0a	68ab	53bc
	Bronc (AMS)	38L		1%	v/v	E SPRING						
7	Cheetah	2.34SL		1.023	lb ai/a	E SPRING	100a	65c	25cd	0a	32c	17de
	Bronc (AMS)	38L		1%	v/v	E SPRING						
8	Non-Treated					SPRING	0c	0d	0d	0a	0d	0e
9	BAS 100102H	1.72SC		0.901	lb ai/a	SPRING	100a	85ab	88a	0a	76ab	78abc
	Bronc (AMS)	38L		1%	v/v	SPRING						
10	BAS 100102H	1.72SC		1.048	lb ai/a	SPRING	100a	92ab	63abc	0a	73ab	70abc
	Bronc (AMS)	38L		1%	v/v	SPRING						
11	BAS 100102H	1.72SC		1.316	lb ai/a	SPRING	100a	100a	73ab	0a	93a	87ab
	Bronc (AMS)	38L		1%	v/v	SPRING						
12	BAS 100102H	1.72SC		1.541	lb ai/a	SPRING	100a	95ab	82a	0a	90a	87ab
	Bronc (AMS)	38L		1%	v/v	SPRING						
13	Rely 280	2.34L		1.285	lb ai/a	SPRING	100a	97ab	85a	0a	91a	85ab
	Bronc (AMS)	38L		1%	v/v	SPRING						
14	Cheetah	2.34SL		1.276	lb ai/a	SPRING	100a	82bc	75ab	0a	60b	45cd
	Bronc (AMS)	38L		1%	v/v	SPRING						
LSD P=.05							9.5	18.1	46.2	.	26.8	33.9
Standard Deviation							5.7	10.8	27.5	0.0	16.0	20.2
CV							6.8	14.24	47.19	0.0	24.55	33.38

Weed Control Efficacy and Crop Tolerance of BAS100102H in Apple - HTRC - 2022

Pest Code							WICA
Crop Name							
Rating Date							14Jul2022
Rating Type							RATING
Rating Unit/Min/Max							%, 0, 100
Assessed By							SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	
1	Non-Treated					E SPRING	0e
2	BAS 100102H	1.72SC		0.901	lb ai/a	E SPRING	67abc
	Bronc (AMS)	38L		1%	v/v	E SPRING	
3	BAS 100102H	1.72SC		1.048	lb ai/a	E SPRING	83ab
	Bronc (AMS)	38L		1%	v/v	E SPRING	
4	BAS 100102H	1.72SC		1.316	lb ai/a	E SPRING	72ab
	Bronc (AMS)	38L		1%	v/v	E SPRING	
5	BAS 100102H	1.72SC		1.541	lb ai/a	E SPRING	82ab
	Bronc (AMS)	38L		1%	v/v	E SPRING	
6	Rely 280	2.34L		1.029	lb ai/a	E SPRING	57bc
	Bronc (AMS)	38L		1%	v/v	E SPRING	
7	Cheetah	2.34SL		1.023	lb ai/a	E SPRING	23de
	Bronc (AMS)	38L		1%	v/v	E SPRING	
8	Non-Treated					SPRING	0e
9	BAS 100102H	1.72SC		0.901	lb ai/a	SPRING	73ab
	Bronc (AMS)	38L		1%	v/v	SPRING	
10	BAS 100102H	1.72SC		1.048	lb ai/a	SPRING	68ab
	Bronc (AMS)	38L		1%	v/v	SPRING	
11	BAS 100102H	1.72SC		1.316	lb ai/a	SPRING	87a
	Bronc (AMS)	38L		1%	v/v	SPRING	
12	BAS 100102H	1.72SC		1.541	lb ai/a	SPRING	85ab
	Bronc (AMS)	38L		1%	v/v	SPRING	
13	Rely 280	2.34L		1.285	lb ai/a	SPRING	83ab
	Bronc (AMS)	38L		1%	v/v	SPRING	
14	Cheetah	2.34SL		1.276	lb ai/a	SPRING	38cd
	Bronc (AMS)	38L		1%	v/v	SPRING	
LSD P=.05							29.4
Standard Deviation							17.5
CV							30.01

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in High-Density Apple - HTRC - 2022

Project Code: 128-22-9 Location: Holt, MI
Block: 148

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Apple Variety: Blondee, Idared, Mutsu, Honeycrisp, Cortland
Planting Method: Transplant Planting Date: 2013
Harvest Date: NA
Plant Spacing: 6 ft Row Spacing: 20 ft
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.3 ft wide x 75 ft long

Soil Type: Marlette Fine Sandy Loam OM: 2.5% pH: 6.4
Sand: 48.1% Silt: 26.7% Clay: 25.2% CEC: 8.4

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
Spring	5/11/22	10:30-11:40 AM	84/65 F	Dry	NE 2-4 mph	45%	75%	N
Summer	7/14/22	9:00-10:30 AM	74/69 F	Dry	NE 0-3 mph	43%	10%	Y

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/11/22	Apple	7-8′	Flower	Good
5/11/22	HOWE = Horseweed	2-3″	Vegetative	Many
5/11/22	ANBG = Annual Bluegrass	2-4″,3-6″ dia	Vegetative	Many
5/11/22	COCW = Common Chickweed	2-4″	Flower	Many
7/14/22	Apple	7-8′	Small Fruit	Good
7/14/22	HOWE	6-8″	Vegetative	Moderate
7/14/22	CATH = Canada Thistle	6-8″	Vegetative	Moderate

Additional Weeds Observed Throughout Season

Grass = grass spp.
PEST = Perennial Sowthistle
DAND = Dandelion
COGR = Common Groundsel
MECW = Mouseear chickweed
PUDN = Purple Deadnettle
WHCL = White Clover
COLQ = Common Lambsquarter
RECL = Red Clover
Total WC = Overall control of broadleaves, sedges, and grasses
Total BL = Overall control of broadleaf spp.
Grasses = Overall control of grass spp.

Notes and Comments
1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer for treatments 2-4.
2. Spray applied with 4 nozzle vision guided sprayer attached to an ATV for treatments 5-7. TeeJet TP 40-02, 18.13 gpa, 40.61 PSI, 4.4 mph, CO2 vision guided sprayer. Each nozzle covers 25 cm area.
3. During spring application, 2 nozzle boom kept clogging during treatments 2-4, resulting in more or less mixture being used for each treatment.

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in High-Density Apple - HTRC - 2022

Trial ID:128-22-9

Protocol ID:128-22-9 Location:Holt, MI (Block 148) Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Treatment 2 to 5 applied using Backback Sprayer

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Timing
1	Non-Treated						
2	Alion	1.67	LBA/GAL	SC	0.065	lb ai/a	SPRING
	Gramoxone 2SL	2	LBA/GAL	SL	1	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Embed Extra	3.8	LBA/GAL	L	1.4	lb ai/a	SUMMER
	Rely 280	2.34	LBA/GAL	L	0.88	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	% v/v	SUMMER
	Prowl H20	3.8	LBA/GAL	CS	3.8	lb ai/a	FALL
	Sandea	75	%AW/W	WG	0.047	lb ai/a	FALL
	Aim	2	LBA/GAL	EC	0.031	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL
3	Chateau SW	51	%AW/W	WDG	0.383	lb ai/a	SPRING
	Prowl H20	3.8	LBA/GAL	CS	3.8	lb ai/a	SPRING
	Gramoxone 2SL	2	LBA/GAL	SL	1	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Stinger	3	LBA/GAL	L	0.125	lb ai/a	SUMMER
	Rely 280	2.34	LBA/GAL	L	0.88	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	% v/v	SUMMER
	Matrix	25	%AW/W	SG	0.063	lb ai/a	FALL
	Aim	2	LBA/GAL	EC	0.031	lb ai/a	FALL
	GoalTender	4	LBA/GAL	SC	1.5	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL
4	Gramoxone 2SL	2	LBA/GAL	SL	1	lb ai/a	SPRING
	GoalTender	4	LBA/GAL	SC	1.5	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Embed Extra	3.8	LBA/GAL	L	1.4	lb ai/a	SUMMER
	Stinger	3	LBA/GAL	L	0.125	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	lb ai/a	SUMMER
	Matrix	25	%AW/W	SG	0.063	lb ai/a	FALL
	Rely 280	2.34	LBA/GAL	L	0.88	lb ai/a	FALL
	Alion	1.67	LBA/GAL	SC	0.065	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL
5	Zeus	4	LBA/GAL	F	0.375	lb ai/a	SPRING
	Aim	2	LBA/GAL	EC	0.031	lb ai/a	SPRING
	Sandea	75	%AW/W	WG	0.047	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Matrix	25	%AW/W	SG	0.063	lb ai/a	SUMMER
	Treevix	70	%AW/W	WG	0.044	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	% v/v	SUMMER
	Sinbar	80	%AW/W	WP	0.8	lb ai/a	FALL
	Karmex	80	%AW/W	DF	3	lb ai/a	FALL
	Embed Extra	3.8	LBA/GAL	L	1.4	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL

Treatment 6 to 9 applied using Vision Guided Sprayer

6	Alion	1.67	LBA/GAL	SC	0.065	lb ai/a	SPRING
	Gramoxone 2SL	2	LBA/GAL	SL	1	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Embed Extra	3.8	LBA/GAL	L	1.4	lb ai/a	SUMMER
	Rely 280	2.34	LBA/GAL	L	0.88	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	% v/v	SUMMER
	Prowl H20	3.8	LBA/GAL	CS	3.8	lb ai/a	FALL
	Sandea	75	%AW/W	WG	0.047	lb ai/a	FALL
	Aim	2	LBA/GAL	EC	0.031	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL
7	Chateau SW	51	%AW/W	WDG	0.383	lb ai/a	SPRING
	Prowl H20	3.8	LBA/GAL	CS	3.8	lb ai/a	SPRING
	Gramoxone 2SL	2	LBA/GAL	SL	1	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Stinger	3	LBA/GAL	L	0.125	lb ai/a	SUMMER
	Rely 280	2.34	LBA/GAL	L	0.88	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	% v/v	SUMMER
	Matrix	25	%AW/W	SG	0.063	lb ai/a	FALL
	Aim	2	LBA/GAL	EC	0.031	lb ai/a	FALL
	GoalTender	4	LBA/GAL	SC	1.5	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL
8	Gramoxone 2SL	2	LBA/GAL	SL	1	lb ai/a	SPRING
	GoalTender	4	LBA/GAL	SC	1.5	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Embed Extra	3.8	LBA/GAL	L	1.4	lb ai/a	SUMMER
	Stinger	3	LBA/GAL	L	0.125	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	lb ai/a	SUMMER
	Matrix	25	%AW/W	SG	0.063	lb ai/a	FALL
	Rely 280	2.34	LBA/GAL	L	0.88	lb ai/a	FALL
	Alion	1.67	LBA/GAL	SC	0.065	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL
9	Zeus	4	LBA/GAL	F	0.375	lb ai/a	SPRING
	Aim	2	LBA/GAL	EC	0.031	lb ai/a	SPRING
	Sandea	75	%AW/W	WG	0.047	lb ai/a	SPRING
	NIS	100	%	SL	0.25	% v/v	SPRING
	Matrix	25	%AW/W	SG	0.063	lb ai/a	SUMMER
	Treevix	70	%AW/W	WG	0.044	lb ai/a	SUMMER
	NIS	100	%	SL	0.25	% v/v	SUMMER
	Sinbar	80	%AW/W	WP	0.8	lb ai/a	FALL
	Karmex	80	%AW/W	DF	3	lb ai/a	FALL
	Embed Extra	3.8	LBA/GAL	L	1.4	lb ai/a	FALL
	NIS	100	%	SL	0.25	% v/v	FALL

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in High-Density Apple - HTRC - 2022

Pest Code		GRASS	HOWE	PEST	DAND	COGR	PUDN	MECW
Crop Name	APPLE							
Crop Variety								
Rating Date	18May2022	18May2022	18May2022	18May2022	18May2022	18May2022	18May2022	18May2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Number of Decimals	0	0	0	0	0	0	0	0
Trt No.								
1	0a	0d	0b	0c	0c	0c	0c	0c
2	0a	83a	97a	100a	100a	100a	100a	97a
3	0a	75a	100a	98a	100a	100a	100a	100a
4	0a	80a	100a	100a	98b	100a	100a	93a
5	0a	23c	100a	97a	100a	100a	95b	37b
6	0a	95a	100a	100a	100a	100a	100a	100a
7	0a	88a	97a	100a	100a	98b	97ab	100a
8	0a	92a	100a	100a	100a	100a	100a	98a
9	0a	50b	33b	33b	100a	100a	100a	55b
LSD P=.05	.	22.6	33.9	33.2	1.7	1.7	4.4	20.7
Standard Deviation	0.0	13.0	19.6	19.2	1.0	1.0	2.5	12.0
CV	0.0	20.0	24.23	23.71	1.08	1.08	2.89	15.85

Pest Code		GRASS	HOWE	PEST	DAND	COGR	PUDN	MECW
Crop Name	APPLE							
Crop Variety								
Rating Date	25May2022	25May2022	25May2022	25May2022	25May2022	25May2022	25May2022	25May2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0a	0c	0c	0b	0b	0b	0b	0c
2	0a	95a	100a	100a	100a	100a	100a	97ab
3	0a	92a	100a	100a	100a	100a	100a	100a
4	0a	92a	100a	100a	100a	100a	100a	100a
5	0a	62b	100a	100a	100a	100a	100a	93b
6	0a	95a	98ab	100a	100a	100a	100a	98ab
7	0a	93a	97b	100a	100a	100a	100a	100a
8	0a	95a	100a	100a	100a	100a	100a	100a
9	0a	85a	98ab	100a	100a	100a	100a	98ab
LSD P=.05	.	23.1	2.8	.	.	.	.	5.1
Standard Deviation	0.0	13.3	1.6	0.0	0.0	0.0	0.0	2.9
CV	0.0	16.95	1.85	0.0	0.0	0.0	0.0	3.35

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in High-Density Apple - HTRC - 2022

Pest Code	WHCL		GRASS	HOWE	PEST	MECW	WHCL	DAND
Crop Name		APPLE						
Crop Variety								
Rating Date	25May2022	06Jun2022	06Jun2022	06Jun2022	06Jun2022	06Jun2022	06Jun2022	06Jun2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0c	0a	0c	0c	0b	0c	0b	0b
2	98ab	0a	92a	95ab	100a	100a	93a	100a
3	95b	2a	87a	82b	100a	100a	95a	97a
4	100a	0a	85a	93ab	97a	100a	100a	100a
5	100a	0a	58b	88ab	100a	93b	95a	97a
6	100a	0a	97a	100a	100a	100a	100a	100a
7	98ab	0a	93a	88ab	100a	100a	100a	100a
8	100a	0a	95a	97a	98a	100a	98a	100a
9	100a	0a	82a	97a	100a	100a	95a	100a
LSD P=.05	3.6	1.7	21.2	14.9	3.8	1.7	7.7	4.9
Standard Deviation	2.1	1.0	12.3	8.6	2.2	1.0	4.4	2.8
CV	2.38	519.62	16.03	10.43	2.5	1.09	5.14	3.18

Pest Code		HOWE	CATH	COLQ	GRASS		HOWE	PEST
Crop Name	APPLE					APPLE		
Crop Variety								
Rating Date	27Jun2022	27Jun2022	27Jun2022	27Jun2022	27Jun2022	21Jul2022	21Jul2022	21Jul2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG	CG	CG	CG
Trt No.								
1	0a	0b	0c	0c	0c	0d	0d	0a
2	0a	88a	92a	100a	80ab	5bc	100a	-
3	0a	67a	100a	100a	67ab	2cd	100a	100a
4	0a	95a	97a	100a	70ab	0d	53c	-
5	0a	63a	90a	100a	50b	0d	70bc	-
6	0a	93a	100a	97b	93a	12a	100a	-
7	0a	97a	57b	100a	93a	8ab	90ab	75a
8	0a	88a	95a	100a	93a	0d	60c	-
9	0a	93a	97a	100a	73ab	0d		45a
LSD P=.05	.	39.2	33.1	3.3	31.6	4.2	23.4	571.8
Standard Deviation	0.0	22.6	19.1	1.9	18.3	2.4	12.4	55.1
CV	0.0	29.73	23.69	2.17	26.53	81.19	17.33	100.21

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in High-Density Apple - HTRC - 2022

Pest Code	GRASS		HOWE	GRASS	TOTAL WC
Crop Name		APPLE			
Crop Variety					
Rating Date	21Jul2022	28Jul2022	28Jul2022	28Jul2022	28Jul2022
Rating Type	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	CG
Trt No.					
1	0c	0d	0c	0d	0d
2	93a	15ab	100a	97a	97a
3	93a	5cd	97a	97a	97a
4	73b	0d	50b	52c	68c
5	68b	0d	90a	77ab	78bc
6	92a	18a	100a	97a	97a
7	97a	8bc	78ab	93ab	88ab
8	89a	0d	83ab	90ab	88ab
9	72b	0d	100a	72bc	77bc
LSD P=.05	12.7	7.5	35.1	22.7	13.9
Standard Deviation	7.2	4.3	19.3	13.1	8.0
CV	9.61	83.25	24.85	17.55	10.45

Pest Code		HOWE	GRASS	TOTAL WC	
Crop Name	APPLE				APPLE
Crop Variety					
Rating Date	08Aug2022	08Aug2022	08Aug2022	08Aug2022	02Sep2022
Rating Type	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	CG	CG	CG	CG	MHM
Trt No.					
1	0b	0c	0c	0d	0a
2	7ab	100a	95a	92ab	0a
3	3ab	95ab	90a	88ab	0a
4	0b	70b	55b	60c	0a
5	0b	70b	87a	77bc	3a
6	10a	100a	100a	100a	0a
7	8a	85ab	93a	90ab	0a
8	0b	75ab	83a	87ab	2a
9	0b	90ab	88a	83ab	0a
LSD P=.05	7.4	27.4	22.2	20.9	3.5
Standard Deviation	4.3	13.0	12.8	12.1	2.0
CV	135.84	17.13	16.67	16.09	367.42

Evaluation of Herbicide Programs with Broadcast and Vision-Guided Sprayer for Weed Control in High-Density Apple - HTRC - 2022

Pest Code		HOWE	COLQ	RECL	GRASSES	TOTAL BL
Crop Name	APPLE SUCKERS					
Crop Variety						
Rating Date	02Sep2022	02Sep2022	02Sep2022	02Sep2022	02Sep2022	02Sep2022
Rating Type	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By	MHM	MHM	MHM	MHM	MHM	MHM
Trt No.						
1	0e	0e	0c	0b	0d	0d
2	72c	100a	100a	100a	93ab	92ab
3	80bc	98ab	100a	100a	88ab	98a
4	22d	97ab	92b	100a	65c	87bc
5	23d	88abc	100a	93a	80bc	80c
6	90ab	87a-d	100a	97a	100a	93ab
7	95a	76cd	100a	100a	95ab	83bc
8	27d	85bcd	97ab	100a	87ab	85bc
9	29d	73d	100a	100a	90ab	80c
LSD P=.05	13.8	13.5	5.5	7.1	17.1	11.4
Standard Deviation	8.0	7.8	3.2	4.1	9.9	6.6
CV	16.47	10.0	3.6	4.65	12.75	8.51

Pest Code			
Crop Name	TOTAL WEEDS	REMAINING MIXTURE AFTER APPLICATION	REMAINING MIXTURE AFTER APPLICATION
Crop Variety			
Rating Date	25Oct2022	11May2022	14Jul2022
Rating Type	WEED DENSIT		
Rating Unit/Min/Max	% weed cover, 0, 100	mLl	mLl
Assessed By	MHM	NS	HT
Trt No.			
1	93a	.	.
2	15cd	1360	1240
3	23bcd	1680	1330
4	38bc	1660	1350
5	45b	1420	1390
6	7d	1390	1650
7	17cd	510	1080
8	20bcd	830	1590
9	17cd	1230	970
LSD P=.05	25.2	Total spray volume was 3785 ml.	
Standard Deviation	14.6	.	.
CV	47.67	.	.

Performance of Quinclorac on Stone Fruit - IR4 - TNRC - 2022

Project Code: 128-22-2 Location: Fennville, MI
Block: Tart Cherry 6

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Cherry Variety: Montmorency
Planting Method: Saplings Planting Date: 2012
Harvest Date: 7/1/22 & 7/5/22
Plant Spacing: 16′ Row Spacing: 20′
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 11 ft wide x 45 ft long (3 trees per plot)

Soil Type: Capac-Marlette Loams OM: 2.3% pH: 6.6
Sand: 78% Silt: 11.4% Clay: 10.6% CEC: 5.4

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	5/19/22	1:55-2:35 PM	71/63 F	Damp	SW 2-5 mph	60%	87%	N
PO2	6/3/22	11:27-12 PM	74/69 F	Dry	SW 1-1.4 mph	47%	0%	N
FALL	10/10/22	10:30-11:30 AM	62/43 F	Moist	S 2-3 mph	61%	0%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
5/19/22	Cherry	7-8′	Petal Fall/Green Fruit	Good
5/19/22	DAND = Dandelion	3-6″	Vegetative-Seeding	Moderate
5/19/22	PUDN = Purple Deadnettle	2-3″	Flower	Moderate
5/19/22	WHCL = White Clover	2-4″	Vegetative	Moderate-Few
5/19/22	HABC = Hairy Bittercress	5-7″	Seeding	Moderate
5/19/22	HAVE = Hairy Vetch	3-6″	Vegetative	Moderate
6/3/22	Cherry	7-8″	Green Fruit	Good
6/3/22	YENS = Yellow Nutsedge	3-6″	Vegetative	Many
6/3/22	CRWS = Creeping Woodsorrel	2-3″	Flower	Moderate
6/3/22	RESO = Red Sorrel	3-4″	Vegetative	Moderate-Few
6/3/22	DAND	4-8″	Flower & Seeding	Few
6/3/22	HAVE	6-10″	Vegetative	Many-Moderate
10/11/22	Sumac Spp.	2-3′	Leaf senescence	Moderate
10/11/22	YENS	8-12″	Dying	Many
10/11/22	COPW = Common Pokeweed	2-3′	Leaf senescence	Moderate
10/11/22	VICR = Virginia Creeper	2-3″	Leaf senescence	Moderate
10/11/22	CRWS	2-3″	Flowering	Moderate
10/11/22	RESO	1-2″	Vegetative	Few
10/11/22	VIPW = Virginia Pepperweed	12-16″	Seeding	Moderate

Additional Weeds Observed Throughout Season

COCW = Common Chickweed
WLDGRP = Wild Grape
SFGE = Small Flower Geranium
SUMAC = Sumac SPP
COMW = Common Milkweed
TOTAL BL = Overall control of broadleaf spp

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 0-100; 0 = no injury, 100 = complete kill.
3. Preemergence herbicide application of simazine + Solicam applied approximately one week before PO1 application. Weeds showed signs of herbicide damage from this application.
4. On 5/19/22 before PO1 application, sumac shoots under Cherry canopy in spray path were cut at ground level.
5. On 6/3/22, Trt 2,3,4,5 were applied at double rate.
6. Total two tresses (first two) were harvested per plot.

Michigan State University

Performance of Quinclorac on Stone Fruit - IR4 - TNRC - 2022

Trial ID:128-22-2 | Location:Fennville, MI | Trial Year:2022

Protocol ID:128-22-2 | Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Nicole Soldan

Pest Code							HABC	HAVE	CRWS	COCW
Crop Name						CHERRY				
Rating Date						25May2022	25May2022	25May2022	25May2022	25May2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free					PO1,PO2,FALL	0a	47a	40a	70a	89a
	Aim		2EC	0.031	lb ai/a	PO1,PO2,FALL				
	COC		100SL	1.25	% v/v	PO1,PO2,FALL				
2	QuinStar 4L		3.8L	0.375	lb ai/a	PO1,PO2	0a	43a	55a	73a	97a
	COC		100SL	1.25	% v/v	PO1,PO2				
3	QuinStar 4L		3.8L	0.75	lb ai/a	PO1,PO2	0a	38a	35a	58a	81a
	COC		100SL	1.25	% v/v	PO1,PO2				
4	QuinStar 4L		3.8L	0.375	lb ai/a	PO1,PO2,FALL	0a	38	45a	43a	80a
	COC		100SL	1.25	% v/v	PO1,PO2,FALL				
5	QuinStar 4L		3.8L	0.75	lb ai/a	PO1,PO2,FALL	0a	57a	83a	100a	99a
	COC		100SL	1.25	% v/v	PO1,PO2,FALL				
6	Loyant		0.21L	0.018	lb ai/a	PO1,PO2,FALL	0a	42a	57a	77a	93a
7	Loyant		0.21L	0.018	lb ai/a	PO1,PO2	0a	50a	67a	88a	100a
	Loyant		0.21L	0.035	lb ai/a	FALL				
8	Loyant		0.21L	0.018	lb ai/a	PO1,PO2,FALL	0a	40a	67a	93a	99a
	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							.	22.1	31.9	36.5	12.9
Standard Deviation							0.0	12.4	18.2	20.9	12.0
CV							0.0	27.46	32.55	27.67	15.73

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Excluded replicate 3 in column 11
Could not calculate LSD (% mean diff) for columns 1,7,11,14,18 because error mean square = 0.
^Calculated from residual.

Performance of Quinclorac on Stone Fruit - IR4 - TNRC - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	WLDGRP	CHERRY	HAVE	CRWS
Pest Code							WLDGRP		HAVE	CRWS
Crop Name								CHERRY		
Rating Date							25May2022	03Jun2022	03Jun2022	03Jun2022
Rating Type							RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	NS	NS	NS
1	Untreated-Weed Free					PO1,PO2,FALL	100a	0a	57c	80a
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL				
	COC	100SL		1.25	% v/v	PO1,PO2,FALL				
2	QuinStar 4L	3.8L		0.375	lb ai/a	PO1,PO2	100a	0a	82bc	70a
	COC	100SL		1.25	% v/v	PO1,PO2				
3	QuinStar 4L	3.8L		0.75	lb ai/a	PO1,PO2	67	0a	93ab	73a
	COC	100SL		1.25	% v/v	PO1,PO2				
4	QuinStar 4L	3.8L		0.375	lb ai/a	PO1,PO2,FALL	80a	0a	80bc	77a
	COC	100SL		1.25	% v/v	PO1,PO2,FALL				
5	QuinStar 4L	3.8L		0.75	lb ai/a	PO1,PO2,FALL	95a	0a	98ab	80a
	COC	100SL		1.25	% v/v	PO1,PO2,FALL				
6	Loyant	0.21L		0.018	lb ai/a	PO1,PO2,FALL	100a	0a	91ab	78a
7	Loyant	0.21L		0.018	lb ai/a	PO1,PO2	93a	0a	81bc	87a
	Loyant	0.21L		0.035	lb ai/a	FALL				
8	Loyant	0.21L		0.018	lb ai/a	PO1,PO2,FALL	83a	0a	100a	75a
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							15.0	.	15.6	36.8
Standard Deviation							8.4	0.0	13.3	21.0
CV							9.05	0.0	18.9	27.09

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	DAND	SFGE	CHERRY	COMW
Pest Code							DAND	SFGE		COMW
Crop Name									CHERRY	
Rating Date							03Jun2022	03Jun2022	16Jun2022	16Jun2022
Rating Type							RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							NS	NS	CG	CG
1	Untreated-Weed Free					PO1,PO2,FALL	100a	77a	0a	65a
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL				
	COC	100SL		1.25	% v/v	PO1,PO2,FALL				
2	QuinStar 4L	3.8L		0.375	lb ai/a	PO1,PO2	75a	87a	0a	87a
	COC	100SL		1.25	% v/v	PO1,PO2				
3	QuinStar 4L	3.8L		0.75	lb ai/a	PO1,PO2	70a	75a	0a	100a
	COC	100SL		1.25	% v/v	PO1,PO2				
4	QuinStar 4L	3.8L		0.375	lb ai/a	PO1,PO2,FALL	93a	100a	0a	100a
	COC	100SL		1.25	% v/v	PO1,PO2,FALL				
5	QuinStar 4L	3.8L		0.75	lb ai/a	PO1,PO2,FALL	83a	100a	0a	100a
	COC	100SL		1.25	% v/v	PO1,PO2,FALL				
6	Loyant	0.21L		0.018	lb ai/a	PO1,PO2,FALL	78a	100a	0a	93a
7	Loyant	0.21L		0.018	lb ai/a	PO1,PO2	95a	100a	0a	98a
	Loyant	0.21L		0.035	lb ai/a	FALL				
8	Loyant	0.21L		0.018	lb ai/a	PO1,PO2,FALL	82a	100a	0a	98a
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							29.7	38.3	.	35.7
Standard Deviation							16.9	21.8	0.0	20.4
CV							20.02	23.67	0.0	21.97

Performance of Quinclorac on Stone Fruit - IR4 - TNRC - 2022

Pest Code								TOTAL BL	SUMAC
Crop Name							CHERRY		
Rating Date							01Jul2022	01Jul2022	01Jul2022
Rating Type							RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weed Free					PO1,PO2,FALL	0a	67c	60 a
	Aim		2EC	0.031	lb ai/a	PO1,PO2,FALL			
	COC		100SL	1.25	% v/v	PO1,PO2,FALL			
2	QuinStar 4L		3.8L	0.375	lb ai/a	PO1,PO2	0a	87ab	87a
	COC		100SL	1.25	% v/v	PO1,PO2			
3	QuinStar 4L		3.8L	0.75	lb ai/a	PO1,PO2	0a	78bc	80a
	COC		100SL	1.25	% v/v	PO1,PO2			
4	QuinStar 4L		3.8L	0.375	lb ai/a	PO1,PO2,FALL	0a	78bc	85a
	COC		100SL	1.25	% v/v	PO1,PO2,FALL			
5	QuinStar 4L		3.8L	0.75	lb ai/a	PO1,PO2,FALL	0a	80abc	88a
	COC		100SL	1.25	% v/v	PO1,PO2,FALL			
6	Loyant		0.21L	0.018	lb ai/a	PO1,PO2,FALL	0a	68c	72a
7	Loyant		0.21L	0.018	lb ai/a	PO1,PO2	0a	93a	92a
	Loyant		0.21L	0.035	lb ai/a	FALL			
8	Loyant		0.21L	0.018	lb ai/a	PO1,PO2,FALL	0a	87ab	97a
	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL			
LSD P=.05							.	14.9	26.8
Standard Deviation							0.0	8.5	15.1
CV							0.0	10.64	17.56

Pest Code								CHERRY	CHERRY
Crop Name								16Jun2022	01Jul2022
Rating Date								CIRCUMFERE	HARVEST
Rating Type								IN/TREE	KG/2TREE
Rating Unit/Min/Max								CG	
Assessed By									
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weed Free					PO1,PO2,FALL		12.63bc	20.07a
	Aim		2EC	0.031	lb ai/a	PO1,PO2,FALL			
	COC		100SL	1.25	% v/v	PO1,PO2,FALL			
2	QuinStar 4L		3.8L	0.375	lb ai/a	PO1,PO2		11.40cd	13.10a
	COC		100SL	1.25	% v/v	PO1,PO2			
3	QuinStar 4L		3.8L	0.75	lb ai/a	PO1,PO2		12.37bc	19.10a
	COC		100SL	1.25	% v/v	PO1,PO2			
4	QuinStar 4L		3.8L	0.375	lb ai/a	PO1,PO2,FALL		10.17d	8.43a
	COC		100SL	1.25	% v/v	PO1,PO2,FALL			
5	QuinStar 4L		3.8L	0.75	lb ai/a	PO1,PO2,FALL		13.03abc	24.64a
	COC		100SL	1.25	% v/v	PO1,PO2,FALL			
6	Loyant		0.21L	0.018	lb ai/a	PO1,PO2,FALL		14.77a	
7	Loyant		0.21L	0.018	lb ai/a	PO1,PO2		13.17abc	
	Loyant		0.21L	0.035	lb ai/a	FALL			
8	Loyant		0.21L	0.018	lb ai/a	PO1,PO2,FALL		14.13ab	
	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL			
LSD P=.05								1.942	11.421
Standard Deviation								1.109	6.066
CV								8.73	35.54

Identify the Optimum Application Rate and Timing of Florpyraxifen for Crop Tolerance and Weed Control in Cherries - CRC - 2022

Project Code: 128-22-3 Location: Clarksville, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Cherry, Tart Variety: Montmorency on Maheleb Rootstock
Planting Method: Planting Date: 2018
Harvest Date: NA
Plant Spacing: 18 ft Row Spacing: 20 ft
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.4 ft wide x 72 ft long

Soil Type: Dryden Sandy Loam OM: 2% pH: 6.5
Sand: 45.6% Silt: 33.9% Clay: 20.5% CEC: 6

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	6/7/22	1:45-2:50 PM	71/71 F	Damp	NW 2-4 mph	45%	35%	N
PO2	7/27/22	9:30-11:00 AM	69/60 F	Dry	S 1-3 mph	81%	35%	N
FALL	10/11/22	1:00-2:00 PM	73/54 F	Dry	S 6-9 mph	36%	2%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/7/22	Cherry	6-7′	Fruit Set	Good
6/7/22	HOWE = Horseweed	3-6″	Vegetative	Moderate
7/27/22	Cherry	6-7′	Fruit	Good
7/27/22	HOWE	6-9″	Vegetative	Moderate
7/27/22	COLQ = Common Lambsquarters	3-7″	Vegetative	Moderate
10/11/22	Cherry	6-7′	Lead Senescence	Good
10/11/22	COLQ	10-24″	Seeding	Many
10/11/22	HOWE	<1″ & 4-5 dia	Vegetative	Many

Additional Weeds Observed Throughout Season

YENS = Yellow Nutsedge
Total WC = Overall Control of broadleaves, sedges, and grass spp.
Toal BL = Overall control of broadleaf spp.
Grasses = Overall control of grass spp.

Notes and Comments

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Each plot had three trees per plot except the last plot in each row had 3 trees per plot (plots 105, 201, 206, 302, 307).
4. Maintenance application of glyphosate (1.5 qt/ac) + Surflan (3 qt/ac) + GoalTender (1.5 qt/ac) applied on 4/12/2022.
5. After fall application, HOWE control was reported as % reduction in germination and % injury as leaf curling followed by yellowing and then plant death.
6. No crop injury reported from any rate of florpyrauxifen when applied alone or in combination with 2,4-D. The tree growth measured as stem circumference was also not impacted by any herbicide application. Florpyrauxifen alone or tank mix with 2,4-D provided more than 90% control of horseweed and >85% control of common lambsquarters. Fall application provided significant amount of HOWE and COLQ control. Florpyrauxifen from 0.018 to 0.035 lb ai/ac has potential to be used in cherry production system for broadleaf weed control.

Michigan State University

Identify the Optimum Application Rate and Timing of Florpyraxifen for Crop Tolerance and Weed Control in Cherries - CRC - 2022

Trial ID:128-22-3

Protocol ID:128-22-3 Location:Clarksville, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code							HOWE		
Crop Name						CHERRY		CHERRY	CHERRY
Rating Date						15Jun2022	15Jun2022	15Jun2022	20Jun2022
Rating Type						RATING	RATING	CIRCUMFEREN	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	CM/TREE	%, 0, 100
Assessed By						CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weed Free						0a	3b	18.94a	0a
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL				
	COC	100SL		1	% v/v	PO1,PO2,FALL				
2	Embed	3.8L		0.95	lb ai/a	PO1,PO2	0a	93a	17.57a	0a
3	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	95a	18.10a	0a
	MSO	100SL		0.312	% v/v	PO1,PO2				
4	Rinskor	0.21L		0.035	lb ai/a	PO1,PO2	0a	95a	19.01a	0a
	MSO	100SL		0.312	% v/v	PO1,PO2				
5	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	95a	17.39a	0a
	Embed	3.8L		0.95	lb ai/a	PO1,PO2				
6	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL	0a	97a	18.49a	0a
7	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	93a	17.99a	0a
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
8	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	95a	18.06a	0a
	Rinskor	0.21L		0.035	lb ai/a	FALL				
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
9	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	95a	16.62a	2a
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							.	4.2	2.219	1.7
Standard Deviation							0.0	2.4	1.282	1.0
CV							0.0	2.85	7.11	519.62

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Due to missing data, larger LSD values (col. 14: >=. and <=0.0) are used for mean comparisons of treatment pairs with missing data.
Missing data estimates are included in columns:Yates=13,15,18
Could not calculate LSD (% mean diff) for columns 1,6,8,12,14,17 because error mean square = 0.
^Calculated from residual.

Identify the Optimum Application Rate and Timing of Florpyraxifen for Crop Tolerance and Weed Control in Cherries - CRC - 2022

Pest Code						HOWE		HOWE		TOTAL WC
Crop Name							CHERRY		CHERRY	
Rating Date						20Jun2022	05Jul2022	05Jul2022	14Jul2022	14Jul2022
Rating Type						RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	CG	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free						0d	0a	0c	0a	0c
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL					
	COC	100SL		1%	v/v	PO1,PO2,FALL					
2	Embed	3.8L		0.95	lb ai/a	PO1,PO2	88c	0a	87b	0a	88b
3	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	93ab	0a	100a	0a	95ab
	MSO	100SL		0.312	% v/v	PO1,PO2					
4	Rinskor	0.21L		0.035	lb ai/a	PO1,PO2	95a	0a	100a	0a	90ab
	MSO	100SL		0.312	% v/v	PO1,PO2					
5	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	95a	0a	100a	0a	93ab
	Embed	3.8L		0.95	lb ai/a	PO1,PO2					
6	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL	95a	0a	97a	0a	90ab
7	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	92b	0a	97a	0a	89ab
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL					
8	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	95a	0a	100a	0a	96a
	Rinskor	0.21L		0.035	lb ai/a	FALL					
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL					
9	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	95a	0a	100a	0a	93ab
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL					
LSD P=.05							2.6	.	5.8	.	7.9
Standard Deviation							1.5	0.0	3.3	0.0	4.6
CV							1.83	0.0	3.85	0.0	5.61

Pest Code						HOWE			HOWE
Crop Name							CHERRY	CHERRY	
Rating Date						14Jul2022	27Jul2022	10Aug2022	10Aug2022
Rating Type						RATING	CIRCUMFEREN	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	CM/TREE	%, 0, 100	%, 0, 100
Assessed By						SC	MHM	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weed Free						0c	16.17a	0a	0d
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL				
	COC	100SL		1%	v/v	PO1,PO2,FALL				
2	Embed	3.8L		0.95	lb ai/a	PO1,PO2	88b	17.57a	0a	82c
3	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	93ab	17.12a	0a	100a
	MSO	100SL		0.312	% v/v	PO1,PO2				
4	Rinskor	0.21L		0.035	lb ai/a	PO1,PO2	96a	19.38a	0a	100a
	MSO	100SL		0.312	% v/v	PO1,PO2				
5	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	92ab	18.63a	0a	100a
	Embed	3.8L		0.95	lb ai/a	PO1,PO2				
6	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL	92ab	19.60a	0a	90b
7	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	95a	18.50a	0a	100a
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
8	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	96a	16.72a	0a	100a
	Rinskor	0.21L		0.035	lb ai/a	FALL				
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
9	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	98a	16.88a	0a	100a
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							6.1	3.125	.	4.8
Standard Deviation							3.5	1.805	0.0	2.7
CV							4.2	10.12	0.0	3.17

Identify the Optimum Application Rate and Timing of Florpyraxifen for Crop Tolerance and Weed Control in Cherries - CRC - 2022

Pest Code						GRASSES	TOTAL BL	
Crop Name								CHERRY
Rating Date						10Aug2022	10Aug2022	24Aug2022
Rating Type						RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						CG	CG	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weed Free						0b	0c	0a
	Aim		2EC	0.031	lb ai/a	PO1,PO2,FALL			
	COC		100SL	1%	v/v	PO1,PO2,FALL			
2	Embed		3.8L	0.95	lb ai/a	PO1,PO2	95a	85ab	0a
3	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	92a	90ab	0a
	MSO		100SL	0.312	% v/v	PO1,PO2			
4	Rinskor		0.21L	0.035	lb ai/a	PO1,PO2	100a	87ab	0a
	MSO		100SL	0.312	% v/v	PO1,PO2			
5	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	90a	93a	0a
	Embed		3.8L	0.95	lb ai/a	PO1,PO2			
6	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL	88a	78b	0a
7	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2,FALL	93a	77b	0a
	MSO		100SL	0.312	% v/v	PO1,PO2,FALL			
8	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	97a	85ab	0a
	Rinskor		0.21L	0.035	lb ai/a	FALL			
	MSO		100SL	0.312	% v/v	PO1,PO2,FALL			
9	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2,FALL	90a	97a	0a
	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL			
LSD P=.05							17.5	14.9	.
Standard Deviation							10.0	8.6	0.0
CV							12.13	11.18	0.0

Pest Code							HOWE	COLQ	TOTAL BL
Crop Name						CHERRY SUCKERS			
Rating Date						24Aug2022	24Aug2022	24Aug2022	24Aug2022
Rating Type						RATING	RATING	RATING	RATING
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By						MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weed Free						0e	0c	0d	0d
	Aim		2EC	0.031	lb ai/a	PO1,PO2,FALL			
	COC		100SL	1%	v/v	PO1,PO2,FALL			
2	Embed		3.8L	0.95	lb ai/a	PO1,PO2	15cde	87b	85c	83c
3	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	37bc	100a	85c	83c
	MSO		100SL	0.312	% v/v	PO1,PO2			
4	Rinskor		0.21L	0.035	lb ai/a	PO1,PO2	37bc	100a	95ab	88bc
	MSO		100SL	0.312	% v/v	PO1,PO2			
5	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	65a	100a	92abc	92ab
	Embed		3.8L	0.95	lb ai/a	PO1,PO2			
6	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL	32bcd	95ab	85c	87bc
7	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2,FALL	11de	100a	88bc	83c
	MSO		100SL	0.312	% v/v	PO1,PO2,FALL			
8	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	33bcd	100a	88bc	87bc
	Rinskor		0.21L	0.035	lb ai/a	FALL			
	MSO		100SL	0.312	% v/v	PO1,PO2,FALL			
9	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2,FALL	53ab	100a	98a	97a
	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL			
LSD P=.05							22.7	8.4	7.6	7.2
Standard Deviation							13.0	4.8	4.4	4.2
CV							41.49	5.58	5.52	5.36

Identify the Optimum Application Rate and Timing of Florpyraxifen for Crop Tolerance and Weed Control in Cherries - CRC - 2022

Pest Code							COLQ <8"	COLQ >8"	HOWE	HOWE
Crop Name										
Rating Date							03Nov2022	03Nov2022	REDUCD	03Nov2022
Rating Type							RATING	RATING	GERMINATION	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Untreated-Weed Free						0c	0c	0c	0c
	Aim		2EC	0.031	lb ai/a	PO1,PO2,FALL				
	COC		100SL	1	% v/v	PO1,PO2,FALL				
2	Embed		3.8L	0.95	lb ai/a	PO1,PO2	0c	0c	7c	0c
3	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	0c	0c	55b	0c
	MSO		100SL	0.312	% v/v	PO1,PO2				
4	Rinskor		0.21L	0.035	lb ai/a	PO1,PO2	0c	0c	87a	0c
	MSO		100SL	0.312	% v/v	PO1,PO2				
5	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	0c	0c	65b	0c
	Embed		3.8L	0.95	lb ai/a	PO1,PO2				
6	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL	67b	13b	50b	47b
7	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2,FALL	77a	23a	94a	85a
	MSO		100SL	0.312	% v/v	PO1,PO2,FALL				
8	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2	79a	17b	100a	100 a
	Rinskor		0.21L	0.035	lb ai/a	FALL				
	MSO		100SL	0.312	% v/v	PO1,PO2,FALL				
9	Rinskor		0.21L	0.018	lb ai/a	PO1,PO2,FALL	80a	23a	100a	100 a
	Embed		3.8L	0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							4.4	5.4	18.6	11.2
Standard Deviation							2.5	3.1	10.7	6.3
CV							7.52	37.37	17.31	33.57

Identify the Optimum Florpyrauxifen Application Rate and Timing for Crop Tolerance and Weed Control in Cherries - NW Research Station - Hart - 2022

Project Code: 128-22-3 Location: Hart MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Cherry, Tart Variety: Montmorency
Planting Method: Transplanted Planting Date: April 2012
Harvest Date: NA
Plant Spacing: 16′; 3 trees/plot Row Spacing: 10′
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.4 ft wide x 80 ft long

Soil Type: Remus Fine Sandy Loam OM: 1.5% pH: 5.2
Sand: 75% Silt: 15.4% Clay: 9.6% CEC: 3.7

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
PO1	6/1/22	2:35-3:25 PM	77/74 F	Dry	N 6 mph	56%	90%	N
PO2	8/5/22	2:00-3:00 PM	94/75 F	Dry	E 0-1 mph	38%	75%	N
FALL	10/20/22	11:30-12:30 PM	50/40 F	Wet	W 0-3 mph	46%	98%	Y (Recent Rain)

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/1/22	Cherry	8-12′	Fruit Set	Good
6/1/22	HOWE = Horseweed	5-8″	Vegetative	Few
6/1/22	COMW = Common Milkweed	5-8″	Vegetative	Few
8/5/22	Cherry	8-12′	Post Fruit	Good
8/5/22	HOWE	6-36″	Reproductive	Moderate
8/5/22	COMW	Up to 4′	Reproductive	Many
10/20/22	Cherry	8-12′	Leaf Senescence	Good
10/20/22	RESO = Red Sorrel	1″	Vegetative	Moderate
10/20/22	HOWE	<1″, 1-2″ diameter	Vegetative	Many
10/20/22	HOWE	3-4′	Seeding	Moderate
10/20/22	GORO = Goldenrod	2-3′	Seeding	Moderate
10/20/22	MECW = Mouseear Chickweed	<1″, 1″ diameter	Vegetative	Moderate
10/20/22	DAND = Dandelion	<1″, 3-4″ diameter	Vegetative	Moderate

Additional Weeds Observed Throughout Season

Grasses = Overall control of grass spp.
Total BL = Overall control of broadleaf spp.

Notes and Comments

1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3.Spring maintenance herbicide application of 1.5 qts/A of glyphosate, 3 qts/A Surflan, and 1.5 qt/ac Goaltender applied on April 8, 2022.
4. Overall, no crop injury was reported from either Florpyrauxifen or 2,4-D when applied alone or together as a tank mix. Florpyrauxifen alone or tank mixed with 2,4-D provided good control of horseweed and other broadleaf weeds. The control of milkweed was not consistent with florpyrauxifen. Florpyrauxifen from 0.018 to 0.035 lb ai/ac has potential to be used in cherry production system for broadleaf weed control.

Michigan State University

Identify the Optimum Florpyrauxifen Application Rate and Timing for Crop Tolerance and Weed Control in Cherries - NW Research Station - Hart - 2022

Trial ID:128-22-10 Location:Hart, MI Trial Year:2022

Protocol ID:128-22-10 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
Pest Code								HOWE	COMW	
Crop Name							CHERRY			CHERRY
Rating Date							14Jun2022	14Jun2022	14Jun2022	14Jun2022
Rating Type							RATING	RATING	RATING	CIRCUMFEREN
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	CM/TREE
Assessed By							CG	CG	CG	CG
1	Untreated-Weed Free						0a	0b	0b	32.74ef
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL				
	COC	100SL		1%	v/v	PO1,PO2,FALL				
2	Embed	3.8L		0.95	lb ai/a	PO1,PO2	0a	95a	90a	30.90f
3	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	97a	90a	43.46a-d
	MSO	100SL		0.312	% v/v	PO1,PO2				
4	Rinskor	0.21L		0.035	lb ai/a	PO1,PO2	0a	98a	90a	46.43ab
	MSO	100SL		0.312	% v/v	PO1,PO2				
5	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	95a	82a	36.69def
	Embed	3.8L		0.95	lb ai/a	PO1,PO2				
6	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL	0a	97a	90a	47.84a
7	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	93a	90a	38.24c-f
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
8	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	98a	95a	45.86abc
	Rinskor	0.21L		0.035	lb ai/a	FALL				
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
9	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	100a	78a	39.23b-e
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							.	7.3	23.0	8.146
Standard Deviation							0.0	4.2	11.9	4.706
CV							0.0	4.88	15.24	11.72

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=13; Average=3,10,11
Could not calculate LSD (% mean diff) for columns 1,5,9 because error mean square = 0.
^Calculated from residual.

Identify the Optimum Florpyrauxifen Application Rate and Timing for Crop Tolerance and Weed Control in Cherries - NW Research Station - Hart - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
Pest Code								HOWE	COMW	
Crop Name							CHERRY			CHERRY
Rating Date							30Jun2022	30Jun2022	30Jun2022	05Aug2022
Rating Type							RATING	RATING	RATING	CIRCUMFEREN
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	CM/TREE
Assessed By							CG	CG	CG	HT
1	Untreated-Weed Free						0a	87a	90a	35.48c
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL				
	COC	100SL		1%	v/v	PO1,PO2,FALL				
2	Embed	3.8L		0.95	lb ai/a	PO1,PO2	0a	95a	78a	33.92c
3	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	95a	92a	48.26ab
	MSO	100SL		0.312	% v/v	PO1,PO2				
4	Rinskor	0.21L		0.035	lb ai/a	PO1,PO2	0a	97a	85a	49.39ab
	MSO	100SL		0.312	% v/v	PO1,PO2				
5	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	95a	63a	41.71bc
	Embed	3.8L		0.95	lb ai/a	PO1,PO2				
6	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL	0a	97a	97a	51.05a
7	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	87a	93a	40.92bc
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
8	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	97a	92a	48.60ab
	Rinskor	0.21L		0.035	lb ai/a	FALL				
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
9	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	100a	75a	37.06c
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							.	15.9	34.2	8.740
Standard Deviation							0.0	9.2	19.7	5.049
CV							0.0	9.76	23.22	11.76

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
Pest Code								HOWE	COMW	TOTAL BL
Crop Name							CHERRY			
Rating Date							15Aug2022	15Aug2022	15Aug2022	15Aug2022
Rating Type							RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG
1	Untreated-Weed Free						0a	0c	0c	0d
	Aim	2EC		0.031	lb ai/a	PO1,PO2,FALL				
	COC	100SL		1%	v/v	PO1,PO2,FALL				
2	Embed	3.8L		0.95	lb ai/a	PO1,PO2	0a	80ab	22bc	55c
3	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	90a	80a	87a
	MSO	100SL		0.312	% v/v	PO1,PO2				
4	Rinskor	0.21L		0.035	lb ai/a	PO1,PO2	0a	-	40b	82a
	MSO	100SL		0.312	% v/v	PO1,PO2				
5	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	85ab	27bc	57bc
	Embed	3.8L		0.95	lb ai/a	PO1,PO2				
6	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL	0a	63b	80a	83a
7	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	78ab	25bc	78ab
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
8	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2	0a	85ab	50ab	87a
	Rinskor	0.21L		0.035	lb ai/a	FALL				
	MSO	100SL		0.312	% v/v	PO1,PO2,FALL				
9	Rinskor	0.21L		0.018	lb ai/a	PO1,PO2,FALL	0a	100a	38bc	77abc
	Embed	3.8L		0.95	lb ai/a	PO1,PO2,FALL				
LSD P=.05							.	23.8	37.6	22.6
Standard Deviation							0.0	10.5	19.5	13.0
CV							0.0	14.5	48.61	19.28

Evaluation of DCC-3825 Efficacy in Stone Fruit - Cherry - CRC - 2022

Project Code: 128-22-8 Location: Clarksville, MI

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Cherry, Tart Variety: Montmorency on Maheleb Rootstock
Planting Method: Saplings Planting Date: 2018
Harvest Date: NA
Plant Spacing: 18 ft Row Spacing: 20 ft
Tillage Type: NA Study Design: RCB Replications: 3
Plot Size: 5.4 ft wide x 72 ft long

Soil Type: Dryden Sandy Loam OM: 2% pH: 6.5
Sand: 45.6% Silt: 33.9% Clay: 20.5% CEC: 6

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
POST	6/7/22	2:50-3:45 PM	71/71 F	Damp	NW 2-4 mph	45%	35%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
6/7/22	Cherry	6-7′	Fruit Set	Good
6/7/22	HOWE = Horseweed	3-6″	Vegetative	Moderate

Additional Weeds Observed Throughout Season

CUDO = Curly Dock
Total WC = Overall control of broadleaves, sedges, and grass spp.

Notes and Comments
1. Spray applied with 2 nozzle boom. FF11002, 20 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Spring herbicide maintenance application of glyphosate (1.5 qt/ac) + Surflan (3 qt/ac) + GoalTender (1.5 qt/ac) applied on 4/8/22.
4. Each plot had four trees per plot except the last plot in each row had 3 trees per plot.
5. No curly-dock weed was present in the plots where treatment tiafenacil + SL-573 was applied.
6. At initial rating (7 DAA), ≤ 20% injury was reported from tiafenacil when applied alone or in combination with Rely. This injury was reported as necrotic leaves wherever spray solution drifted on tree leaves. However, this injury was transit and no injury was reported at further ratings. At 7 DAA (day after application), all the treatments provided ≥90% control of horseweed. Horseweed started recovering quickly from Aim and Rely injury as compared to tiafenacil applied alone or in combination with Rely and SL-573. At 35 DAA, highest level of control of horseweed and other broadleaves weeds were provided with tank mix of tiafenacil + Rely and tiafenacil + SL-573.

Michigan State University

Evaluation of DCC-3825 Efficacy in Stone Fruit - Cherry - CRC - 2022

Trial ID:128-22-8

Protocol ID:128-22-8 Location:Clarksville, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code								HOWE		HOWE		HOWE	
Crop Name							CHERRY		CHERRY		CHERRY		CHERRY
Rating Date							15Jun2022	15Jun2022	20Jun2022	20Jun2022	05Jul2022	05Jul2022	14Jul2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG	CG	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing							
1	Untreated						0c	0c	0a	27c	0a	0c	0a
2	DCC-3825	70WDG		0.022	lb ai/a	POST	18ab	100a	0a	98a	0a	82a	0a
	MSO	100SL		1%	v/v	POST							
3	DCC-3825	70WDG		0.044	lb ai/a	POST	7bc	100a	0a	97a	0a	83a	0a
	MSO	100SL		1%	v/v	POST							
4	DCC-3825	70WDG		0.022	lb ai/a	POST	10abc	98a	0a	97a	0a	78a	0a
	SL-573	3.33SC		0.027	lb ai/a	POST							
	MSO	100SL		1%	v/v	POST							
5	DCC-3825	70WDG		0.066	lb ai/a	POST	7bc	98a	2a	95a	0a	80a	0a
	MSO	100SL		1%	v/v	POST							
6	DCC-3825	70WDG		0.022	lb ai/a	POST	20a	100a	0a	95a	0a	83a	0a
	Rely 280	2.34L		0.401	lb ai/a	POST							
	MSO	100SL		1%	v/v	POST							
7	Rely 280	2.34L		0.401	lb ai/a	POST	5c	90b	0a	70ab	0a	20b	0a
	MSO	100SL		1%	v/v	POST							
8	Aim	2EC		0.031	lb ai/a	POST	2c	92b	0a	55bc	0a	15b	0a
	NIS	100SL		0.25%	v/v	POST							
LSD P=.05							13.2	3.2	1.8	36.8	.	12.5	.
Standard Deviation							7.5	1.9	1.0	21.0	0.0	7.1	0.0
CV							87.92	2.18	489.9	26.53	0.0	12.88	0.0

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Average=10
Could not calculate LSD (% mean diff) for columns 5,7 because error mean square = 0.
^Calculated from residual.

Evaluation of DCC-3825 Efficacy in Stone Fruit - Cherry - CRC - 2022

Pest Code							TOTAL WC	HOWE	CUDO
Crop Name									
Rating Date							14Jul2022	14Jul2022	14Jul2022
Rating Type							RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							SC	SC	SC
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated						0c	0c	0d
2	DCC-3825	70WDG		0.022	lb ai/a	POST	58ab	55ab	69ab
	MSO	100SL		1%	v/v	POST			
3	DCC-3825	70WDG		0.044	lb ai/a	POST	60ab	57ab	50abc
	MSO	100SL		1%	v/v	POST			
4	DCC-3825	70WDG		0.022	lb ai/a	POST	67ab	66a	-
	SL-573	3.33SC		0.027	lb ai/a	POST			
	MSO	100SL		1%	v/v	POST			
5	DCC-3825	70WDG		0.066	lb ai/a	POST	48b	44b	60ab
	MSO	100SL		1%	v/v	POST			
6	DCC-3825	70WDG		0.022	lb ai/a	POST	70a	67a	75a
	Rely 280	2.34L		0.401	lb ai/a	POST			
	MSO	100SL		1%	v/v	POST			
7	Rely 280	2.34L		0.401	lb ai/a	POST	7c	10c	33bcd
	MSO	100SL		1%	v/v	POST			
8	Aim	2EC		0.031	lb ai/a	POST	7c	0c	13cd
	NIS	100SL		0.25%	v/v	POST			
LSD P=.05							19.8	20.6	36.8
Standard Deviation							11.3	11.8	18.4
CV							28.6	31.57	42.95

Weed Control Efficacy and Crop Tolerance of BAS 100102H in Cherry - HTRC - 2022

Project Code: 128-22-7 Location: Holt, MI
Block: 157

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Cherry, Tart Variety: Montmorency
Planting Date: 2007
Plant Spacing: 16′ Row Spacing: 20′
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 11 ft wide x 50 ft long (3 trees/plot)

Soil Type: Mixture of Capac Loam & Marlette Fine Sandy Loam OM: 3.8% pH: 6.1
Sand: 44.9% Silt: 28% Clay: 27.1% CEC: 10.1

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
Spring	4/21/22	1:00-2:00 PM	64/49 F	Wet	SW 4-6mph	53%	5%	N
Fall	9/29/22	1:15-2:30 PM	66/63 F	Moist	S 1-2 mph	47%	10%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
4/21/22	Cherry	10′	Bud Break	Good
4/21/22	WICA = Wild Carrot	2-4″ dia	Vegetative	Moderate
4/21/22	DAND = Dandelion	4-7″ dia	Vegetative	Moderate
4/21/22	PUDN = Purple Deadnettle	2-4″ dia	Veg-Flower	Many
4/21/22	Arabadopsis	3-4″	Flower	Moderate
4/21/22	HOWE = Horseweed	2-4″	Vegetative	Moderate
4/21/22	MECW = Mouseear Chickweed	4-7″ dia	Vegetative	Moderate
9/29/22	Cherry	10′	All Leaf Fall	Good
9/29/22	COMW = Common Milkweed	12-24″	Fruit, flowering, & dead	Few
9/29/22	HENB = Henbit	1-2″	Vegetative	Good
9/29/22	DAND = Dandelion	1-2″	Vegetative	Few
9/29/22	CWBS = Catchweed Bedstraw	1-2″	Vegetative	Good
9/29/22	Grass	1-2″	Vegetative	Moderate
9/29/22	VICR = Virginia Creeper		Almost Dead	Few
9/29/22	WLDGRP = Wild Grape		Almost Dead	Few

Additional Weeds Observed Throughout Season

POIV = Poison Ivy
PEST = Perennial Sowthistle
CATH = Canada Thistle
Grasses = Overall control of grass spp.
Total BL = Overall control of broadleaf spp.

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 0-100; 0 = no injury, 100 = complete kill.
3. On July 28, 2022, a tank mix of Roundup Ultra 4L at 3 qt/ac plus Stinger 3L at 0.67 pt/ac (0.25 lb ai/ac) was applied throughout the study area.
4. No crop injury from spring application and provided good broadleaf and grass weed control.

Michigan State University

Weed Control Efficacy and Crop Tolerance of BAS 100102H in Cherry - HTRC - 2022

Trial ID:128-22-7 Location:Holt, MI Trial Year:2022
Protocol ID:128-22-7 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
Pest Code								DAND	PUDN	MECR	HOWE
Crop Name							CHERRY				
Rating Date							06May2022	06May2022	06May2022	06May2022	06May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG,MHM	CG,MHM	CG,MHM	CG,MHM	CG,MHM
1	Non-Treated Weedy						0a	0b	0c	0b	0b
2	Treevix	70WG		0.044	lb ai/a	SPRING	0a	96a	93ab	99a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		0.901	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
3	Treevix	70WG		0.044	lb ai/a	SPRING	0a	90a	86b	99a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.048	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
4	Treevix	70WG		0.044	lb ai/a	SPRING	0a	90a	88b	99a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.316	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
5	Treevix	70WG		0.044	lb ai/a	SPRING	0a	93a	91ab	100a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.541	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
6	GoalTender	4SC		2	lb ai/a	SPRING	0a	93a	96a	98a	98a
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	Chateau SW	51WDG		0.383	lb ai/a	FALL					
	Rely 280	2.34L		1.03	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
LSD P=.05							.	10.2	7.2	4.1	3.1
Standard Deviation							0.0	6.7	4.8	2.7	2.0
CV							0.0	8.77	6.34	3.31	2.46

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 1,8,10,14,18 because error mean square = 0.
^Calculated from residual.

Weed Control Efficacy and Crop Tolerance of BAS 100102H in Cherry - HTRC - 2022

Pest Code							MECW	GRASS		PUDN	CWBS
Crop Name									CHERRY		
Rating Date							06May2022	06May2022	19May2022	19May2022	19May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG,MHM	CG,MHM	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weedy						0b	0b	0a	0b	0b
2	Treevix	70WG		0.044	lb ai/a	SPRING	79a	90a	0a	94a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		0.901	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
3	Treevix	70WG		0.044	lb ai/a	SPRING	80a	90a	0a	99a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.048	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
4	Treevix	70WG		0.044	lb ai/a	SPRING	80a	90a	0a	100a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.316	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
5	Treevix	70WG		0.044	lb ai/a	SPRING	84a	90a	0a	96a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.541	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
6	GoalTender	4SC		2	lb ai/a	SPRING	85a	91a	0a	99a	100a
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	Chateau SW	51WDG		0.383	lb ai/a	FALL					
	Rely 280	2.34L		1.03	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
LSD P=.05							9.7	1.5	.	8.1	.
Standard Deviation							6.4	1.0	0.0	5.4	0.0
CV							9.44	1.36	0.0	6.65	0.0

Weed Control Efficacy and Crop Tolerance of BAS 100102H in Cherry - HTRC - 2022

Pest Code							WLDGRP	PEST	HOWE	MECR	DAND
Crop Name											
Rating Date							19May2022	19May2022	19May2022	19May2022	19May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weedy						0b	0b	0b	0b	0b
2	Treevix	70WG		0.044	lb ai/a	SPRING	63a	89a	100a	100a	98a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		0.901	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
3	Treevix	70WG		0.044	lb ai/a	SPRING	70a	91a	99a	100a	91a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.048	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
4	Treevix	70WG		0.044	lb ai/a	SPRING	53a	71a	100a	100a	86a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.316	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
5	Treevix	70WG		0.044	lb ai/a	SPRING	70a	86a	100a	100a	96a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.541	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
6	GoalTender	4SC		2	lb ai/a	SPRING	96a	90a	100a	100a	95a
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	Chateau SW	51WDG		0.383	lb ai/a	FALL					
	Rely 280	2.34L		1.03	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
LSD P=.05							45.3	22.8	1.5	.	13.3
Standard Deviation							30.0	15.1	1.0	0.0	8.8
CV							51.32	21.2	1.23	0.0	11.36

Weed Control Efficacy and Crop Tolerance of BAS 100102H in Cherry - HTRC - 2022

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	POIV	GRASS		HOWE	PEST
Pest Code							POIV	GRASS		HOWE	PEST
Crop Name									CHERRY		
Rating Date							19May2022	19May2022	22Jun2022	22Jun2022	22Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
1	Non-Treated Weedy						0b	0b	0a	0c	0b
2	Treevix	70WG		0.044	lb ai/a	SPRING	88a	89a	0a	100a	64a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		0.901	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
3	Treevix	70WG		0.044	lb ai/a	SPRING	95a	90a	0a	99ab	89a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.048	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
4	Treevix	70WG		0.044	lb ai/a	SPRING	75a	98a	0a	99ab	66a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.316	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
5	Treevix	70WG		0.044	lb ai/a	SPRING	100a	96a	0a	99ab	85a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.541	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
6	GoalTender	4SC		2	lb ai/a	SPRING	98a	94a	0a	96b	83a
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	Chateau SW	51WDG		0.383	lb ai/a	FALL					
	Rely 280	2.34L		1.03	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
LSD P=.05							32.1	10.1	.	3.3	32.5
Standard Deviation							21.3	6.7	0.0	2.2	21.6
CV							28.08	8.65	0.0	2.65	33.48

Weed Control Efficacy and Crop Tolerance of BAS 100102H in Cherry - HTRC - 2022

Pest Code							COMW	WLDGRP	GRASS	CATH	WICA
Crop Name											
Rating Date							22Jun2022	22Jun2022	22Jun2022	22Jun2022	22Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	CG	CG	CG	CG
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weedy						0c	0c	0c	0c	0b
2	Treevix	70WG		0.044	lb ai/a	SPRING	45bc	25bc	88a	80ab	89a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		0.901	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
3	Treevix	70WG		0.044	lb ai/a	SPRING	64ab	68ab	86a	59ab	89a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.048	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
4	Treevix	70WG		0.044	lb ai/a	SPRING	65ab	38bc	80ab	95a	89a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.316	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
5	Treevix	70WG		0.044	lb ai/a	SPRING	96a	60ab	54b	66ab	84a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.541	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
6	GoalTender	4SC		2	lb ai/a	SPRING	70ab	91a	84a	50b	86a
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	Chateau SW	51WDG		0.383	lb ai/a	FALL					
	Rely 280	2.34L		1.03	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
LSD P=.05							47.9	53.4	26.9	44.3	8.5
Standard Deviation							31.8	35.4	17.8	29.4	5.6
CV							56.06	75.56	27.32	50.43	7.73

Weed Control Efficacy and Crop Tolerance of BAS 100102H in Cherry - HTRC - 2022

Pest Code							POIV	HENB	CWBS	GRASSES	TOTAL BL
Crop Name											
Rating Date							22Jun2022	25Oct2022	25Oct2022	25Oct2022	25Oct2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							CG	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Non-Treated Weedy						0b	0b	0c	0b	0c
2	Treevix	70WG		0.044	lb ai/a	SPRING	75a	96a	98ab	100a	94b
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		0.901	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
3	Treevix	70WG		0.044	lb ai/a	SPRING	90a	96a	95b	99a	95ab
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.048	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
4	Treevix	70WG		0.044	lb ai/a	SPRING	50ab	99a	100a	96a	99ab
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.316	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
5	Treevix	70WG		0.044	lb ai/a	SPRING	98a	100a	100a	99a	100a
	Prowl H20	3.8CS		3.8	lb ai/a	SPRING					
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	BAS 100102H	1.72SC		1.541	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
6	GoalTender	4SC		2	lb ai/a	SPRING	75a	100a	100a	100a	100a
	Roundup PowerMax II	5.5L		1.69	lb ai/a	SPRING					
	MSO	100SL		1%	v/v	SPRING					
	N Pak (AMS)	100L		1%	v/v	SPRING					
	Chateau SW	51WDG		0.383	lb ai/a	FALL					
	Rely 280	2.34L		1.03	lb ai/a	FALL					
	Bronc (AMS)	38L		1%	v/v	FALL					
LSD P=.05							55.3	5.9	3.6	3.8	5.7
Standard Deviation							36.7	3.9	2.4	2.5	3.8
CV							56.8	4.76	2.94	3.05	4.68

Pome (Pear) Fruit Tolerance to High Rates of DCC-3825 - TNRC - 2022

Project Code: 128-22-4 Location: Fennville, MI
Block: Pear 3

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Pear Variety: Bartlett
Planting Method: Transplanted Planting Date: 1985
Harvest Date: NA
Plant Spacing: 18 ft Row Spacing: 20 ft
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 11 ft wide x 40 ft long

Soil Type: Metamora Sandy Loam OM: 3.4% pH: 6.5
Sand: 45% Silt: 28% Clay: 27% CEC: 8.9

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
POST	4/27/22	10:45-11:30 AM	39/41 F	Wet	W 5-7 mph	57%	20%	N
POST	4/29/22	1:20-1:30 PM	61/50 F	Damp	SE 3-6 mph	28%	35%	N
Trt 7 Only								

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
4/27/22	Pear	7-8′	Leaf bud break	Good
4/27/22	DAND = Dandelion	1-4″	Veg & Flower	Many
4/27/22	WLDSTBE = Wild Strawberry		Vegetative	Many
4/27/22	WICA = Wild Carrot	2-3″	Vegetative	Moderate
4/27/22	WHCA = White Campion	1-2″	Vegetative	Few
4/27/22	CATH = Canada Thistle	1-2″	Vegetative	Moderate
4/29/22	Same as 4/27/22			

Additional Weeds Observed Throughout Season

WHCL = White Clover
Total BL = Overall control of broadleaf spp.

Notes and Comments
1. Spray applied with 4 nozzle boom, FF80015, 15 gpa, 30 psi, 3.2 mph, CO2 backpack sprayer.
2. Crop and weed injury ratings on scale of 0-100; 0 = no injury, 100 = complete kill.
3. Spring application of SimTrol 4L 2qts/a and Solicam 3lb/a applied in all the plots on May 10, 2022.
4. No crop injury reported to pear trees from any tiafenacil treatments. Overall, broadleaf control improved with the tank mix of tiafenacil and SL-573 as compared to SL-573 only.

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Pome (Pear) Fruit Tolerance to High Rates of DCC-3825 - TNRC - 2022

Trial ID:128-22-4

Protocol ID:128-22-4 Location:Fennville, MI Trial Year:2022

Study Director:Monique Hemker Mose

Investigator (Creator):Dr. Sushila Chaudhari

Pest Code								DAND	WLDSTBE	WHCA	CATH
Crop Name							PEAR				
Rating Date							05May2022	05May2022	05May2022	05May2022	05May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						0a	0d	0b	0b	0c
2	DCC-3825	70WDG		0.033	lb ai/a	POST	1a	76b	90a	100a	100a
	MSO	100SL		1%	v/v	POST					
3	DCC-3825	70WDG		0.066	lb ai/a	POST	1a	89a	80a	100a	70ab
	MSO	100SL		1%	v/v	POST					
4	DCC-3825	70WDG		0.131	lb ai/a	POST	0a	88ab	75a	84a	86ab
	MSO	100SL		1%	v/v	POST					
5	Treevix	70WG		0.044	lb ai/a	POST	3a	85ab	78a	85a	65ab
	MSO	100SL		1%	v/v	POST					
6	SL-573	3.33SC		0.036	lb ai/a	POST	0a	16c	66a	75a	50b
	MSO	100SL		1%	v/v	POST					
7	DCC-3825	70WDG		0.033	lb ai/a	POST	24a	84ab	91a	83a	78ab
	SL-573	3.33SC		0.036	lb ai/a	POST					
	MSO	100SL		1%	v/v	POST					
8	Loyant	0.21L		0.018	lb ai/a	POST	3a	76b	71a	61a	74ab
	Embed	3.8L		0.95	lb ai/a	POST					
LSD P=.05							25.3	11.5	33.6	48.3	39.8
Standard Deviation							17.2	7.8	22.9	32.9	27.1
CV							441.12	12.15	33.18	44.74	41.48

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 8,14,20 because error mean square = 0.
^Calculated from residual.

Pome (Pear) Fruit Tolerance to High Rates of DCC-3825 - TNRC - 2022

Pest Code							WHCL	TOTAL BL		DAND	WLDSTBE
Crop Name									PEAR		
Rating Date							05May2022	05May2022	12May2022	12May2022	12May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						0c	0d	0a	0d	0c
2	DCC-3825	70WDG		0.033	lb ai/a	POST	81a	80ab	0a	51bc	96a
	MSO	100SL		1%	v/v	POST					
3	DCC-3825	70WDG		0.066	lb ai/a	POST	80a	80ab	0a	65ab	69ab
	MSO	100SL		1%	v/v	POST					
4	DCC-3825	70WDG		0.131	lb ai/a	POST	66ab	83a	0a	83a	93a
	MSO	100SL		1%	v/v	POST					
5	Treevix	70WG		0.044	lb ai/a	POST	64ab	80ab	0a	43bc	49b
	MSO	100SL		1%	v/v	POST					
6	SL-573	3.33SC		0.036	lb ai/a	POST	36b	33c	0a	36c	85a
	MSO	100SL		1%	v/v	POST					
7	DCC-3825	70WDG		0.033	lb ai/a	POST	83a	88a	0a	83a	80ab
	SL-573	3.33SC		0.036	lb ai/a	POST					
	MSO	100SL		1%	v/v	POST					
8	Loyant	0.21L		0.018	lb ai/a	POST	70a	71b	0a	81a	64ab
	Embed	3.8L		0.95	lb ai/a	POST					
LSD P=.05							31.9	10.5	.	27.3	36.0
Standard Deviation							21.7	7.1	0.0	18.6	24.5
CV							36.15	11.13	0.0	33.7	36.66

Pest Code							WHCL	CATH	TOTAL BL		DAND
Crop Name										PEAR	
Rating Date							12May2022	12May2022	12May2022	25May2022	25May2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Number of Decimals							0	0	0	0	0
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						0d	0c	0d	0a	0c
2	DCC-3825	70WDG		0.033	lb ai/a	POST	94a	95a	64b	0a	21bc
	MSO	100SL		1%	v/v	POST					
3	DCC-3825	70WDG		0.066	lb ai/a	POST	91ab	86ab	68ab	0a	33b
	MSO	100SL		1%	v/v	POST					
4	DCC-3825	70WDG		0.131	lb ai/a	POST	98a	89ab	84a	0a	33b
	MSO	100SL		1%	v/v	POST					
5	Treevix	70WG		0.044	lb ai/a	POST	84ab	78ab	64b	0a	25bc
	MSO	100SL		1%	v/v	POST					
6	SL-573	3.33SC		0.036	lb ai/a	POST	55c	65b	38c	0a	29bc
	MSO	100SL		1%	v/v	POST					
7	DCC-3825	70WDG		0.033	lb ai/a	POST	89ab	91a	84a	0a	50b
	SL-573	3.33SC		0.036	lb ai/a	POST					
	MSO	100SL		1%	v/v	POST					
8	Loyant	0.21L		0.018	lb ai/a	POST	71bc	80ab	71ab	0a	85a
	Embed	3.8L		0.95	lb ai/a	POST					
LSD P=.05							20.0	24.7	17.5	.	31.8
Standard Deviation							13.6	16.8	11.9	0.0	21.6
CV							18.72	23.02	20.22	0.0	62.94

Pome (Pear) Fruit Tolerance to High Rates of DCC-3825 - TNRC - 2022

Pest Code							WHCL	CATH	WLDSTBE	TOTAL BL	
Crop Name											PEAR
Rating Date							25May2022	25May2022	25May2022	25May2022	03Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing					
1	Untreated-Weedy						0c	0b	0b	0c	0a
2	DCC-3825	70WDG		0.033	lb ai/a	POST	90a	64a	93a	48b	0a
	MSO	100SL		1%	v/v	POST					
3	DCC-3825	70WDG		0.066	lb ai/a	POST	88ab	60a	90a	50b	0a
	MSO	100SL		1%	v/v	POST					
4	DCC-3825	70WDG		0.131	lb ai/a	POST	86ab	65a	85a	55ab	0a
	MSO	100SL		1%	v/v	POST					
5	Treevix	70WG		0.044	lb ai/a	POST	76b	74a	83a	60ab	0a
	MSO	100SL		1%	v/v	POST					
6	SL-573	3.33SC		0.036	lb ai/a	POST	84ab	63a	91a	46b	0a
	MSO	100SL		1%	v/v	POST					
7	DCC-3825	70WDG		0.033	lb ai/a	POST	85ab	55a	80a	65ab	0a
	SL-573	3.33SC		0.036	lb ai/a	POST					
	MSO	100SL		1%	v/v	POST					
8	Loyant	0.21L		0.018	lb ai/a	POST	89a	80a	81a	76a	0a
	Embed	3.8L		0.95	lb ai/a	POST					
LSD P=.05							11.4	44.3	16.7	23.5	.
Standard Deviation							7.8	30.1	11.3	16.0	0.0
CV							10.42	52.34	15.05	31.9	0.0

Pest Code							DAND	CATH	TOTAL BL
Crop Name									
Rating Date							03Jun2022	03Jun2022	03Jun2022
Rating Type							RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing			
1	Untreated-Weedy						3b	0a	0c
2	DCC-3825	70WDG		0.033	lb ai/a	POST	13b	54a	15bc
	MSO	100SL		1%	v/v	POST			
3	DCC-3825	70WDG		0.066	lb ai/a	POST	8b	55a	13bc
	MSO	100SL		1%	v/v	POST			
4	DCC-3825	70WDG		0.131	lb ai/a	POST	16b	53a	24b
	MSO	100SL		1%	v/v	POST			
5	Treevix	70WG		0.044	lb ai/a	POST	11b	55a	24b
	MSO	100SL		1%	v/v	POST			
6	SL-573	3.33SC		0.036	lb ai/a	POST	1b	55a	4c
	MSO	100SL		1%	v/v	POST			
7	DCC-3825	70WDG		0.033	lb ai/a	POST	9b	59a	13bc
	SL-573	3.33SC		0.036	lb ai/a	POST			
	MSO	100SL		1%	v/v	POST			
8	Loyant	0.21L		0.018	lb ai/a	POST	91a	78a	81a
	Embed	3.8L		0.95	lb ai/a	POST			
LSD P=.05							17.9	60.1	20.0
Standard Deviation							12.2	40.8	13.6
CV							64.5	80.17	62.97

Fall Weed Control in Strawberry - HTRC - 2021-2022

Project Code: 126-21-22-1 Location: Holt, MI
Block: 122

Personnel: Dr. Sushila Chaudhari, Monique Hemker Mose, Nicole Soldan
Crop: Strawberry Variety: Jewel
Planting Method: Transplant Planting Date: 2021
Harvest Date: 5 harvests between 6/13/22 & 6/27/22
Plant Spacing: 18″ Row Spacing: 7′
Tillage Type: NA Study Design: RCB Replications: 4
Plot Size: 5.3 ft wide x 20 ft long

Soil Type: Marlette Fine Sandy Loam OM: 1.9% pH: 6.0
Sand: 55.1% Silt: 25.7% Clay: 19.2% CEC: 5.2

Herbicide Application Information

Timing	Date	Time	Air/Soil Temp	Soil Surf	Wind	RH	Cloud Cover	Dew
FALL	11/3/21	1:45-1:30 PM	43/42 F	Wet	SW 2-7 mph	51%	70%	N

Crop and Weed Information at Application

Date	Crop or Weed	Height or Diameter	Growth Stage	Density
11/3/21	MECW or COCW	1-5″	Vegetative-Seed set	Many
11/3/21	COLQ = Common Lambsquarters	1-2″	Vegetative	Few
11/3/21	WHGR= Whitlow grass	1-2″	Vegetative	Moderate

Additional Weeds Observed Throughout Season

SHPU = Shepherd's Purse
CORW = Common Ragweed
Grasses = Overall control of grass spp.
Total BL = Overall control of broadleaf spp.

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 0-100; 0 = no injury, 100 = complete kill.
3. After harvest in early July, applied maintenance application of Stinger (10.7 fl oz/ac) + Select Max (16 fl oz/ac) + NIS (0.25%).
4. Fertilizer (200 lb 19-19-19) applied in early July.
5. After renovation around mid-July, applied maintenance application of Ultra Blazer (1.5 pt/ac) + Spartan 6 fl oz/ac.

Michigan State University

Fall Weed Control in Strawberry - HTRC - 2021-2022

Trial ID:126-21-22-1 Location:Holt, MI Trial Year:2022

Protocol ID:126-21-22-1 Investigator (Creator):Dr. Sushila Chaudhari

Study Director:Monique Hemker Mose

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing	STBE	SHPU	COCW	STBE	CORW	GRASSES
Pest Code								SHPU	COCW		CORW	GRASSES
Crop Name							STBE		MECW	STBE		
Rating Date							09May2022	09May2022	09May2022	16Jun2022	16Jun2022	16Jun2022
Rating Type							RATING	RATING	RATING	RATING	RATING	RATING
Rating Unit/Min/Max							%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100	%, 0, 100
Assessed By							MHM	MHM	MHM	MHM	MHM	MHM
1	Non-Treated						0a	0c	0b	0c	0d	0d
	Spartan	4F		0.25	lb ai/a	FALL						
	Stinger	3L		0.25	lb ai/a	FALL						
2	Devrinol DF-XT	50DF		4	lb ai/a	FALL	8a	0c	100a	1bc	100a	75ab
	Stinger	3L		0.25	lb ai/a	FALL						
3	Alion	1.67SC		0.065	lb ai/a	FALL	3a	100a	100a	6bc	100a	100a
4	Alion	1.67SC		0.085	lb ai/a	FALL	3a	100a	98a	4bc	100a	96a
5	Trellis SC	4.16SC		1	lb ai/a	FALL	5a	95a	100a	13abc	93bc	45bc
6	Reflex	2SL		0.375	lb ai/a	FALL	0a	91a	0b	6bc	100a	59bc
7	Loyant	0.21L		0.0175	lb ai/a	FALL	3a	88a	25b	13abc	95ab	56bc
8	Loyant	0.21L		0.035	lb ai/a	FALL	8a	95a	95a	25a	93bc	39c
9	Elevore	0.572SC		0.0022	lb ai/a	FALL	0a	23bc	23b	6bc	98ab	61bc
	MSO	100SL		1	% v/v	FALL						
10	Elevore	0.572SC		0.0044	lb ai/a	FALL	8a	21bc	18b	25a	100a	45bc
	MSO	100SL		1	% v/v	FALL						
11	BASF-1	3.13L		0.022	lb ai/a	FALL	8a	44b	95a	15ab	88c	38c
LSD P=.05							7.9	32.4	29.8	13.8	6.7	30.3
Standard Deviation							5.5	22.4	20.6	9.6	4.6	21.0
CV							142.48	37.59	34.76	92.1	5.29	37.55

Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Missing data estimates are included in columns:Yates=7
^Calculated from residual.

Fall Weed Control in Strawberry - HTRC - 2021-2022

Pest Code						TOTAL BL	MECW			
Crop Name							COCW	STBE	STBE	STBE
Rating Date						16Jun2022	16Jun2022	13Jun2022	16Jun2022	20Jun2022
Rating Type						RATING	RATING	HARVEST	HARVEST	HARVEST
Rating Unit/Min/Max						%, 0, 100	%, 0, 100	KG/PLOT	KG/PLOT	KG/PLOT
Assessed By						MHM	MHM	HT	HT	HT
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing				
1	Non-Treated						0e	0e	2.21a	2.55a	2.37a
	Spartan		4F	0.25	lb ai/a	FALL					
	Stinger		3L	0.25	lb ai/a	FALL					
2	Devrinol DF-XT		50DF	4	lb ai/a	FALL	86ab	94ab	1.89ab	2.50a	2.39a
	Stinger		3L	0.25	lb ai/a	FALL					
3	Alion		1.67SC	0.065	lb ai/a	FALL	93a	100a	1.66abc	2.06a	2.73a
4	Alion		1.67SC	0.085	lb ai/a	FALL	94a	92abc	1.60abc	2.50a	2.81a
5	Trellis SC		4.16SC	1	lb ai/a	FALL	71cd	93abc	1.03bc	2.13a	2.62a
6	Reflex		2SL	0.375	lb ai/a	FALL	85abc	80a-d	0.72c	2.04a	3.42a
7	Loyant		0.21L	0.0175	lb ai/a	FALL	77bcd	73cd	0.94bc	2.04a	2.70a
8	Loyant		0.21L	0.035	lb ai/a	FALL	74bcd	84a-d	0.93bc	1.90a	1.89a
9	Elevore		0.572SC	0.0022	lb ai/a	FALL	78bcd	75bcd	0.69c	2.12a	2.76a
	MSO		100SL	1	% v/v	FALL					
10	Elevore		0.572SC	0.0044	lb ai/a	FALL	65d	66d	0.89c	1.74a	2.28a
	MSO		100SL	1	% v/v	FALL					
11	BASF-1		3.13L	0.022	lb ai/a	FALL	73bcd	66d	1.29abc	2.12a	1.83a
LSD P=.05							14.6	21.1	0.995	0.982	1.257
Standard Deviation							10.1	14.6	0.689	0.680	0.870
CV							13.96	19.58	54.86	31.57	34.44

Pest Code								
Crop Name						STBE	STBE	STBE
Rating Date						23Jun2022	27Jun2022	
Rating Type						HARVEST	HARVEST	HRVT TOTAL
Rating Unit/Min/Max						KG/PLOT	KG/PLOT	KG/PLOT
Assessed By						HT	MJ	
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl Timing		
1	Non-Treated						2.44a	1.12a	10.69a
	Spartan		4F	0.25	lb ai/a	FALL			
	Stinger		3L	0.25	lb ai/a	FALL			
2	Devrinol DF-XT		50DF	4	lb ai/a	FALL	2.84a	1.16a	10.78a
	Stinger		3L	0.25	lb ai/a	FALL			
3	Alion		1.67SC	0.065	lb ai/a	FALL	3.43a	1.87a	11.75a
4	Alion		1.67SC	0.085	lb ai/a	FALL	3.14a	2.00a	12.05a
5	Trellis SC		4.16SC	1	lb ai/a	FALL	2.93a	1.20a	9.91a
6	Reflex		2SL	0.375	lb ai/a	FALL	4.40a	1.80a	12.38a
7	Loyant		0.21L	0.0175	lb ai/a	FALL	3.81a	1.83a	11.32a
8	Loyant		0.21L	0.035	lb ai/a	FALL	2.81a	1.35a	8.87a
9	Elevore		0.572SC	0.0022	lb ai/a	FALL	3.47a	1.44a	10.47a
	MSO		100SL	1	% v/v	FALL			
10	Elevore		0.572SC	0.0044	lb ai/a	FALL	2.78a	0.98a	8.67a
	MSO		100SL	1	% v/v	FALL			
11	BASF-1		3.13L	0.022	lb ai/a	FALL	2.65a	1.19a	9.07a
LSD P=.05							1.523	0.943	3.838
Standard Deviation							1.055	0.653	2.657
CV							33.45	45.09	25.21